JAIDEV EDUCATION SOCIETY'S
J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
SESSION 2021-22
SEMESTER I
Remedial Classes time table (W-21)

Department of First Year(consolidated)				GROUPA, GROUP B	W.e.f. 28/06/2021
Sr. No.	Date	Day	Time Slot	Group	
				A	B
1	28-06-2021	Monday	2:00 to 4:00	Engg. Mathematics I	Engg. Mathematics I
2	29-06-2021	Tuesday	2:00 to 4:00	Engg. Chemistry	Engg. Physics
3	30-06-2021	Wednesday	2:00 to 4:00	Engg. Graphics	Intro. Computer Programing in C
4	01-07-2021	Thursday	2:00 to 4:00	Communication Skills	Energy and Enviormental Engg.
5	02-07-2021	Friday	2:00 to 4:00	Basic civil and mechanical Engg.	Basic Electronics and Electrical Engg.

Mrs. P.M.Parkhi
Time table Incharge,
BSHD

Dr.U.V.Rathod
Acedemic Incharge,
BSHD

Dr.A.N.Gupta
HOD, BSHD

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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KATOL ROAD, NAGPUR
SESSION 2021-22
SEMESTER I
Remedial Classes time table (W-21)

Department of First Year(consolidated)				GROUP A, GROUP B	W.e.f. 28/06/2021
Sr. No.	Date	Day	Time Slot	Group	
				A	B
1	28-06-2021	Monday	2:00 to 4:00	Engg. Mathematics I	Engg. Mathematics I
2	29-06-2021	Tuesday	2:00 to 4:00	Engg. Chemistry	Engg. Physics
3	30-06-2021	Wednesday	2:00 to 4:00	Engg. Graphics	Intro. Computer Programing in C
4	01-07-2021	Thursday	2:00 to 4:00	Communication Skills	Energy and Enviormental Engg.
5	02-07-2021	Friday	2:00 to 4:00	Basic civil and mechanical Engg.	Basic Electronics and Electrical Engg.

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VISION	MISSION
To shape professional Leaders of Global Standards in Civil Engineering.	1. To provide quality Education and Excellent Learning Environment for the overall development of students. 2. Making sustainable efforts for integrating academics with industry.

Date: 15/01/2022

Notice

The Student of 3rd semester are hereby informed that Remedial classes are scheduled to commence from 17-01-22 to 21-01-22. These sessions aim to provide additional support and assistance to enhance your understanding of course materials. Please make sure to attend these classes promptly to make the most out of this opportunity. Your participation is crucial for your academic success.

Remedial Classes Time Table

Year/Sem- II Year/III Sem

Date	Day	Time	Subject
17-01-22	Monday	4.00 pm to 5.00 pm	MORB
18-01-22	Tuesday	4.00 pm to 5.00 pm	M-III
19-01-22	Wednesday	4.00 pm to 5.00 pm	CSEGI
20-01-22	Thursday	4.00 pm to 5.00 pm	BGGTE
21-01-22	Friday	4.00 pm to 5.00 pm	ESE

(J.M. Khandale)

Time Table Incharge   **Academic Incharge**   **HOD, (Civil)**

Principal
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Affiliated to DBATU, RTMNU
Department of Civil Engineering
"Building Better Development"
Session : 2021-22 (Even Sem)

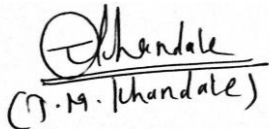| VISION	MISSION
To shape professional Leaders of Global Standards in Civil Engineering.	1. To provide quality Education and Excellent Learning Environment for the overall development of students. 2. Making sustainable efforts for integrating academics with industry.

Date: 14/06/2022

Notice

The Student of 4th semester are hereby informed that Remedial classes are scheduled to commence from 15-06-22 to 18-06-22. These sessions aim to provide additional support and assistance to enhance your understanding of course materials. Please make sure to attend these classes promptly to make the most out of this opportunity. Your participation is crucial for your academic success.

Remedial Classes Time Table

Year/Sem- II Year/IV Sem

Date	Day	Time	Subject
15-06-22	Wednesday	4.00 pm to 5.00 pm	CT&RCC
16-06-22	Thursday	4.00 pm to 5.00 pm	SM
17-06-22	Friday	4.00 pm to 5.00 pm	S&G
18-06-22	Saturday	4.00 pm to 5.00 pm	HWRE

Time Table Incharge

(J. M. Khandale)

Academic Incharge

HOD. (Civil)

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"Building Better Development"
Session : 2021-22 (Odd Sem)

VISION	MISSION
To shape professional Leaders of Global Standards in Civil Engineering.	1. To provide quality Education and Excellent Learning Environment for the overall development of students. 2. Making sustainable efforts for integrating academics with industry.

Date: 26/11/2021

Notice

The Student of 5th semester are hereby informed that Remedial classes are scheduled to commence from 29-11-21 to 04-12-21. These sessions aim to provide additional support and assistance to enhance your understanding of course materials. Please make sure to attend these classes promptly to make the most out of this opportunity. Your participation is crucial for your academic success.

Remedial Classes Time Table

Year/Sem- III Year/V Sem

Date	Day	Time	Subject
29-11-21	Monday	4.00 pm to 5.00 pm	SA
30-11-21	Tuesday	4.00 pm to 5.00 pm	FM
1/12/2021	Wednesday	4.00 pm to 5.00 pm	PPLE
2/12/2021	Thursday	4.00 pm to 5.00 pm	TRE
3/12/2021	Friday	4.00 pm to 5.00 pm	SA
4/12/2021	Saturday	4.00 pm to 5.00 pm	FM

(J. M. Thandale)

Time Table Incharge   **Academic Incharge**   **HOD, (Civil)**

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"Building Better Development"
Session : 2021-22 (Even Sem)

VISION	MISSION
To shape professional Leaders of Global Standards in Civil Engineering.	1. To provide quality Education and Excellent Learning Environment for the overall development of students. 2. Making sustainable efforts for integrating academics with industry.

Date: 30/04/2022

Notice

 The Student of 6th semester are hereby informed that Remedial classes are scheduled to commence from 02-05-22 to 03-05-22. These sessions aim to provide additional support and assistance to enhance your understanding of course materials. Please make sure to attend these classes promptly to make the most out of this opportunity. Your participation is crucial for your academic success.

Remedial Classes Time Table

Year/Sem- III Year/VI Sem

Date	Day	Time	Subject
2/5/2022	Monday	4.00 pm to 5.00 pm	DSS
3/5/2022	Tuesday	4.00 pm to 5.00 pm	DSS

Time Table Incharge   **Academic Incharge**   **HOD, (Civil)**

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Department of Computer Science & Engineering
"A Place to Learn, A Chance to Grow"
Session: 2021-22

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

REMEDIAL CLASSES NOTICE

Date: 14/01/2022

All the students of B. Tech III Semester (Computer Science & Engineering) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the Class test and MSE.

Classes will commence from 17/01/2022 to 31/01/2022 as per the following schedule.

Day/Time	Time	Subject Name
Monday	4.00 Pm to 5.00 Pm	OB
Tuesday	4.00 Pm to 5.00 Pm	DSA
Wednesday	4.00 Pm to 5.00 Pm	M-III
Thursday	4.00 Pm to 5.00 Pm	PPS
Friday	4.00 Pm to 5.00 Pm	OS
Saturday	4.00 Pm to 5.00 Pm	UHR

Prof. A. P. Nanotkar
Timetable In-charge

Prof. Nitin Chaudhary
Dept. Academic Coordinator

Prof. Supriya Sawwashere
Dept. Head CSE

HOD
Computer Science & Engineering
JDCOEM, Nagpur

Principal
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Nagpur-441501

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

REMEDIAL CLASSES NOTICE

Date: 14/01/2022

All the students of B. Tech V Semester (Computer Science & Engineering) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the Class test and MSE.

Classes will commence from 17/01/2022 to 31/01/2022 as per the following schedule.

Day/Time	Time	Subject Name
Monday	4.00 Pm to 5.00 Pm	IOT
Tuesday	4.00 Pm to 5.00 Pm	TCP/IP
Wednesday	4.00 Pm to 5.00 Pm	DAA
Thursday	4.00 Pm to 5.00 Pm	BC
Friday	4.00 Pm to 5.00 Pm	IEED
Saturday	4.00 Pm to 5.00 Pm	DAA

Prof. A. P. Nanotkar
Timetable In-charge

Prof. Nitin Chaudhary
Dept. Academic Coordinator

Prof. Supriya Sawwashere
Dept. Head CSE

HOD
Computer Science & Engineering
JDCOEM, Nagpur

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Session: 2021-22

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

REMEDIAL CLASSES NOTICE

Date: 04/06/2022

All the students of B. Tech IV Semester (Computer Science & Engineering) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the Class test and MSE.

Classes will commence from 07/06/2022 to 21/06/2022 as per the following schedule.

Day/Time	Time	Subject Name
Monday	4.00 Pm to 5.00 Pm	CAO
Tuesday	4.00 Pm to 5.00 Pm	JP
Wednesday	4.00 Pm to 5.00 Pm	FLAT
Thursday	4.00 Pm to 5.00 Pm	CN
Friday	4.00 Pm to 5.00 Pm	DMGT
Saturday	4.00 Pm to 5.00 Pm	DBMS

Prof. A. P. Nanotkar
Timetable In-charge

Prof. Nitin Chaudhary
Dept. Academic Coordinator

Prof. Supriya Sawwashere
Dept. Head CSE

HOD
Computer Science & Engineering
JDCOEM, Nagpur

Principal
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VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

REMEDIAL CLASSES NOTICE

Date: 04/06/2022

All the students of B. Tech VI Semester (Computer Science & Engineering) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the Class test and MSE.

Classes will commence from 07/06/2022 to 21/06/2022 as per the following schedule.

Day/Time	Time	Subject Name
Monday	4.00 Pm to 5.00 Pm	AIR
Tuesday	4.00 Pm to 5.00 Pm	NNML
Wednesday	4.00 Pm to 5.00 Pm	CC
Thursday	4.00 Pm to 5.00 Pm	DL
Friday	4.00 Pm to 5.00 Pm	IPR
Saturday	4.00 Pm to 5.00 Pm	AIR

Prof. A. P. Nanotkar
Timetable In-charge

Prof. Nitin Chaudhary
Dept. Academic Coordinator

Prof. Supriya Sawwashere
Dept. Head CSE

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Computer Science & Engineering
JDCOEM, Nagpur

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Department Of Electrical Engineering
"Igniting minds to illuminate the world"
2021-22 (Odd Sem)

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	1. To impart quality education in the field of Electrical Engineering. 2. To be excellent learning centre through research and industry interaction.

Date- 15/01/2022

Remedial Classes Notice

All the students of B.Tech 3rd Sem are hereby informed that the department is going to arrange remedial classes for students who has scored less than 40 marks in aggregate from class test and MSE. Classes schedule is given below.

Sr.No	Day	Time	Subject
1	17/01/2022	4pm to 5 pm	NA
2	18/01/2022	4pm to 5 pm	EMI
3	19/01/2022	4pm to 5 pm	EM-I
4	20/01/2022	4pm to 5 pm	FEE
5	21/01/2022	4pm to 5 pm	Economics

Time Table Incharge   Academic Incharge   HOD

PRINCIPAL

Principal
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Department Of Electrical Engineering

"Igniting minds to illuminate the world"

2021-2022 (Odd Sem)

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	3. To impart quality education in the field of Electrical Engineering. 4. To be excellent learning centre through research and industry interaction.

Date- 15/01/2022

Remedial Classes Notice

All the students of B.Tech 5th Sem are hereby informed that the department is going to arrange remedial classes for students who has scored less than 40 marks in aggregate from class test and MSE. Classes schedule is given below.

Sr.No	Day	Time	Subject
1	17/01/2022	4pm to 5 pm	Elective I
2	18/01/2022	4pm to 5 pm	Elective II
3	19/01/2022	4pm to 5 pm	Control System-I
4	20/01/2022	4pm to 5 pm	Power Electronics
5	21/01/2022	4pm to 5 pm	Power System II

Time Table Incharge   Academic Incharge   HOD

PRINCIPAL

Principal
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Department Of Electrical Engineering

"Igniting minds to illuminate the world"

2021-2022 (Even Sem)

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	5. To impart quality education in the field of Electrical Engineering. 6. To be excellent learning centre through research and industry interaction.

Date- 06/06/2022

Remedial Classes Notice

All the students of B.Tech 4th Sem are hereby informed that the department is going to arrange remedial classes for students who has scored less than 40 marks in aggregate from class test and MSE. Classes schedule is given below.

Sr.No	Day	Time	Subject
1	07/06/2022	4pm to 5 pm	EM-II
2	08/06/2022	4pm to 5 pm	PSP
3	09/06/2022	4pm to 5 pm	PS-I
4	10/06/2022	4pm to 5 pm	EDC
5	07/06/2022	4pm to 5 pm	NMP

Time Table Incharge   Academic Incharge   HOD

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Department Of Electrical Engineering

"Igniting minds to illuminate the world"

2021-2022 (Even Sem)

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	7. To impart quality education in the field of Electrical Engineering. 8. To be excellent learning centre through research and industry interaction.

Date- 06/06/2022

Remedial Classes Notice

All the students of B.Tech 6th Sem are hereby informed that the department is going to arrange remedial classes for students who has scored less than 40 marks in aggregate from class test and MSE. Classes schedule is given below.

Sr.No	Day	Time	Subject
1	07/06/2022	4pm to 5 pm	MPMC
2	08/06/2022	4pm to 5 pm	ACS
3	09/06/2022	4pm to 5 pm	Elective –III
4	10/06/2022	4pm to 5 pm	Elective –IV

Time Table Incharge   Academic Incharge   HOD

PRINCIPAL

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An Autonomous Institute, with NAAC "A" Grade
Department of Electronics Engineering
"Rectifying Ideas, Amplifying Knowledge"
2021-22 (Odd Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

REMEDIAL CLASSES NOTICE   w.e.f:17/01/22

All the students of B.Tech 3rd Semester (Electronics & Telecommunication Engineering) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the class test and MSE. Classes will commence from 17/01/22 to 22/01/22 as per the following schedule.

S.N	Day	Time	Subject
1	Monday	4.00 Pm to 5.00 Pm	MVC
2	Tuesday	4.00 Pm to 5.00 Pm	EDC-1
3	Wednesday	4.00 Pm to 5.00 Pm	NSAF
4	Thursday	4.00 Pm to 5.00 Pm	ICA
5	Friday	4.00 Pm to 5.00 Pm	ACS
6	Saturday	4.00 Pm to 5.00 Pm	DCM

Prof. Firoz Akhtar   **Prof. A.K.Ikhar**   **Dr. P. R. Kshirsagar**

Time-Table Incharge   **Academic Incharge**   **HOD, ETC**

HOD, Dept. of EN/ETC
JD College of Engineering
& Management, Nagpur

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2021-22 (Odd Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

REMEDIAL CLASSES NOTICE   w.e.f:26/01/22

All the students of B.Tech 5th Semester (Electronics & Telecommunication Engineering) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the class test and MSE. Classes will commence from 26/01/22 to 02/01/22 as per the following schedule.

S.N	Day	Time	Subject
1	Friday	4.00 Pm to 5.00 Pm	DSP
2	Saturday	4.00 Pm to 5.00 Pm	MCA
3	Monday	4.00 Pm to 5.00 Pm	CSE
4	Tuesday	4.00 Pm to 5.00 Pm	DSP
5	Wednesday	4.00 Pm to 5.00 Pm	MCA
6	Thursday	4.00 Pm to 5.00 Pm	CSE

Prof. Firoz Akhtar   **Prof. A.K.Ikhar**   **Dr. P. R. Kshirsagar**

Time-Table Incharge   **Academic Incharge**   **HOD, ETC**

HOD, Dept. of EN/ETC
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& Management, Nagpur

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2021-22 (Odd Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	3. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 4. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

REMEDIAL CLASSES NOTICE   w.e.f:17/01/22

All the students of B.Tech 7th Semester (Electronics & Telecommunication Engineering) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the class test and MSE. Classes will commence from 17/01/22 to 22/01/22 as per the following schedule.

S.N	Day	Time	Subject
1	Monday	4.00 Pm to 5.00 Pm	DC
2	Tuesday	4.00 Pm to 5.00 Pm	IOT/OCN/ACC
3	Wednesday	4.00 Pm to 5.00 Pm	VHDL/UHF&MICROWAVE
4	Thursday	4.00 Pm to 5.00 Pm	DIP
5	Friday	4.00 Pm to 5.00 Pm	DIP
6	Saturday	4.00 Pm to 5.00 Pm	DC

Prof. Firoz Akhtar   **Prof. A.K.Ikhar**   **Dr. P. R. Kshirsagar**

Time-Table Incharge   **Academic Incharge**   **HOD, ETC**

HOD, Dept. of EN/ETC
JD College of Engineering
& Management, Nagpur

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"Rectifying Ideas, Amplifying Knowledge"
2021-22 (Even Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

REMEDIAL CLASSES NOTICE   w.e.f :07/06/22

All the students of B.Tech 4th Semester (Electronics & Telecommunication Engineering) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the class test and MSE. Classes will commence from 07/06/22 to 12/06/22 as per the following schedule.

S.N	Day	Time	Subject
1	Monday	4.00 Pm to 5.00 Pm	PDENM
2	Tuesday	4.00 Pm to 5.00 Pm	EMI
3	Wednesday	4.00 Pm to 5.00 Pm	S&S
4	Thursday	4.00 Pm to 5.00 Pm	EDCII
5	Friday	4.00 Pm to 5.00 Pm	EMF
6	Saturday	4.00 Pm to 5.00 Pm	Basics of Python Prog.

Prof. Firoz Akhtar   **Prof. A.K.Ikhar**   **Dr. P. R. Kshirsagar**

Time-Table Incharge   **Academic Incharge**   **HOD, ETC**

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An Autonomous Institute, with NAAC "A" Grade
Department of Electronics Engineering
"Rectifying Ideas, Amplifying Knowledge"
2021-22 (Even Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	3. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 4. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

REMEDIAL CLASSES NOTICE   w.e.f :07/06/22

All the students of B.Tech 6th Semester (Electronics & Telecommunication Engineering) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the class test and MSE. Classes will commence from 07/06/22 to 12/06/22 as per the following schedule.

S.N	Day	Time	Subject
1	Monday	4.00 Pm to 5.00 Pm	PE
2	Tuesday	4.00 Pm to 5.00 Pm	AWP
3	Wednesday	4.00 Pm to 5.00 Pm	PE
4	Thursday	4.00 Pm to 5.00 Pm	CNCC
5	Friday	4.00 Pm to 5.00 Pm	CNCC
6	Saturday	4.00 Pm to 5.00 Pm	AWP

Prof. Firoz Akhtar

Time-Table Incharge

Prof. A.K.Ikhar

Academic Incharge

Dr. P. R. Kshirsagar

HOD, ETC

HOD, Dept. of EN/ETC
JD College of Engineering
& Management, Nagpur

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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J D COLLEGE OF ENGINEERING AND MANAGEMENT
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"Rectifying Ideas, Amplifying Knowledge"
2021-22 (Even Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	5. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 6. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

REMEDIAL CLASSES NOTICE   w.e.f :07/06/22

All the students of B.Tech 8th Semester (Electronics & Telecommunication Engineering) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the class test and MSE. Classes will commence from 07/06/22 to 12/06/22 as per the following schedule.

S.N	Day	Time	Subject
1	Monday	4.00 Pm to 5.00 Pm	VHDL/UHF & MICROWAVE
2	Tuesday	4.00 Pm to 5.00 Pm	MEMS
3	Wednesday	4.00 Pm to 5.00 Pm	OE
4	Thursday	4.00 Pm to 5.00 Pm	OE
5	Friday	4.00 Pm to 5.00 Pm	Major Project
6	Saturday	4.00 Pm to 5.00 Pm	Major Project

Prof. Firoz Akhtar   **Prof. A.K.Ikhar**   **Dr. P. R. Kshirsagar**

Time-Table Incharge   **Academic Incharge**   **HOD, ETC**

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Department of Information Technology
"A Place to Learn, A Chance to Grow"
Session: 2021-22

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

REMEDIAL CLASSES NOTICE

Date: 14/01/2022

All the students of B. Tech III Semester (IT) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the Class test and MSE. Classes will commence from 17/01/2022 to 22/01/2022 as per the following schedule.

Day/Time	Time	Subject Name
Monday	4.00 Pm to 5.00 Pm	OB
Tuesday	4.00 Pm to 5.00 Pm	DEFM
Wednesday	4.00 Pm to 5.00 Pm	M-III
Thursday	4.00 Pm to 5.00 Pm	CAO
Friday	4.00 Pm to 5.00 Pm	CG
Saturday	4.00 Pm to 5.00 Pm	UHR

Prof. A. P. Nanotkar
Timetable In-charge

Prof. Nitin Chaudhary
Dept. Academic Coordinator

HOD IT

H.O.D.
Department of CSE-IT
JDCOEM, Nagpur

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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Department of Information Technology

"A Place to Learn, A Chance to Grow"

Session: 2021-22

VISION	MISSION
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REMEDIAL CLASSES NOTICE

Date: 14/01/2022

All the students of B. Tech V Semester (IT) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the Class test and MSE. Classes will commence from 17/01/2022 to 22/01/2022 as per the following schedule.

Day/Time	Time	Subject Name
Monday	4.00 Pm to 5.00 Pm	ES & IOT
Tuesday	4.00 Pm to 5.00 Pm	CCS
Wednesday	4.00 Pm to 5.00 Pm	DAA
Thursday	4.00 Pm to 5.00 Pm	Elective-I
Friday	4.00 Pm to 5.00 Pm	CCS
Saturday	4.00 Pm to 5.00 Pm	DAA

Prof. A. P. Nanotkar

Timetable In-charge

Prof. Nitin Chaudhary

Dept. Academic Coordinator

HOD IT

H.O.D.
Department of CSE-IT
JDCOEM, Nagpur

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REMEDIAL CLASSES NOTICE

Date: 04/06/2022

All the students of B. Tech IV Semester (IT) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the Class test and MSE. Classes will commence from 07/06/2022 to 21/06/2022 as per the following schedule.

Day/Time	Time	Subject Name
Monday	4.00 Pm to 5.00 Pm	CA
Tuesday	4.00 Pm to 5.00 Pm	JP
Wednesday	4.00 Pm to 5.00 Pm	TOC
Thursday	4.00 Pm to 5.00 Pm	CN
Friday	4.00 Pm to 5.00 Pm	DMGT
Saturday	4.00 Pm to 5.00 Pm	DBMS

Prof. A. P. Nanotkar
Timetable In-charge

Prof. Swati Raut
Dept. Academic Incharge

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H.O.D.
Department of CSE-IT
JDCOEM, Nagpur

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Session: 2021-22

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

REMEDIAL CLASSES NOTICE

Date: 04/06/2022

All the students of B. Tech VI Semester (IT) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the Class test and MSE. Classes will commence from 07/06/2022 to 21/06/2022 as per the following schedule.

Day/Time	Time	Subject Name
Monday	4.00 Pm to 5.00 Pm	AWN
Tuesday	4.00 Pm to 5.00 Pm	ML
Wednesday	4.00 Pm to 5.00 Pm	Elective-1
Thursday	4.00 Pm to 5.00 Pm	AWN
Friday	4.00 Pm to 5.00 Pm	ML
Saturday	4.00 Pm to 5.00 Pm	Elective-1

Prof. A. P. Nanotkar
Timetable In-charge

Prof. Swati Raut
Dept. Academic Incharge

HOD IT

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Department of CSE-IT
JDCOEM, Nagpur

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2020-21(ODD SEM)

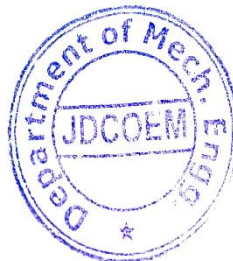| VISION	MISSION
"To be a centre of excellence of learning and research in Mechanical Engineering."	1. To provide high quality, innovative and research environment in Mechanical Engineering. 2. To impart soft skills and hard skills to achieve the institutional vision.

w.e.f:17/01/2022

REMEDIAL CLASSES NOTICE

All The students of B. TECH 3rd semester (Mechanical Engineering) are hereby informed that the Department is going to arrange remedial classes for students who have scored less than 40 marks in aggregate from the class test and MSE. Classes will commence form 17/01/2022 to 17/01/2022 as per the following schedule.

Sr. No	Day	Time	Subject
1	Monday	04:00 pm to 05:00 pm	M-III
2	Tuesday	04:00 pm to 05:00 pm	TOM-I
3	Wednesday	04:00 pm to 05:00 pm	ET
4	Friday	04:00 pm to 05:00 pm	M-III
5	Saturday	04:00 pm to 05:00 pm	TOM-I
6	Monday	04:00 pm to 05:00 pm	ET

Time Table In-charge
DOME, JDCOEM

Academic In-Charge
DOME, JDCOEM

HOD
DOME, JDCOEM

Head of Department
Mechanical Engineering
J D College of Engineering & Management

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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2020-21(ODD SEM)

VISION	MISSION
*"*To be a centre of excellence of learning and research in Mechanical Engineering.*"*	3. To provide high quality, innovative and research environment in Mechanical Engineering. 4. To impart soft skills and hard skills to achieve the institutional vision.

w.e.f:17/01/2022
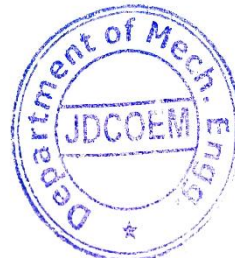
REMEDIAL CLASSES NOTICE

All The students of B. TECH 5th semester (Mechanical Engineering) are hereby informed that the Department is going to arrange remedial classes for students who have scored less than 40 marks in aggregate from the class test and MSE. Classes will commence form 17/01/2022 to 17/01/2022 as per the following schedule.

Sr. No	Day	Time	Subject
1	Monday	04:00 pm to 05:00 pm	HT
2	Tuesday	04:00 pm to 05:00 pm	TOM II
3	Wednesday	04:00 pm to 05:00 pm	HT
4	Friday	04:00 pm to 05:00 pm	TOM II
5	Saturday	04:00 pm to 05:00 pm	HT
6	Monday	04:00 pm to 05:00 pm	TOM II

Time Table In-charge
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Academic In-Charge
DOME, JDCOEM

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VISION	MISSION
"To be a centre of excellence of learning and research in Mechanical Engineering."	5. To provide high quality, innovative and research environment in Mechanical Engineering. 6. To impart soft skills and hard skills to achieve the institutional vision.

w.e.f:07/06/2022
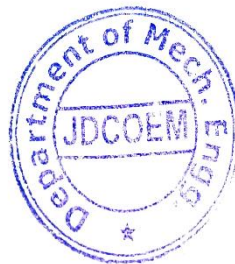
REMEDIAL CLASSES NOTICE

All The students of B. TECH 4th semester (Mechanical Engineering) are hereby informed that the Department is going to arrange remedial classes for students who have scored less than 40 marks in aggregate from the class test and MSE. Classes will commence form 07/06/2022 to 12/06/2022 as per the following schedule.

Sr. No	Day	Time	Subject
1	Monday	04:00 pm to 05:00 pm	SOM
2	Tuesday	04:00 pm to 05:00 pm	FM
3	Wednesday	04:00 pm to 05:00 pm	ME-II
4	Friday	04:00 pm to 05:00 pm	SOM
5	Saturday	04:00 pm to 05:00 pm	FM
6	Monday	04:00 pm to 05:00 pm	ME-II

Time Table In-charge
DOME, JDCOEM

Academic In-Charge
DOME, JDCOEM

HOD
DOME, JDCOEM

Head of Department
Mechanical Engineering
J D College of Engineering & Management
Nagpur

Principal
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2020-21(ODD SEM)

VISION	MISSION
"To be a centre of excellence of learning and research in Mechanical Engineering."	7. To provide high quality, innovative and research environment in Mechanical Engineering. 8. To impart soft skills and hard skills to achieve the institutional vision.

w.e.f:07/06/2022

REMEDIAL CLASSES NOTICE

All The students of B. TECH 6th semester (Mechanical Engineering) are hereby informed that the Department is going to arrange remedial classes for students who have scored less than 40 marks in aggregate from the class test and MSE. Classes will commence form 07/06/2022 to 12/06/2022 as per the following schedule.

Sr. No	Day	Time	Subject
1	Monday	04:00 pm to 05:00 pm	DOM
2	Tuesday	04:00 pm to 05:00 pm	OR
3	Wednesday	04:00 pm to 05:00 pm	AT
4	Friday	04:00 pm to 05:00 pm	DOM
5	Saturday	04:00 pm to 05:00 pm	OR
6	Monday	04:00 pm to 05:00 pm	AT

Time Table In-charge
DOME, JDCOEM

Academic In-Charge
DOME, JDCOEM

HOD
DOME, JDCOEM

Head of Department
Mechanical Engineering
J D College of Engineering & Management
Nagpur

Principal
J D College of Engineering & Management
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Nagpur-441501

JAIDEV EDUCATION SOCIETY'S
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(An Autonomous Institute, with NAAC "A" Grade)
Affiliated to DBATU, RTMNU
Department of Artificial Intelligence
"A Place to Learn, A Chance to Grow"
Session: 2021-22

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

REMEDIAL CLASSES NOTICE

Date: 14/01/2022
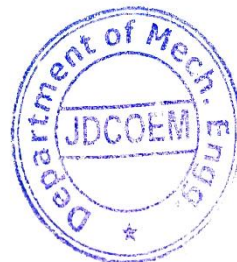
All the students of B. Tech III Semester (Artificial Intelligence) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the Class test and MSE.

Classes will commence from 17/01/2022 to 22/01/2022 as per the following schedule.

Day/Time	Time	Subject Name
Monday	4.00 Pm to 5.00 Pm	OB
Tuesday	4.00 Pm to 5.00 Pm	DSA
Wednesday	4.00 Pm to 5.00 Pm	M-III
Thursday	4.00 Pm to 5.00 Pm	DEFM
Friday	4.00 Pm to 5.00 Pm	OSV
Saturday	4.00 Pm to 5.00 Pm	UHR

Prof. A. P. Nanotkar
Timetable In-charge

Prof. Nitin Chaudhary
Dept. Academic Coordinator

Prof. Supriya Sawwashere
Dept. Head CSE

HOD
Artificial Intelligence
JDCOEM, Nagpur

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Department of Artificial Intelligence
"A Place to Learn, A Chance to Grow"
Session: 2021-22

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

REMEDIAL CLASSES NOTICE

Date: 04/06/2022

All the students of B. Tech IV Semester (Artificial Intelligence) are hereby informed that the department is going to arrange remedial classes for students who have scored less than 40 Marks in aggregate from the Class test and MSE.

Classes will commence from 07/06/2022 to 21/06/2022 as per the following schedule.

Day/Time	Time	Subject Name
Monday	4.00 Pm to 5.00 Pm	IOT
Tuesday	4.00 Pm to 5.00 Pm	DAA
Wednesday	4.00 Pm to 5.00 Pm	NNFS
Thursday	4.00 Pm to 5.00 Pm	OSV
Friday	4.00 Pm to 5.00 Pm	DMGT
Saturday	4.00 Pm to 5.00 Pm	DBMS

Prof. A. P. Nanotkar
Timetable In-charge

Prof. Nitin Chaudhary
Dept. Academic Coordinator

Prof. Supriya Sawwashere
Dept. Head CSE
HOD
Artificial Intelligence
JDCOEM, Nagpur

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VISION	MISSION
To be a center of excellence imparting professional education satisfying societal and global needs.	1. Transforming students into lifelong learners through, quality teaching, training and exposure to concurrent technologies. 2. Fostering conducive atmosphere for research and development through well-equipped laboratories and qualified personnel in collaboration with global organizations.

NOTICE
REMEDIAL CLASSES
ACADEMIC YEAR 2021-22

The students of **Semester-I** of the Department of Management are hereby informed to attend the remedial classes as per the below Time Table. The list of students who have to attend the remedial classes is attached herewith. Kindly refer the same.

Sr. No.	Date	Day	Name of Course	Timing
1	07/04/2022	Thursday	Financial Reporting, Statements and Analysis	09:30 am- 10:30 am
2	07/04/2022	Thursday	Financial Reporting, Statements and Analysis	10:30 am- 11:30 am
3	07/04/2022	Thursday	Financial Reporting, Statements and Analysis	11:30 am- 12:20 pm
4	07/04/2022	Thursday	Managerial Economics	01:00 pm- 02:00 pm
5	08/04/2022	Friday	Business Statistics and Analytics for Decision Making	09:30 am- 10:30 am
6	08/04/2022	Friday	Business Statistics and Analytics for Decision Making	10:30 am- 11:30 am
7	08/04/2022	Friday	Business Research	11:30 am- 12:20 pm
8	08/04/2022	Friday	Legal and Business Environment	01:00 pm- 02:00 pm

Time Table In-charge   Academic Coordinator   HOD- MBA

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CIRCULAR
REMEDIAL CLASSES
ACADEMIC YEAR 2021-22

All the faculty members of the Department of Management Studies are hereby requested to engage the remedial classes as per the below Time Table. The Attendance record of the remedial classes must be maintained by respective course in charge.

Sr. No.	Date	Day	Name of Course	Timing
1	07/04/2022	Thursday	Financial Reporting, Statements and Analysis	09:30 am- 10:30 am
2	07/04/2022	Thursday	Financial Reporting, Statements and Analysis	10:30 am- 11:30 am
3	07/04/2022	Thursday	Financial Reporting, Statements and Analysis	11:30 am- 12:20 pm
4	07/04/2022	Thursday	Managerial Economics	01:00 pm- 02:00 pm
5	08/04/2022	Friday	Business Statistics and Analytics for Decision Making	09:30 am- 10:30 am
6	08/04/2022	Friday	Business Statistics and Analytics for Decision Making	10:30 am- 11:30 am
7	08/04/2022	Friday	Business Research	11:30 am- 12:20 pm
8	08/04/2022	Friday	Legal and Business Environment	01:00 pm- 02:00 pm

Time Table In-charge

Academic Coordinator

HOD- MBA

Principal
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NOTICE
REMEDIAL CLASSES
ACADEMIC YEAR 2021-22

The students of **Semester-II** of the Department of Management are hereby informed to attend the remedial classes as per the below Time Table. The list of students who have to attend the remedial classes is attached herewith. Kindly refer the same.

Sr. No.	Date	Day	Name of Course	Timing
1	05/08/2022	Friday	Financial Management	09:30 am- 10:30 am
2	05/08/2022	Friday	Financial Management	10:30 am- 11:30 am
3	05/08/2022	Friday	Human Resource Management	11:30 am- 12:20 pm
4	05/08/2022	Friday	Operations Management	01:00 pm- 02:00 pm
5	06/08/2022	Saturday	Strategic Management	09:30 am- 10:30 am
6	06/08/2022	Saturday	Marketing Management	10:30 am- 11:30 am
7	06/08/2022	Saturday	Cost Accounting	11:30 am- 12:20 pm
8	06/08/2022	Saturday	Cost Accounting	01:00 pm- 02:00 pm

Time Table In-charge   Academic Coordinator   HOD- MBA

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VISION	MISSION
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CIRCULAR
REMEDIAL CLASSES
ACADEMIC YEAR 2021-22

All the faculty members of the Department of Management Studies are hereby requested to engage the remedial classes as per the below Time Table. The Attendance record of the remedial classes must be maintained by respective course in charge.
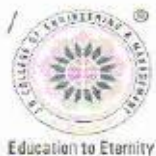
Sr. No.	Date	Day	Name of Course	Timing
1	05/08/2022	Friday	Financial Management	09:30 am- 10:30 am
2	05/08/2022	Friday	Financial Management	10:30 am- 11:30 am
3	05/08/2022	Friday	Human Resource Management	11:30 am- 12:20 pm
4	05/08/2022	Friday	Operations Management	01:00 pm- 02:00 pm
5	06/08/2022	Saturday	Strategic Management	09:30 am- 10:30 am
6	06/08/2022	Saturday	Marketing Management	10:30 am- 11:30 am
7	06/08/2022	Saturday	Cost Accounting	11:30 am- 12:20 pm
8	06/08/2022	Saturday	Cost Accounting	01:00 pm- 02:00 pm

Time Table In-charge   Academic Coordinator   HOD- MBA

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S
J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
An Autonomous Institute, with NAAC "A" Grade
Department of Training and Placement
2021-22

Education to Eternity

VISION	MISSION
"To be the Department providing strong human quotient thereby making our students top class professionals and entrepreneurs."	7. To provide the world class training for the students through continuous training modules.
	8. To improve industry institute relationship.
	9. To enhance students interest towards entrepreneurship and business strategies.

Super 40 Students (2021-22)

Training and Placement department in association with all departments of our college will form super-40 students groups.

The criteria for selection of Super-40 groups students are as follow:

Sr. No	Selection Process
1	60% Aggregate throughout SSC onward.
2	Aptitude Test
3	Group Discussion
4	Technical Interview
5	Personal Interview
6	Overall Performance in the department as suggested by HOD and senior faculty

On the basis of above criteria, we will form Super-40 group at college level

Sr.n	List of Super 40 Students(2021-22) Name	Specialization
1	Ashwini Doke	Civil
2	Harshal Avinash Gaidhane	Civil
3	Chaitanya Sahare	Civil
4	Suraj Mukesh Shambharkar	Civil
5	Raksha Swami	Civil
6	Hritika Vilas Deshbhratar	Civil
7	Sanket chandrakumar meshram	CSE
8	Ganesh Kusan Nanhe	CSE
9	Shejal Dhenge	CSE
10	Nikhil Mishra	CSE
11	Amisha Dhabekar	CSE
12	Krunal Zodape	Electrical
13	Pallavichaubey2008@gmail.com	Electrical
14	Mansi Somkuwar	Electrical
15	Swapnil Dangare	Electrical
16	Sharvari Doke	Electrical
17	Prajwal Duryodhan	Electrical

Principal
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J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
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2021-22

VISION	MISSION
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18	Ruchi Yuvraj Shiurkar	Electrical
19	Roshan Varma	ETC
20	Dikshita Prakashrao Badwaik	ETC
21	mahesh Shivaji runnaware	ETC
22	Pranjali Gore	IT
23	RITIK DHABEKAR	IT
24	Pranjal Sahare	IT
25	Reshma Jagtap	IT
26	Rutuja Thakre	IT
27	Sunaina Praful Jagtap	IT
28	Pankaj Sunil Ganvir	IT
29	Mahima Tiwari	IT
30	Anjali Jaiswal	IT
31	Minakshi Gahalyan	IT
32	Pranjali Gore	IT
33	Rohit Chanduji Mankar	Mechanical
34	Vivek Thakur	Mechanical
35	Rohit Deoram Lade	Mechanical
36	Susobhan Maity	Mechanical
37	Fiyanshu Prashant Nagrare	Mechanical
38	Durgesh Meshram	Mechanical

Training and Placement Department
Training & Placement Officer
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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JD COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
Website: www.jdcoem.ac.in   E-mail: info@jdcoem.ac.in
An Autonomous Institute, with NAAC "A" Grade
Affiliated to DBATU & RTMNU
Department of Civil Engineering
"Building Better Development"
Session 2021-22

VISION	MISSION
To be a well-known center for shaping professional leaders of Global Standards in Civil Engineering	• Provide quality education and excellent learning Environment for overall development of students. • Making Sustainable efforts for integrating academics with Industry.

CE Student NPTEL Certificate- 2021-22

CE- 2021-22

HOD, (CE)

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S
JD COLLEGE OF ENGINEERING AND MANAGEMENT
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CE Student NPTEL Certificate- 2021-22

Elite

NPTEL Online Certification
(Funded by the MoE, Govt. of India)

This certificate is awarded to

ASHWINI DOKE

for successfully completing the course

Enhancing Soft Skills and Personality

with a consolidated score of **79** %

Online Assignments	20.38/25	Proctored Exam	58.29/75

Total number of candidates certified in this course: 9994

Prof. B. V. Ratish Kumar
Chairman, Centre for Continuing Education
IIT Kanpur

Feb-Apr 2022
(8 week course)

Prof. Satyaki Roy
NPTEL Coordinator
IIT Kanpur

Indian Institute of Technology Kanpur

swayam

To validate and check scores: https://nptel.ac.in/noc

Roll No:NPTEL22HS08S43931043

CE- 2021-22

HOD, (CE)

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S
J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
Website: **www.jdcoem.ac.in**   E-mail: info@jdcoem.ac.in
(An Autonomous Institute, with NAAC "A" Grade)
Affiliated to DBATU, RTMNU
Department of Computer Science & Engineering
"A Place to Learn, A Chance to Grow"
Session: 2021-22

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

CSE Student NPTEL Certificate 2021-22

2021-22 CSE NPTEL Certificate

2021-22 CSE NPTEL Certificate

Prof. Supriya Sawwashere
HOD. CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S

J D COLLEGE OF ENGINEERING AND MANAGEMENT

KATOL ROAD, NAGPUR

Website: www.jdcoem.ac.in   E-mail: info@jdcoem.ac.in

(An Autonomous Institute, with NAAC "A" Grade)

Affiliated to DBATU, RTMNU & MSBTE Mumbai

Department Of Electrical Engineering

"Igniting minds to illuminate the world"

2021-22

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	1. To impart quality education in the field of Electrical Engineering. 2. To be excellent learning centre through research and industry interaction.

EE Student NPTEL Certificate 2021-22

NPTEL Certificate 2021-22 EE Department

H.O.D

PRINCIPAL

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
Website: www.jdcoem.ac.in   E-mail: info@jdcoem.ac.in
(An Autonomous Institute, with NAAC "A" Grade)
Affiliated to DBATU, RTMNU & MSBTE Mumbai
Department Of Electrical Engineering
"Igniting minds to illuminate the world"
2021-22

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	1. To impart quality education in the field of Electrical Engineering. 2. To be excellent learning centre through research and industry interaction.

EE Student NPTEL Certificate 2021-22

NPTEL Certificate 2021-22 EE Department

H.O.D

PRINCIPAL

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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Website: www.jdcoem.ac.in   E-mail: info@jdcoem.ac.in
An Autonomous Institute, with NAAC "A" Grade
Affiliated to DBATU & RTMNU
Department of Electronics and Telecommunication Engineering
"Rectifying Ideas, Amplifying Knowledge"
2021-22

VISION	MISSION
To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. **To provide quality teaching learning process through well-developed educational environment and dedicated faculties.** 2. **To produce competent technocrats of high standards satisfying the needs of all stakeholders.**

ETC Student NPTEL Certificate 2021-22

2021 ETC NPTEL Certificate

ETC NPTEL Certificate

JAIDEV EDUCATION SOCIETY'S
J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
Affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere
Website: www.jdcoem.ac.in   E-mail: info@jdcoem.ac.in
An Autonomous Institute, with NAAC "A" Grade
Affiliated to DBATU, RTMNU & MSBTE Mumbai
Department of Information Technology
"Progress Beyond Excellence"
Session: 2021-22

VISION	MISSION
" To Produce Competent Professionals equipped with technical knowledge and commitment for satisfying the needs of society "	1. To impart advanced knowledge with an inclination towards Research with well-equipped Labs. 2. To develop an ability to work ethically and Responsive towards the need of society.

IT Student NPTEL Certificate 2021-22

Figure 1NPTEL_IT_2021-22

JAIDEV EDUCATION SOCIETY'S

J D COLLEGE OF ENGINEERING AND MANAGEMENT

KATOL ROAD, NAGPUR

Website: www.jdcoem.ac.in E-mail: info@jdcoem.ac.in

An Autonomous Institute, with NAAC "A" Grade

Affiliated to DBATU, RTMNU

2021-22

VISION	MISSION
"To be a centre of excellence of learning and research in Mechanical Engineering."	1. To provide high quality, innovative and research environment in Mechanical Engineering. 2. To impart soft skills and hard skills to achieve the institutional vision.

ME Student NPTEL Certificate 2021-22

NPTEL Online Certification
(Funded by the MoE, Govt. of India)

This certificate is awarded to

YASHWANT SUDHAKAR HAJARE

for successfully completing the course

Fundamentals of Automotive Systems

with a consolidated score of **49** %

Online Assignments	18.94/25	Proctored Exam	30/75

Total number of candidates certified in this course: **713**

Prof. Devendra Jalihal
Chairman
Centre for Continuing Education, IITM

Jan-Apr 2022
(12 week course)

Prof. Andrew Thangaraj
NPTEL, Coordinator
IIT Madras

Indian Institute of Technology Madras

swayam

Roll No: NPTEL22DE02S13931744

To validate and check scores: https://nptel.ac.in/noc

STUDENT NPTEL CERTIFICATE 2021-22

Elite

NPTEL Online Certification
(Funded by the MoE, Govt. of India)

This certificate is awarded to

VAIBHAV FULCHAND DHUWARE

for successfully completing the course

Computer Integrated Manufacturing

with a consolidated score of **60** %

Online Assignments	16.56/25	Proctored Exam	43.5/75

Total number of candidates certified in this course: **865**

Prof. B. V. Ratish Kumar
Chairman, Centre for Continuing Education
IIT Kanpur

Jan-Apr 2022
(12 week course)

Prof. Satyaki Roy
NPTEL Coordinator
IIT Kanpur

Indian Institute of Technology Kanpur

swayam

Roll No: NPTEL22ME10S13930445

To validate and check scores: https://nptel.ac.in/noc

STUDENT NPTEL CERTIFICATE 2021-22

Bhushan R.Mahajan
Head of Department,
DOME
JDCOEM Department
Mechanical Engineering
D College of Engineering & Management
Nagpur

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S

J D COLLEGE OF ENGINEERING AND MANAGEMENT

KATOL ROAD, NAGPUR

Website: www.jdcoem.ac.in   **E-mail:** info@jdcoem.ac.in

(An Autonomous Institute, with NAAC "A" Grade)

Affiliated to DBATU, RTMNU

Department of Artificial Intelligence

"A Place to Learn, A Chance to Grow"

Session: 2021-22

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

AI Student NPTEL Certificate 2021-22

Elite

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

KULDEEP RAVINDRA BORKAR

for successfully completing the course

Programming, Data Structures and Algorithms using Python

with a consolidated score of **71** %

Online Assignments	25/25	Programming Exam	25/25	Proctored Exam	21.25/50

Total number of candidates certified in this course: **1600**

Prof. Devendra Jalihal
Chairman
Centre for Continuing Education, IITM

Jan-Mar 2022
(8 week course)

Prof. Andrew Thangaraj
NPTEL, Coordinator
IIT Madras

Indian Institute of Technology Madras

swayam

Roll No: NPTEL22CS26S33980148

To validate and check scores: https://nptel.ac.in/noc

2021-22 AI NPTEL Certificate

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

DAMINI SUNIL MISHRA

for successfully completing the course

Machine Learning and Deep Learning - Fundamentals and Applications

with a consolidated score of **51** %

Online Assignments	20.5/25	Proctored Exam	30/75

Total number of candidates certified in this course: **893**

Jul-Oct 2023
(12 week course)

Prof. T. V. Bharat
Head, Centre for Educational Technology
NPTEL Coordinator, IIT Guwahati

Indian Institute of Technology Guwahati

swayam

Roll No: NPTEL23EE87S842802513

To verify the certificate

No. of credits recommended: 3 or 4

2021-22 AI NPTEL Certificate

Prof. Supriya Sawwashere
HOD AI

HOD
Artificial Intelligence
JDCOEM, Nagpur

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S
J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
Website: www.jdcoem.ac.in   E-mail: info@jdcoem.ac.in
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Affiliated to DBATU, RTMNU

VISION	MISSION
To be a center of excellence imparting professional education satisfying societal and global needs.	1. Transforming students into lifelong learners through, quality teaching, training and exposure to concurrent technologies. 2. Fostering conducive atmosphere for research and development through well-equipped laboratories and qualified personnel in collaboration with global organizations.

MBA Student NPTEL Certificate 2021-22

This certificate is computer generated and can be verified by scanning the QR code given below. This will display the certificate from the NPTEL repository, https://nptel.ac.in/noc/

Roll No: NPTEL21MG96S23981046

To
SHRUTIKA A LANGDE
FLAT NO. 001, FLAT NO. 47, "VAISHAKH
APPARTMENT", DATTATRAYA NAGAR
NAGPUR
MAHARASHTRA - 440024
PH. NO :8554837239

Score	Type of Certificate
>=90	Elite+Gold
75-89	Elite+Silver
>=60	Elite
40-59	Successfully Completed
<40	No Certificate

No. of credits recommended by NPTEL:2
An additional 1 credit may be awarded if the University deems it fit, based on the actual student effort involved.

Elite

NPTEL Online Certification
(Funded by the Ministry of HRD, Govt. of India)

This certificate is awarded to

SHRUTIKA A LANGDE

for successfully completing the course

Intellectual Property Rights and Competition Law

with a consolidated score of   **78**   %

Online Assignments	23.83/25	Proctored Exam	54/75

Total number of candidates certified in this course: **240**

Prof. G P Raja Sekhar
Dean, Continuing Education
IIT Kharagpur

Jul-Sep 2021
(8 week course)

Prof. Debjani Chakraborty
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

swayam
FREE ONLINE EDUCATION

Roll No:NPTEL21MG96S23981046   To validate and check scores: https://nptel.ac.in/noc

1. MBA: 2021-22

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S
J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
Website: www.jdcoem.ac.in E-mail: info@jdcoem.ac.in
(An Autonomous Institute, with NAAC "A" Grade)
Affiliated to DBATU, RTMNU

VISION	MISSION
To be a center of excellence imparting professional education satisfying societal and global needs.	1. Transforming students into lifelong learners through, quality teaching, training and exposure to concurrent technologies. 2. Fostering conducive atmosphere for research and development through well-equipped laboratories and qualified personnel in collaboration with global organizations.

This certificate is computer generated and can be verified by scanning the QR code given below. This will display the certificate from the NPTEL repository, https://nptel.ac.in/noc/

Roll No: NPTEL21MG96S23981185

To
FALAK NAAZ
PLOT NO.2, ANANT NAGAR, RATHOD LAYOUT
MAHARASHTRA - 440013
PH. NO :8668573963

Score	Type of Certificate
>=90	Elite+Gold
75-89	Elite+Silver
>=60	Elite
40-59	Successfully Completed
<40	No Certificate

No. of credits recommended by NPTEL:2
An additional 1 credit may be awarded if the University deems it fit, based on the actual student effort involved.

Elite

NPTEL Online Certification
(Funded by the Ministry of HRD, Govt. of India)

This certificate is awarded to

FALAK NAAZ

for successfully completing the course

Intellectual Property Rights and Competition Law

with a consolidated score of **67** %

Online Assignments	23.58/25	Proctored Exam	43.5/75

Total number of candidates certified in this course: **240**

Prof. G P Raja Sekhar
Dean, Continuing Education
IIT Kharagpur

Jul-Sep 2021
(8 week course)

Prof. Debjani Chakraborty
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

swayam
FREE ONLINE EDUCATION

Roll No:NPTEL21MG96S23981185

To validate and check scores: https://nptel.ac.in/noc

2. MBA: 2021-22

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

HOD- MBA
Dept. of Management Studies (MBA)
J.D. College of Engineering & Management
Nagpur

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Affiliated to DBATU, RTMNU
Department of Computer Science & Engineering
"A Place to Learn, A Chance to Grow"
Session: 2021-22

VISION	MISSION
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CSE Student Coursera Certificate 2021-22
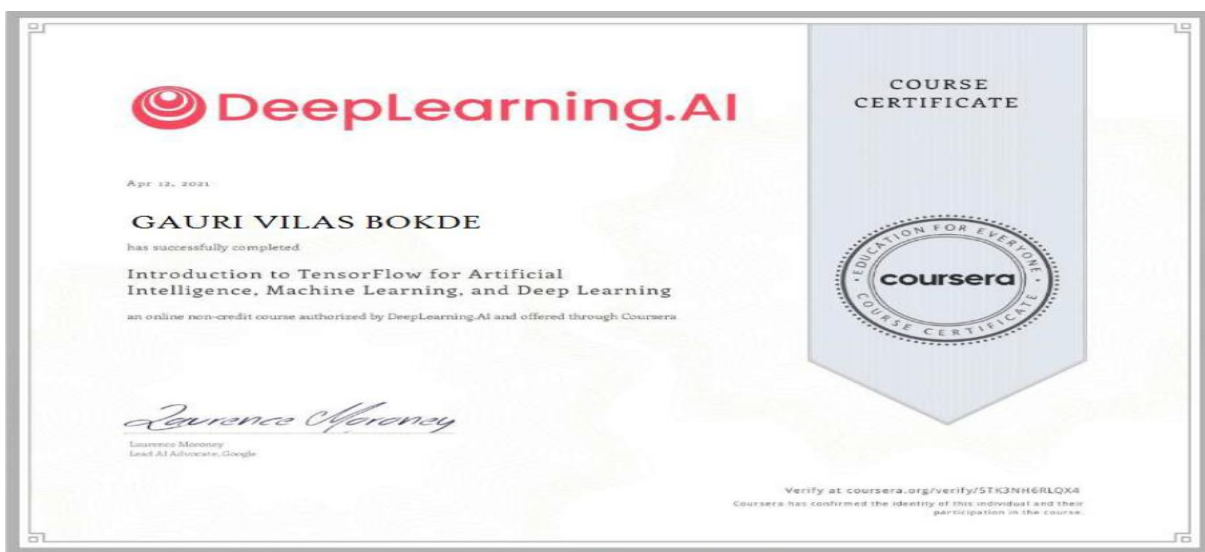
2021-22 CSE Coursera Certificate
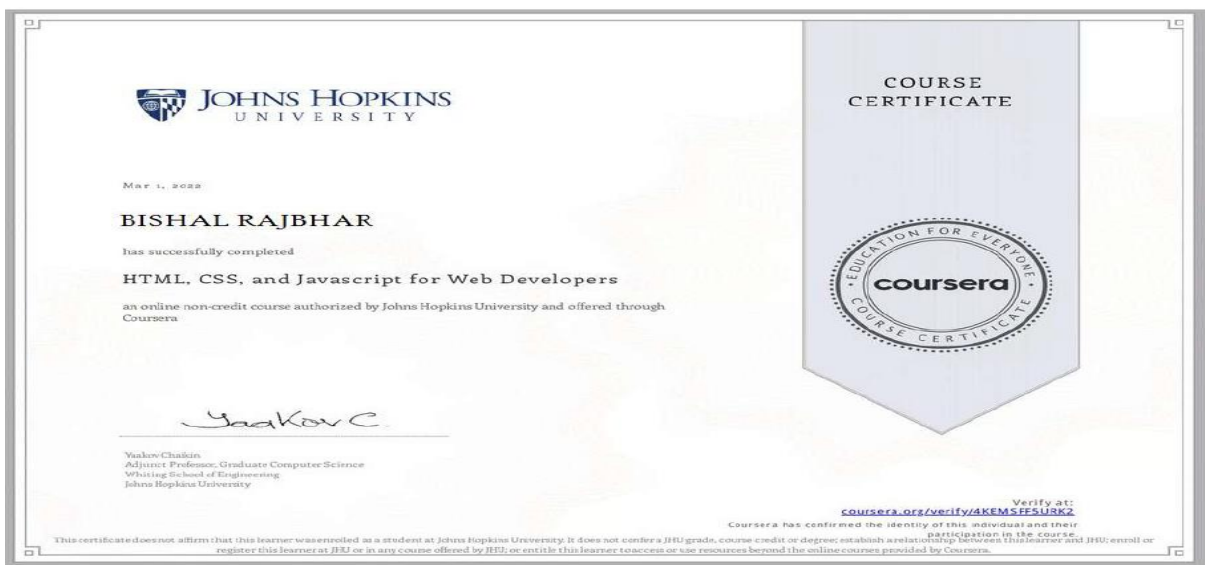
2021-22 CSE Coursera Certificate

Prof. Supriya Sawwashere
HOD. CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S

J D COLLEGE OF ENGINEERING AND MANAGEMENT

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An Autonomous Institute, with NAAC "A" Grade

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2021-22

VISION	MISSION
"To be a centre of excellence of learning and research in Mechanical Engineering."	1. To provide high quality, innovative and research environment in Mechanical Engineering. 2. To impart soft skills and hard skills to achieve the institutional vision.

ME Student Coursera Certificate 2021-22

AUTODESK

COURSE CERTIFICATE

Mar 1, 2022

Pawan Vijay Chawke

has successfully completed

Modeling and Design for Mechanical Engineers
with Autodesk Fusion 360

an online non-credit course authorized by Autodesk and offered through Coursera

Andrew Anagnost, President and Chief Executive Officer of Autodesk, Inc.

coursera

Verify at:
https://coursera.org/verify/GNXKS9FCQY2E
Coursera has confirmed the identity of this individual and their participation in the course.

STUDENT COURSERA CERTIFICATE 2021-22

AUTODESK

COURSE CERTIFICATE

Mar 6, 2022

Manish Shivshankar Gurve

has successfully completed

Modeling and Design for Mechanical Engineers
with Autodesk Fusion 360

an online non-credit course authorized by Autodesk and offered through Coursera

Andrew Anagnost, President and Chief Executive Officer of Autodesk, Inc.

coursera

Verify at:
https://coursera.org/verify/LPZZ4K4NCS8J
Coursera has confirmed the identity of this individual and their participation in the course.

STUDENT COURSERA CERTIFICATE 2021-22

Bhushan R.Mahajan
Head of Department,
DOME
JDCOEM Department
Mechanical Engineering
D College of Engineering & Management
Nagpur

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S
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KATOL ROAD, NAGPUR
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(An Autonomous Institute, with NAAC "A" Grade)
Affiliated to DBATU, RTMNU
Department of Artificial Intelligence
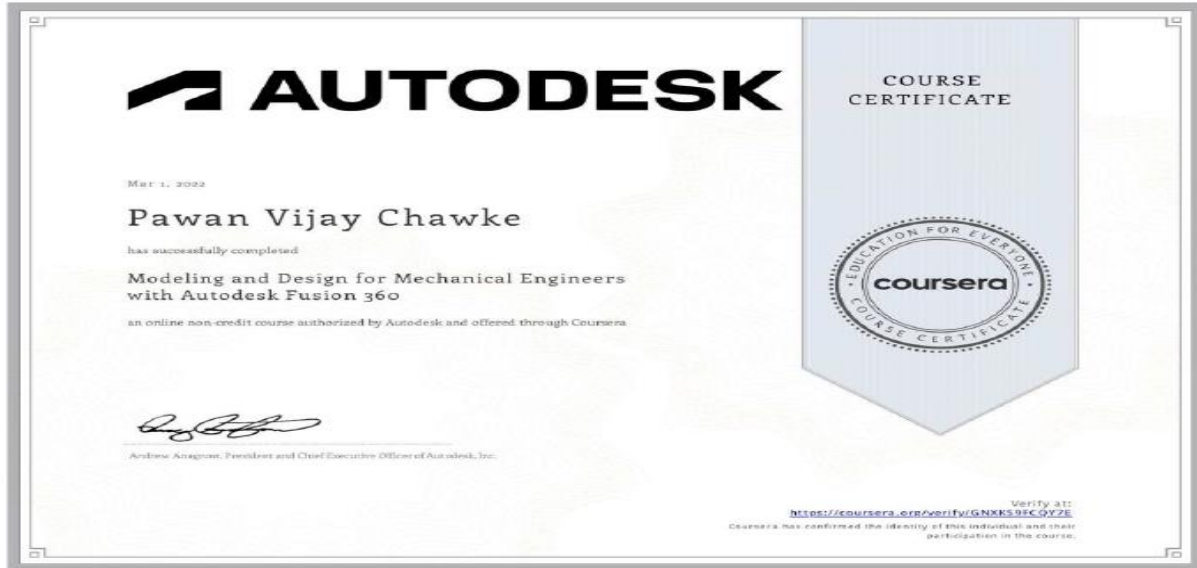*"A Place to Learn, A Chance to Grow"*
**Session: 2021-22**

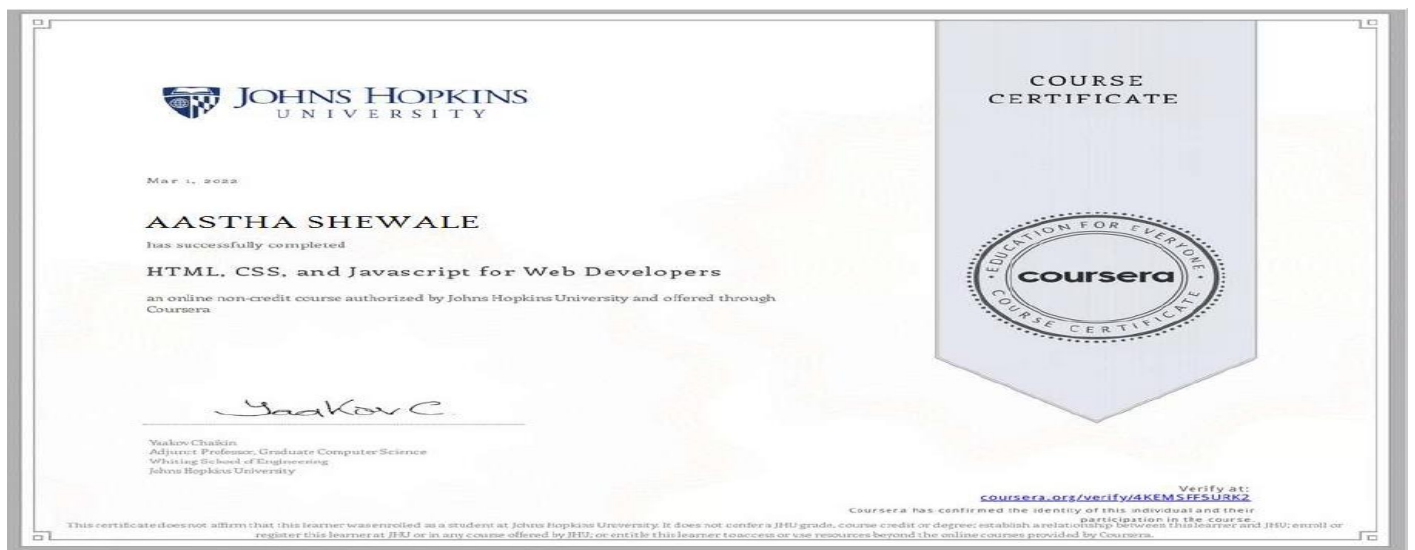| VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

AI Student Coursera Certificate 2021-22
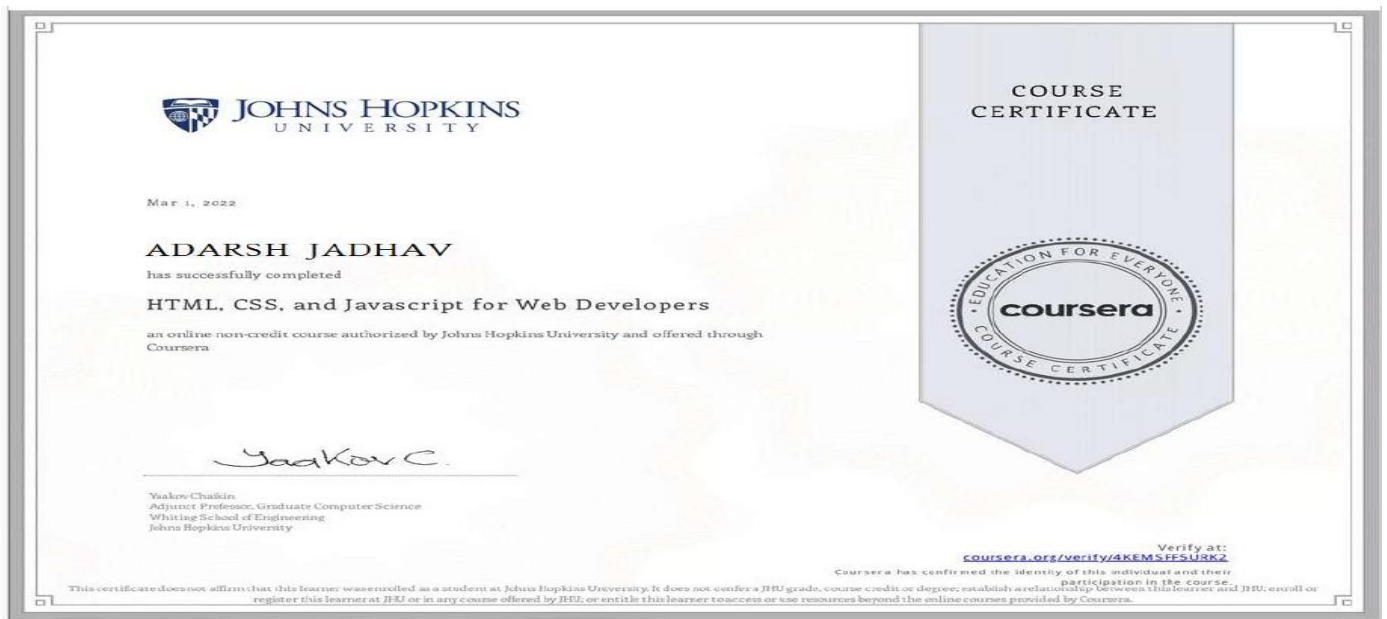
2021-22 AI Coursera Certificate

2021-22 AI Coursera Certificate

Prof. Supriya Sawwashere
HOD AI

HOD
Artificial Intelligence
JDCOEM, Nagpur

Principal
J D College of Engineering & Management
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Department of Civil Engineering
"Building Better Development"
Session 2021-22

VISION	MISSION
To be a well-known center for shaping professional leaders of Global Standards in Civil Engineering	• Provide quality education and excellent learning Environment for overall development of students. • Making Sustainable efforts for integrating academics with Industry.

महाराष्ट्र शासन

कार्यकारी अभियंता ,यांचे कार्यालय
एकात्मिकृत घटक (वैद्यकीय)
सार्वजनिक बांधकाम,नागपूर.

E-mail ID :- integratednagpur.ee@mahapwd.gov.in

दुरध्वनी क्र.:-०७१२२७४४३८७-

जावक क्र. ९३७ / आस्था-१/२०२२

दिनांक :-९०/०९/२०२२

प्रति,
सहाय्यक अभियंता श्रेणी-१,
सा.बां. घटक क्र.१,
नागपूर

विषय :- स्थापत्य अभियांत्रिकी विद्यार्थ्यांना Field Project च्या पुर्ततेसाठी सहकार्य येणेबाबत.

संदर्भ :- जे.डी. कॉलेज ऑफ इंजिनिअरींग ॲन्ड मॅनेजमेन्ट, नागपूर यांचे पत्र दिनांक ०९.१२.२०२१

उपरोक्त संदर्भिय पत्रान्वये जे.डी. कॉलेज ऑफ इंजिनिअरींग ॲन्ड मॅनेजमेन्ट, नागपूर यांनी यांनी विनंती केल्यानंतर दिनांक १०.०१.२०२२ ते १०.०२.२०२२ पर्यंत १ महीना Field Project ची पुर्तता करू इच्छित असणाऱ्या स्थापत्य अभ्यासक्रमाच्या खाली नमूद केलेल्या विद्यार्थ्यांना आपल्या उपविभागात प्रत्यक्ष क्षेत्रीय कामकाज्याच्या अनुभव मिळण्याकरीता पाठविण्यात येत आहे. तरी सदर विद्यार्थ्यांना त्या अनुषंगाने मार्गदर्शन व सहकार्य करावे. संबधीताकडून किमान विशिष्ट एका कामाबाबत अंदाजपत्रक स्तरावरून निविदा प्रक्रीया व कार्यारंभ आदेश व प्रत्यक्षातील कार्यान्वयन ह्याबाबत सहकार्य प्राप्त करण्यात यावे.

तसेच प्रशिक्षण पुर्ग झालेल्या कालावधीची प्रशिक्षणार्थी यांचे प्रमाणपत्र तयार करून कार्यकारी अभिरांता यांच्या स्वाक्षरीकरीता पाठविण्यात यावे.

१. आकांक्षा वासनिक
२. अनुष्का बागडे
३. प्रज्ञा गडमाडे
४. कुणाल अंबुलकर
५. प्रतीक लाडे

सहपत्र :- १. संदर्भिय पत्र

कार्यकारी अभियंता
एकात्मीकृत घटक (वै) सा.बां.
नागपूर.

प्रतिलिपी :- प्राचार्य, जे.डी. कॉलेज ऑफ इंजिनिअरींग ॲन्ड मॅनेजमेन्ट, नागपूर माहिती व पुढील कार्यवाहीस्तव अग्रेषित.

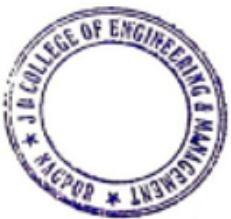D:\2021 -2022 All Files\Deep Madam\Flid Project .docx

Student Internship Completion Cerificate (CE)- 2021-22

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

HOD, (CE)

JAIDEV EDUCATION SOCIETY'S
JD COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
Website: www.jdcoem.ac.in   E-mail: info@jdcoem.ac.in
An Autonomous Institute, with NAAC "A" Grade
Affiliated to DBATU & RTMNU
Department of Civil Engineering
"Building Better Development"
Session 2021-22

VISION	MISSION
To be a well-known center for shaping professional leaders of Global Standards in Civil Engineering	• Provide quality education and excellent learning Environment for overall development of students. • Making Sustainable efforts for integrating academics with Industry.

INDRA
INFRA CREATIONS PVT. LTD.
ENGINEERS, DEVELOPERS & BUILDERS
4, "MALHAR", LAKE VIEW, AMBAZARI DRIVE, BESIDES SUBHASH NAGAR METRO STATION,
HINGNA ROAD, NAGPUR-440036 (M.S.). Ph : (0712)2236387, 2235075, 9422443737
E-mail : mahendra_group@rediffmail.com W : www.groupmahendra.com mahendra.group
CIN : U45201MH2005PTC156133

CERTIFICATE OF INTERNSHIP

This is to certify that Master Prafull B Vaishnav a student of 3rd year in Civil Engineering of J D college of Engineering and Management, Nagpur had been under industrial training at our construction site. He has successfully completed his internship during the period from 08/11/2021 to 01/12/2021 and 24/12/2021 to 31/12/2021 during the internship, he was expose to various activities at our construction site of flat scheme.

He has gathered knowledge regarding the functionalities of our project work such as construction / maintenance / operation activities, we observed that his attendance and performance during the training was good & remarkable His submitted Report was remarkably outstanding and detailed.

We wish him best for coming aspects.

Director
Surendra Deshpande
Indra Infra Creations Pvt Ltd

Indra Infra Creations Pvt Ltd
CIN : U74900MH2012PTC226547
For Further verification and assistance
9422-44-3737

Scanned with CamScanner

Student Internship Completion Cerificate   (CE)- 2021-22

HOD, (CE)

Principal
Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S

J D COLLEGE OF ENGINEERING AND MANAGEMENT

KATOL ROAD, NAGPUR

Website: **www.jdcoem.ac.in**   E-mail: **info@jdcoem.ac.in**

(An Autonomous Institute, with NAAC "A" Grade)

Affiliated to DBATU, RTMNU & MSBTE Mumbai

Department Of Electrical Engineering

"Igniting minds to illuminate the world"

2021-22

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	1. To impart quality education in the field of Electrical Engineering. 2. To be excellent learning centre through research and industry interaction.

Internship Certificate 2021-22 EE Department

H.O.D

PRINCIPAL

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

JAIDEV EDUCATION SOCIETY'S
J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
Website: **www.jdcoem.ac.in**   E-mail: **info@jdcoem.ac.in**
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Department Of Electrical Engineering
"Igniting minds to illuminate the world"
2021-22

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	1. To impart quality education in the field of Electrical Engineering. 2. To be excellent learning centre through research and industry interaction.

UMEED INDIA FOUNDATION

TRUST REGISTRATION S. NO. DEL UR25851-0802

RefNo:UIF21/1058
Date:19-11-2021

Certificate of Internship

We present this certificate to

Ms. TEJASWINI WAKALKAR

In appreciation for your successful work as an intern at Umeed India Foundation in the area of Social Work, HR, Marketing, Finance & Environment.

The internship was conducted between **20-10-2021** and **19-11-2021**.

During the tenure this internship the candidate was found to be dedicated, hardworking and efficient.

Subhrajeet Gautam
(Founder & Secretary)

Internship Certificate 2021-22 EE Department

H.O.D

PRINCIPAL

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

14th May 2022

CERTIFICATE

This is to certify that under mentioned student has undergone Internship lIndustrial Training in our organization and successfully completed the same.

Name of the student   :   Miss.Aditi Godheswar

B. TECH - ELECTRONICS AND TELECOMMUNICATION

Name of College   :   J D College of Engineering &

Management, Nagpur

Duration of Training   :   09.04.2022 to 09.05.2022

We are happy to note the keen interest shown by the student during the training period.

Best Wishes for a bright future.

For JSW Steel Coated Products Limited

Authorised Signatory

HOD, Dept. of EN/ETC
JD College of Engineering
& Manegement, Nagpur

Principal
J D College of Engineering & Mannoemer
Khandala, Katol Road
Nagpur-441501

Date: 26/05/2022

SUB: INTERNSHIP COMPLETION LETTER

We are glad to inform you that Ms. Anas Khan from JD College of Engineering, Nagpur, has successfully completed her internship at iWorkstation from 01st December, 2021 – 31st May, 2022. During her internship, she was exposed to the various activities in Graphic Design.

We found her extremely inquisitive and hard working. she was very much interested to learn the functions of our core division and also willing to put her best efforts and get in to the depth of the subject to understand it better.

Her association with us was very fruitful and we wish her all the best in his future endeavors.

Adnan Ghori
Founder & Director

HOD, Dept. of EN/ETC
JD College of Engineering
& Management, Nagpur

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

वेस्टर्न कोलफील्ड्स लिमिटेड
Western Coalfields Limited
(मिनीरत्न कंपनी)   (A Miniratna Company)
(कोल इंडिया लि. की अनुषंगी कंपनी)
(A Subsidiary of Coal India Limited)

मानव संसाधन विकास विभाग   **Human Resource Development**

email- gmhrd.wcl@gmail.com   ☎/FAX: 0712 –2510869
CIN – U10100MH1975GOI018626   🌐 www.westerncoal.nic.in
भर्ती. मा. कोयला विहार, सिविल लाइन्स, नागपुर (महाराष्ट्र)-440001   Regd. Off. : Coal Estate, Civil Lines, Nagpur (MS) -440001

संदर्भ संख्या/Ref.No.:   दिनांक/Date :   /   / 201

संदर्भ नाग/डब्लूसीएल/एचआरडी/2020-21/ 1518   दिनांक 05.02.2021

प्रति,
PROF. HEMANT BAITULE
TRAINING & PLACEMENT COORDINATOR
J D COLLEGE OF ENGINEERING & MANAGEMENT
NAGPUR - 442403

संदर्भ : NIL Date : 2/2/21

प्रशिक्षण हेतु स्वीकृति पत्र

आपके विश्वविद्यालय/महाविद्यालय से प्राप्त निवेदन पत्र के तहत नीचे तालिका में दर्शाए गए विवरण के अनुसार **B.TECH (MECHANICAL) STUDENT** को वेस्टर्न कोलफील्ड्स लिमिटेड में दिनांक **12.02.2021** से **03 MONTHS** के लिये निम्न उल्लेखित प्रशिक्षण शर्तों के आधार पर **Practical Training** की सुविधा प्रदान की जाती है।

SN.	Name of Student	Area Letter No.	Date	Allotted Deptt for Trg.
1	ISHRAR AHMED SHEIKH	NIL	NIL	RWS SILLEWARA, NAGPUR AREA

प्रशिक्षण शर्तें-

- प्रशिक्षण के दौरान प्रशिक्षणरत विद्यार्थी को किसी प्रकार का वेतन/स्टायफंड/छात्रवृत्ति प्रदान नहीं की जाएगी।
- वेकोलि द्वारा प्रशिक्षणरत विद्यार्थी/विद्यार्थियों को आवास एवं यातायात सुविधा प्रदान नहीं की जाएगी।
- प्रशिक्षणरत विद्यार्थी/विद्यार्थियों को अपने प्रशिक्षण प्रभारी/सुपीरियर द्वारा निर्देशित वैधानिक निर्देशों का पालन करना होगा।
- विद्यार्थी अपनी सुरक्षा के लिये स्वयं जिम्मेदार होंगे। वेकोलि प्रबंधन की ओर से उन्हें किसी भी प्रकार की नुकसान
- भरपाई नहीं की जाएगी।
- प्रशिक्षणरत विद्यार्थी/विद्यार्थियों को प्रशिक्षण के दौरान वेकोलि से संबंधित इकत्रित की गई कोई भी जानकारी, सूचना अथवा आँकड़े गोपनीय रखना होगा। इसका उपयोग केवल शैक्षणिक प्रयोजन हेतु ही किया जाएगा।
- प्रशिक्षण प्रदान करनेवाले विभाग/इकाई से प्राप्त उपस्थिति प्रमाण-पत्र एवं प्रोजेक्ट रिपोर्ट की एक-एक प्रति, प्रशिक्षणरत विद्यार्थी को मानव संसाधन विकास विभाग में जमा करना अनिवार्य होगा।
- प्रशिक्षणरत विद्यार्थी/विद्यार्थियों को सलाह दी जाती है कि प्रशिक्षण ग्रहण करने जाते समय अपने साथ जन्म तिथि का प्रमाण अवश्य लेते जाएं।

महाप्रबंधक (कार्मिक)/मासंवि

प्रतिलिपि :

- क्षेत्रीय महाप्रबंधक, NAGPUR क्षेत्र
- क्षेत्रीय प्रशिक्षण अधिकारी, NAGPUR क्षेत्र
- संबंधित विद्यार्थी

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

WESTERN COALFIELDS LIMITED

Office of the Area General Manager,

Nagpur Area.   Email - atonagpur@gmail.com

Area Training Department   An ISO 9001:2015 Certified

पंजीकृत कार्यालय: कस्तूरबा नगर, अरिपटका, नागपुर-४४००१४   CIN - U10100MH1975GOI018028

संदर्भ: वे.को.लि/क्षे.म.का./तक प्रशि/नागपुर/2020-21/ 50

वेस्टर्न कोलफील्डस लिमिटेड

मुख्य महा प्रबंधक का कार्यालय

नागपुर क्षेत्र

क्षेत्रीय प्रशिक्षण विभाग

टेली क्रमांक - 0712-2641960

दिनांक- 12/02/2021

प्रति

वरि.प्रबंधक (वि/या)/प्रभारी

रिजनल वर्क शॉप सिलेवारा

नागपुर क्षेत्र

महोदय,

विषय : प्रशिक्षण हेतु |

संदर्भ : नाग/डब्लूसी एल/एचआरडी/20-21 / 1518 दि. 05/02/2021

महाप्रबंधक (मसावि) के उपरोक्त संदर्भित पत्र के अनुसार J.D. COLLEGE OF ENGINEERING & MANAGEMENT, NAGPUR , B. TECH (MECHANICAL) के निम्नलिखित विद्यार्थी को वे.को.लि नागपुर क्षेत्र के रिजनल वर्क शॉप, सिलेवारा में 12.02.2021 से 3 माह के लिए Practical Training की सुविधा प्रदान की जाती है |

   1. SRI- ISHRAR AH - MED SHEIKH

प्रशिक्षण के दौरान विद्यार्थियों को पत्रानुसार निम्लिखित शर्ते यथावत लागू होंगी |

१. यह प्रशिक्षण सुविधा प्रशिक्षनार्थियो के स्वय के रिस्क और सेफ्टी पर आधारित होंगी |

२. प्रशिक्षनार्थियो को वेकोली द्वारा किसी प्रकार का भुकतान /पारिश्रमिक नहीं दी जाएँगी \

३. प्रशिक्षनार्थियो को प्रशिक्षण के दौरान Mines Act 1952 के नियम /विनियम का पालन करना होगा|

४. प्रशिक्षनार्थियो को किसी चोट/दुर्घटना की स्थिति में कंपनी की जिम्मेदारी नहीं होंगी|

५. प्रशिक्षनार्थियो को अपने आवागमन/आवास की व्यवस्था स्वय ही करना होगा |

६. कंपनी पर किसी प्रकार का कोई वित्तीय दायित्तव नहीं होगा |

७. प्रशिक्षनार्थियो के किसी कार्य की वजह से कंपनी की संपत्ति को होनेवाले नुकसान भरपाई के लिए प्रशिक्षनार्थियो स्वय जिम्मेदार होंगे |

८. प्रशिक्षणरत विद्यार्थी को प्रशिक्षण के दौरान वेकोली से सम्बंधित इकत्रित की गयी कोई भी जानकारी सुचना अथवा आकडे गोपनीय रखना होगा इसका उपयोग केवल शैक्षणिक प्रयोजन हेतु किया जायेगा |

९. प्रशिक्षणरत विद्यार्थी को सलाह दी जाती है की प्रशिक्षण ग्रहण करने के समय अपने साथ जन्म तिथि का प्रमाण अवश्य लेते जाए |

क्षेत्रिय प्रशिक्षण अधिकारी

नागपुर क्षेत्र

प्रतिलीपी

१. महा प्रबंधक नागपुर क्षेत्र

२. महा प्रबन्धक (संचालन) नागपुर क्षेत्र

३. क्षेत्रिय कार्मिक अधिकारी नागपुर क्षेत्र

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

Date:February 14, 2022

Vishwesh Prakash Mule,
(Maharashtra) India

<u>**Subject: Training Letter**</u>

Dear Vishwesh Prakash Mule,

This is further with reference to the tests and interviews conducted by us. We are pleased to inform you, that we have decided to provide you appointment as **Trainee** at **Nagarro**.

You are requested to join us on or before **March 9, 2022**. During the period of training you would be paid a stipend of **Indian Rupee (INR) 19,00** per month.

The details of your compensation package and terms and conditions of your employment are enclosed herein.

You are requested to send us the signed duplicate copy of this letter as a token of your acceptance.

We welcome you to a pursuit of excellence with **Nagarro**.

To help complete joining formalities, may we request you to carry the following documents with you on the date of joining:

- **Mark sheets and Certificates for Class X, XII, Graduation and Post Graduation (if applicable)**
- **Copy of Aadhar Card, PAN Card, Driving License and Passport (if applicable)**
- **Five Passport size photographs**

Yours Sincerely,

For **Nagarro Software Pvt. Ltd.**

Swati Yadav
Director

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

Ref: Nagarro Software Pvt. Ltd./APP/18001917/1448756

Date: February 14, 2022

Vishwesh Prakash Mule,
(Maharashtra) India

Dear Vishwesh Prakash Mule,

This has reference to your application for employment with **Nagarro Software** and your subsequent interview.

We are pleased to appoint you as **Associate Engineer** at **Nagarro Software Private Limited Unit-II** of **Nagarro Software Pvt. Ltd. Plot No. 13,**
Vihar, Sector - 18, Gurgaon, India. You can join us on or before **September 9, 2022**

The terms and conditions of your employment are enclosed as **Annexure "B"**.

We welcome you to a pursuit of excellence with Nagarro.

Please sign the duplicate copy of this letter, Annexure "A" and Annexure "B" as a token of your acceptance and deliver it to us in person
mail/courier within ten days from the date of receipt of this letter.

To help complete joining formalities, may we request you to carry the following documents with you on the date of joining:

- **Mark-sheets and certificates for Class X, Class XII, Graduation and Post-graduation if applicable**
- **Copy of Aadhar Card, PAN Card, Driving License and Passport (if applicable)**
- **Five passport-size photographs**

Yours truly,

For **Nagarro Software Pvt. Ltd.**

Swati Yadav
Director

Principal
J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

Name	Vishwesh Mule

Monthly Earnings	Amount in Indian Rupee (INR)	Annualized Amount in Indian Rupee (INR)
Basic Pay	15,000.00	180,000.00
HRA	7,500.00	90,000
Executive Allowance	12,278.00	147,336.00
Total (A)	**34,778.00**	**417,336.00**

Annual Earnings	Amount in Indian Rupee (INR)	
Medical Reimbursement*	0	
Employer's Contribution to Provident Fund	23,400.00	
Employer's Contribution to ESIC	0.00	
Leave Travel Allowance**	0.00	
Gratuity***	8,664.00	
Labour Contribution Fund	600.00	
Total Yearly (B)	**32,664.00**	
Variable Bonus	0	
Total Fixed Compensation (A+B)	**450,000.00**	

Note:

**Leave Travel Allowance (LTA) will be paid once in a year on submission of bills & subject to Income Tax rules

***Payment as per Gratuity Act

Income Tax in respect of the above mentioned compensation package should be borne by the employee. There would be follo deduction from Monthly A- Tax/ Mediclaim / PF-employee contribution and Transport (Optional)

PLs will accrue each month on a prorated basis. Amount of accrual for the month is calculated on the basic pay exist at the end of each month

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Group Insurance

Guidelines:-

Group Mediclaim Insurance

a) An employee has a mediclaim insurance cover of 3 lac by default and he/she at the time of joining can increase his/her sum insured upto lakhs & cover his dependents (spouse, kids and parents). Premium deduction details has been provided in table below.

b) During mid-term of the policy, only newly-wed spouse, Parents in Law (on account of marriage) and new born child can be included in the p within 90 days from Date of Marriage and Date of Birth respectively. No other dependent can be included during mid-term of the policy.

c) Downward revision of Sum Insured will be allowed at the time of renewal as per the then prevalent term and conditions of the policy.

d) Exclusion of dependents will be allowed at the time of renewal only as per the then prevalent terms and conditions of the policy.

Group Personal Accident Insurance (GPA)

The GPA Policy provides the insured a cover for disability or death caused by an accident.

a) An employee has personal accident insurance cover of 3X of his TFC by default and he/she at the time of joining can go in for a sum insure upto 4X to 10X as per policy terms. Premium deduction details has been provided in table below.

b) Once an employee is enrolled in the policy he/she cannot exit the policy till he leaves the company.

Group Term Life Insurance (GTL)

The GTL policy provides the insured a cover in case of death.

a) Enrollment in GTL is optional and on discretion of the employee and employee can opt for a cover of upto 10X of their TFC. The most comm practice is to cover within 3X to 5X of your TFC. Premium deduction details has been provided in table below.

b) Exit from the policy can be done at the time of renewal only by selecting "0X" multiplier in internal insurance application.

Premium for Group Insurance

	Premium	Deduction
Premium Deduction for Mediclaim Insurance	Calculated Formula	In equal instalments starting from the following month of DOJ till Policy end date.
Premium Deduction for GPA	Calculated Formula	From the following month of DOJ
Premium Deduction for GTL (optional)	Calculated Formula	From the following month of DOJ

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Terms and Conditions

The key service conditions applicable to your employment are given below. The Company reserves the right to revise these terms and conditic
any time.

1. Place of Posting and Assignment:
Your place of posting will currently be GURUGRAM. However, you are liable to be temporarily assigned or permanently transferred from one pl
another, one job to another, one unit to another, wherever located in the country or abroad, at any point of time as the exigencies of work dema
You can also be deputed to work in and/or for any client or affiliate company.

2. Whole Time Service:
Your employment with the Company is full time and while so employed, you must under no circumstances engage yourself directly or through
agency in any work, business, profession or employment, either honorary or otherwise without obtaining written prior permission from the
Management. Any breach of this condition may result in your immediate termination from the services of the Company.

3. Inventions and Discoveries:
The rights created or accrued out of any and all discoveries, inventions, copyrights, patents, etc., which you may make or obtain during the per
your employment with Nagarro shall exclusively vest with the Company and may be re-assigned by it as it deems fit. This does not apply to cr
non-commercial products that are wholly unconnected with the business of the Company.

4. Termination on Misconduct or Breach of any Service Condition:
If you are found guilty of any misconduct or should you commit any breach of the service conditions or get involved in an act which in the opir
the Company is prejudicial to the interest of the Company, the Company may without any notice terminate your services.

5. Termination by Notice:
Without prejudice to clause 4 above, your services can be terminated at any time by giving two calendar months' notice or two months' salary
of notice. In case you desire to leave the services of the Company, you will have to give us two calendar months' notice. In case you do not gi
two calendar months' notice, the Company will have the authority to recover up to two months' salary from your full and final dues (inclusive c
performance linked bonus, if any) depending upon the impact of your resignation on the work assigned to you.

I have read and understood the above terms and conditions and I agree to abide the same.

Signature

6. Company's decision on Termination to be Final and Binding:

The Company's decisions regarding termination under clauses 4 & 5 shall be final and binding.

7. Retirement:

The Company's retirement age is 60.

8. General Policies and Procedures:

A copy of the General Policies and Procedures of the Company will be given to you on the date of joining. You will be required to adhere to the
well as to any other service conditions governing your unit and location that may be in force currently and/or which may be issued from time t
by the Management with respect to hours of work, weekly offs, paid holidays etc.

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9. Reference/Background Checks:

Your employment by the Company is conditional upon and subject to completion of an Employment Application, the completion of a reference/background check, and approval thereof by the Company, in its sole discretion.

10. Confidentiality of this Offer:

The package offered to you is highly confidential and must not be revealed between now and the joining date or while in employment or therea any individual/agency/organization, by word of mouth or otherwise.

11. Jurisdiction:

Any dispute arising out of the employment or terms of service shall be subject to the jurisdiction of the competent courts in Delhi.

12. Final Agreement:

This written offer supersedes all verbal or written agreements between you and the Company.

For Nagarro Software Pvt. Ltd.

 Authorized Signatory

I have read and understood the above terms and conditions and I agree to abide the same.

Name   Signature   Date

Registered Office: 19/20, Punjabi Bagh (East), New Delhi – 110 026 email:info@nagarro.com

Unit II: Plot. 14, Electronic City, Sector 18, Gurgaon 122 015, Haryana, India Ph: (+91 124) 3048647 Fax: (+91 124) 3048646

Unit III: Plot 37, Electronic City, Sector 18, Gurgaon – 122 015, Haryana, India Ph : (+91 124) 3048647 Fax : (+91 124) 3048646

Bhushan R.Mahajan
Head of Department,
DOME
JDCOEM Department
Mechanical Engineering
J D College of Engineering & Management
Nagpur

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Education to Eternity

MBA: 2021-22

INTERNSHIP CERTIFICATES

Mahindra

SWARAJ

Deming Prize
2012
Mahindra & Mahindra Ltd
Farm Equipment Sector
Swaraj Division
Date: 07.12.2021

TO WHOM IT MAY CONCERN

This is to certify that**Mr. Rohan Nitin Koshti, S/O-Nitin Ramesh Koshti**, a student of MBA (Major in Marketing), JD College of Engineering and Management, Nagpur has successfully completed 01 (One) month (From 21stSeptember, 2021 to 21stOctober, 2021) long internship programme at this Dhawale Autozone Authorised Centre of Swaraj Tractors Mahindra & Mahindra Ltd., Farm Equipment Sector Swaraj Division. During the period of his internship programme with us, he was found punctual, hardworking and inquisitive.

We wish him every success in life.

For,

Dhawale Autozone

(S. R. Gwgabe)

(Authorized Signature)

Authorised Dealer
Dhawale Autozone
Near Radha Krishna Theatre, Murtizapur Road,
Akola (Mh.) - 444001 Tel.: + 919767483823
E-mail ID- dhawale.autozone@gmail.com

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⭐

Internship Completion Certificate

This is to certify that

Dipti Chinchkhede

has successfully completed an internship with IFORTIS WORLDWIDE as a

Marketing & Sales Intern

in the Marketing Department from

10/09/2021 to 10/10/2021

Besides showing high comprehension capacity, managing assignments with the utmost expertise and exhibiting maximal efficiency, he/she has also maintained an outstanding professional demeanor and showcased excellent moral character throughout the internship period.

Wishing the candidate all the best for his/her future endeavors.

Certificate code: IA/2021/M-HR04000316
Place: Tirunelveli, India
Date: 20/10/2021

Rohit Naidu S.
Chief Executive Officer

ISO
29993:2017

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No 704, Kuruvikulam KN, Sankaranesvi TK, Tirunelveli, Tamilnadu - 627754 (INDIA)

Internship In- charge   **Academic Coordinator**   **HOD- MBA**

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Basic Science and Humanities Department
Session- 2021-22
Semester-I

VISION	MISSION
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Assignment-1

Year/Semester: 1st Semester (First Year)
Subject: Engineering Physics
Subject Code: Cs/IT/AI/DS 1T 005

Max Marks: 20   **Date:15.01.2022**

Q1   Explain with diagram : Absorption ,Spontaneous emission, and Stimulated emisssion of radiation

Q2   Describe construction and working of solid state He-Ne LASER with necessary energy level diagram. Explain why diameter of discharge tube is narrow?

Q3   What is acceptance angle for an optical fiber and derive its expression for an optical signal propagating through optical fiber.

Q4   Write difference between :1) Single mode and Multimode Fiber
                                         2) Step Index and Graded Index Fiber

Q5   Draw energy band diagram of n type and p type semiconductor at 0°K and 300°K.

Q6   What is Hall effect. Derive an expression for Hall coefficient,Hall voltage,Hall angle and Hall mobility for an extrinsic semiconductor.Mentioned some application of Hall effect

Q7   What is Fermi energy . Derive an expression to show that Fermi energy lies in middle of band gap in intrinsic semiconductor.

Q8   What is thin film ? Obtain an expression for fringe width in wedge shaped thin film.

Q9   Expain the formation of Newton's ring and show that radius of nth dark ring is proportional to square root of wavelength of light used.

Q10   What are antireflection coating? Derive condition for minimum thickness of film for antireflection .

Last Date of Submission :   22.01.2022

Mr.U.V.Rathod,   Dr.A.N.Gupta,
Subject Teacher   HOD, BSHD,JDCOEM

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Department of Basic Science & Humanities
2021-22 (Odd Sem)

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Assignment for All Branches

Engineering Mathematics

Date of Assignment: 10/04/2022

Q.1. Define the order and degree of differential equation.

$$\frac{d^2y}{dx^2} + 3\left(\frac{d}{dx}\right)^2 + y = 0 \qquad\qquad \text{CO1/1}$$

Q2. Illustrate the C.F. $(D^3 + D^2 + 4D + 4) = 0$ CO2/2

Q.3. Interpret the differential equation $(D^2 + 4) = cos2x$ CO2/2

Q.4. Solve the P.I. of $(D^2 + 3D + 2) = e^{e^x}$ CO3/3

Q.5. Apply the variation of Parameter to get solution $\frac{d^2y}{dx^2} + y = Secxtanx$ CO4/4

Last date of submission: 18/04/2022

Ms.Prerna M.Parkhi,
  Subject Teacher

Dr.A.N.Gupta,
HOD, BSHD,JDCOEM

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Basic Science and Humanities Department
Session- 2021-22
Semester-II

VISION	MISSION
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Assignment-1

Subject:Engineering Physics   Branch:ME/CE/EE/ETC   Date:15.06.2022

Sr.No.	Questions
Q1	Explain with diagram : Absorption , Spontaneous emission, and Stimulated emisssion of radiation
Q2	Describe construction and working of solid state He-Ne LASER with necessary energy level diagram. Explain why diameter of discharge tube is narrow?
Q3	What is acceptance angle for an optical fiber and derive its expression for an optical signal propagating through optical fiber.
Q4	Write difference between :1) Single mode and Multimode Fiber 2) Step Index and Graded Index Fiber
Q5	Draw energy band diagram of n type and p type semiconductor at $0^{\circ}K$ and $300^{\circ}K$.
Q6	What is Hall effect. Derive an expression for Hall coefficient,Hall voltage,Hall angle and Hall mobility for an extrinsic semiconductor.Mentioned some application of Hall effect
Q7	What is Fermi energy . Derive an expression to show that Fermi energy lies in middle of band gap in intrinsic semiconductor.
Q8	What is thin film ? Obtain an expression for fringe width in wedge shaped thin film.
Q9	Expain the formation of Newton's ring and show that radius of nth dark ring is proportional to square root of wavelength of light used.
Q10	What are antireflection coating? Derive condition for minimum thickness of film for antireflection .

Last Date of Submission :   22.06.2022

Dr.U.V.Rathod,   **Principal**   Dr.A.N.Gupta,
Subject Teacher   J D College of Engineering & Management   HOD, BSHD,JDCOEM
                              Khandala, Katol Road
                              Nagpur-441501

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Engineering Mathematics-II   Dt.: 05/06/2021

ASSIGNMENT-1
COMPLEX NUMBER

Q.1. Illustrate$2cos\theta = x + \frac{1}{x}$, $2cos\,\emptyset = y + \frac{1}{y}$,   Prove that

$x^m y^n + \frac{1}{x^m y^n} = 2cos\,(m\theta + n\emptyset)$, $\frac{x^m}{y^n} + \frac{y^n}{x^m} = 2cos(m\theta - n\emptyset)$ 4M]

Q.2. Identify the all values of $\left(\frac{1}{2} + i\frac{\sqrt{3}}{2}\right)^{3/4}$ and show that the continued product of

all the values is 1.   4M]

Q.3. Analyze the function$sin(A + iB) = x + iy,$ then prove that
   (a) $\frac{x^2}{cosh^2 B} + \frac{y^2}{sinh^2 B} = 1$ (b) $\frac{x^2}{sin^2 A} - \frac{y^2}{cos^2 B} = 1$ 4M]

Q.4.Using Demoivre's theorem, solve$x^7 - x^4 + x^3 - 1 = 0$ 4M]

Q.5. Extend the function of $\frac{sin7\theta}{sin\theta}$ in power of $sin\theta$ only.   4M]

Last Dt of submission: 12/06/2021

Ms.Prerna M.Parkhi,   Dr.A.N.Gupta,
  Subject Teacher   **Principal**   HOD, BSHD,JDCOEM
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Department Of Electrical Engineering
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2021-22 (Odd Sem)

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	1. To impart quality education in the field of Electrical Engineering. 2. To be excellent learning center through research and industry interaction.

Assignment

Subject	Network Analysis
Subject code	**EE3T004**
Semester/Year	3rd/2nd year
Unit No. I	I & II
Date of display	31/08/2021
Date of submission	06/09/2021

Sr. No.	Question	Mapped Co
1	What do you mean by passive element.	CO1/ CO2
2	Give the classification of electrical sources.	CO1/CO3/CO4
3	Recall Inductance.	CO3
4	What is a loop.	CO3/CO4
5	Explain the equation for voltage and current in capacitor.	L2/CO4
6	Simplify and Reduce the network using source transformation	L4/CO3
7	Estimate voltage across 20 ohm resistance using Mesh Analysis.	L6/CO4

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8	Explain the equation for voltage and current in capacitor.	L2/CO4
9	Explain duality.	L4/CO4
10	Explain the derivation of Mesh analysis.	L2/CO4

Subject teacher   Academic incharge   HOD EE

PRINCIPAL

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2021-22 (Odd Sem)

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Assignment 1   Date: 31/08/2021

Course: B. Tech in Electronics & Telecommunication

Subject: Microcontroller & its Applications

Subject Code: ET5T002

Year/Semester: 5th Semester (3rd Year)

		(Level/CO)
Q .1	Draw & explain block diagram of 8051 Microcontroller.	2/2
Q.2	Compare the functioning of Von Neuman & Harward architecture.	2/1
Q.3	Compare the difference between Microcontroller & Microprocessor.	2/1
Q.4	Explain the memory organization of 8051 Microcontroller.	2/2
Q.5	Summarize the Interrupt structure of 8051 Microcontroller.	2/2
	Date of Submission: 07/09/2021	

Prof. Avinash K. Ikhar   **Dr. Pravin Kshirsagar**

Course Coordinator /   **HOD (ETC)**
Academic Incharge

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Nagpur-441501

Assignment 1   **Date: 29/01/2022**

Course: B. Tech. in Mechanical Engineering

Subject: Research Methodology

 Subject Code: ME6T005

Year/Semester: 6th Semester (3rd Year)

Q. No.	Question	Level	CO	Marks
01.	Describe basic framework of research process.	2	1	10
02.	Demonstrate various sources of information for research.	1,2	2	10
03.	Explain various types of research design and techniques.	2,5	1,3	10
04.	Compare between primary and secondary sources of literature review.	2,4	4	10

Date of Submission: 12/02/2022

Submit via google classroom (Code- bp7rctw)

Prof. S. G. Chakrabarty   Prof. D. A. Agrawal   Bhushan R.Mahajan
 Subject Teacher   Academic In charge   Head of Department,
                                                                         DOME
                                                                         JDCOEMDepartment
                                                                         Mechanical Engineering
                                                                         J D College of Engineering & Management
                                                                         Nagpur

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Education to Eternity

Semester: - MBA I Semester   **Subject Code:-1T2**

Subject Name: - Management Information System   **Assignment: 2021-22**

==

All Questions are Compulsory:

Q.1.A. Shivam Infotech received a contract to design a MIS System for Ventura Corporation a newly started manufacturing unit for effective operational management. As operational head design a suitable MIS for this organization.

OR

Q.1.B. Modern day Business cannot be managed without an efficient MIS in place. Critically examine this statement while describing the different types of MIS from a management activity point of view.

Q.2.A. An inspection is scheduled at your organization by the labour Commissioner. As an HR Manager, discuss which statutory records you need to make available for inspection to the Labour Commissioner.

OR

Q.2.B.- Tarpulin Engg. engaged in manufacturing & marketing of four wheeler side glass, wants to install a computer program for its marketing department. if you are the marketing specialist in this organization, discuss which are the information update reports, you would require through programming.

Q.3.A. Explain the term Service Management System (SMS). Draw and discuss the conceptual SMS architecture model.

OR

Q.3.B. With the help of suitable example suggest the conceptual model of Project Management System (PMS). Also, draw a system model of integrated system.

Q.4.A. As a sales manager you need to quote a tender of various modules of ERP solution for Shradha Corporation.

OR

Q.4.B. Describe the impact of SCM software on operations of a firm

Q.5.A. Outline and elaborate the three dimensions used in evaluation of an IT Solution

OR

Q.5.B. Explain the tests which are used in TQM software testing

Subject In charge   **Dept. Academic Incharge**   **Dept. Head MBA**

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Semester: - MBA IV Semester   **Subject Code:-4T5**

Subject Name: - Team Dynamic   **Assignment: 2021-22**

===
All Questions are Compulsory

Q1.A. Explain the Maslow Theory in detail

Or

Q1.B. Discuss the Application of Motivation concept in Team Behavior.

Q2.A. Discuss the Meaning and Importance of Interpersonal Communication

Or

Q2.B. Discovering facets of interpersonal trust through Johari window discuss

Q3.A. Write the Concept of Group and Team. Also discuss synergy of Team work

Or

Q3.B. Write notes on Team Decision making and team morale

Q4.A. Explain the Meaning of Conflict and Types of conflict

Or

Q4.B. Discuss competitive vs collaborative behavior

Q5.A. Explain the Concept of OD. Also discuss the Process of OD

Or

Q5.B. Elaborate various Experiential learning methodologies-T-group sensitivity training

Subject In charge   **Dept. Academic Incharge**   **Dept. Head MBA**

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HEAD
Dept. of Management Studies (MBA)
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Nagpur

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KATOL ROAD, NAGPUR
An Autonomous Institute, with NAAC "A" Grade
Subject: Engineering Mathematics
Question Bank

Unit 2

Ordinary Differential Equations of First Order and First Degree and Their Applications

1) Solve $\frac{dy}{dx} = \frac{y}{2y \log y + y - x}$

2) Solve $(x + 1)\frac{dy}{dx} - 2y = (x + 1)^4$

3) Solve $(1 + x^2)\frac{dy}{dx} + y = e^{tan^{-1}x}$

4) Solve a D.E. $\frac{dy}{dx} + \frac{1}{x}tany = \frac{1}{x^2}tanysiny$.

5) Solve $(1 + x)\frac{dy}{dx} - tany = (1 + x)^2 e^x secy$

6) Solve $\frac{dy}{dx}\cos x + y \sin x = \sqrt{y \sec x}$

7) Solve $\left(1 + e^{\frac{x}{y}}\right)dx + \left(1 - \frac{x}{y}\right)e^{\frac{x}{y}}dy = 0$

8) Solve $\frac{2y}{x}dx + (2logx - y)dy = 0$

9) Solve $\frac{dy}{dx} + \left[\frac{x+y \cos x}{1+\sin x}\right] = 0$

10) Solve $\left(y^2e^{xy^2} + 4x^3\right)dx + \left(2xye^{xy^2} - 3y^2\right)dy = 0$

11) Solve $(1 - x^2)\frac{dy}{dx} + 2xy = x\sqrt{(1 - x^2)}$

12] Solve a D.E. $(x^3 - x)\frac{dy}{dx} - (3x^2 - 1)y = x^5 - 2x^3 + x$

13] Solve $\frac{dy}{dx} = \frac{y+1}{(y+2)e^y - x}$

14] Solve $(1 + x)\frac{dy}{dx} - tany = (1 + x)^2 e^x secy$

15] Solve $\frac{dy}{dx} + xsin2y = x^3cos^2y$

16] Solve $\frac{dy}{dx} + y \ tanx = y^3 secx$

17] Solve $\frac{dy}{dx} + \frac{ylogy}{x} = \frac{y(logy)^2}{x^2}$

18] Solve $3y^2\frac{dy}{dx} + 2xy^3 = 4xe^{-x^2}$

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III) EXACT DIFFERENTIAL EQUATION.

19) Solve $\left(1 + e^{\frac{x}{y}}\right) + e^{\frac{x}{y}}\left(1 - \frac{x}{y}\right)\frac{dy}{dx} = 0$

20] Solve $\left(y^2 e^{xy^2} + 4x^3\right)dx + \left(2xye^{xy^2} - 3y^2\right)dy = 0$.

21] Find the value of λ ,for which differential equation $(xy^2 + \lambda x^2 y)dx + (x + y)x^2 dy = 0$ is exact .solve the equation for this value of λ

22) Solve: $(x^2 y^2 + xy + 1)y dx + (x^2 y^2 - xy + 1)x dy = 0$

Ordinary Differential Equation of First Order and First Degree

23) Solve $sinx\frac{dy}{dx} + 2y = tan^3\left(\frac{x}{2}\right)$.

24) Solve $(1 + x^2)\frac{dy}{dx} + y = e^{tan^{-1}x}$.

25) Solve $x(x - 1)\frac{dy}{dx} - y = x^2(x - 1)^2$.

26) Solve a D.E. $(x^3 - x)\frac{dy}{dx} - (3x^2 - 1)y = x^5 - 2x^3 + x$.

27) $\left(\frac{e^{-2\sqrt{x}}}{\sqrt{x}} - \frac{y}{\sqrt{x}}\right)\frac{dx}{dy} = 1$

28) $.tany\frac{dy}{dx} + tanx = cosycos^2 x$

29) Solve $(1 + x)\frac{dy}{dx} - tany = (1 + x)^2 e^x secy$

30) Solve. $x\left[\frac{dy}{dx} + y\right] = 1 - y$.

31) Solve $\frac{dy}{dx} - xtan(y - x) = 1$.

32) Solve the differential equation $\frac{dy}{dx} + \frac{ylogy}{x} = \frac{y(logy)^2}{x^2}$

33) $\{1 + xycos^2 x - 2xy + 1\}dx + \{sin^2 x - x^2 + 3\}dy = 0$

34) Solve $(2x + y - 3)dy - (x + 2y - 3)dx = 0$

35) $.\{cosx + tany + cos(x + y)\}dx + \{sinxsec^2 y + cos(x + y)\}dy = 0$

36) $.Solve(1 + y^2)dx = (tan^{-1}y - x)dy$.

37) $.Solve\left(xtan\frac{y}{x} - ysec^2\frac{y}{x}\right)dx + xsec^2\frac{y}{x}dy = 0$.

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Question Bank

UNIT-I

MATRIX

1) Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$$

2) Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{bmatrix}$$

3) Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 1 & 1 & 4 \\ 1 & 1 & 0 \\ 2 & 3 & 4 \end{bmatrix}$$

4) Test for consistency and solve: $2x - 3y + 7z = 5, 3x + y - 3z = 13, 2x + 19y - 47z = 22$.

5) Test for consistency and solve: $x + y + z = 6, 2x + y + 3z = 13, 5x + 2y + z = 12$.

6) Investigate the values of λ and μ so that the equations

$2x + 3y + 5z = 9, 7x + 3y - 2z = 8, 2x + 3y + \lambda z = \mu$ have

 (i) No solution (ii) Unique solution (iii) More than one solution.

7) Solve the following equations $x + y + z = 3, \ x + 2y + 3z = 4, \ x + 4y + 9z = 6$ by matrix method.

8) Solve the following equations $x - 2y + 3z = 2, \ 2x - 3z = 3, \ x + y + z = 0$ by matrix method.

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9) Find the rank of the following matrices by reducing them to normal form

$$A = \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$$ (4M)

10) For the matrix $A = \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$,find the nonsingular matrices P and Q such that PAQ is in normal form.   (6M)

11) Use Gauss-Jordan method to find the inverse of the following Matrices $A =$
$\begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$. (4M)

12) For what values of k is the following system of equations consistent and hence solve for them $x + y + z = 1; x + 2y + 4z = k, x + 4y + 10z = k^2$. (6M)

13) Show that the equations
$x + 2y - z = 3; 3x - y + 2z = 1; 2x - 2y + 3z = 2; x - y + z = -1$.
(4M)

14) Show that the equations $3x + 4y + 5z = a; 4x + 5y + 6z = b; 5x + 6y + 7z = c$ do not

have a solution unless $a + c = 2b$.(4M)

15) Find the characteristic vectors of the matrix $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$. (6M)

16) Find the eigen values and the eigen vectors of the matrix $A = \begin{bmatrix} -2 & 2 & 2 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$ (6M).

17) Use the Cayley-Hamilton theorem to find A^{-1}, if the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$ (4M).

10.If $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$, find A^{-1}. Find $B = A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$.(6M)

18] Find A^{-1} by adjoint method if

$$A = \begin{bmatrix} 1 & 2 & 0 \\ -1 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$$

19] Find A^{-1} by adjoint method if

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$$A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$$

20] Find A^{-1} by adjoint method if

$$A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 3 & 4 \\ 1 & 4 & 3 \end{bmatrix}$$

21] Find A^{-1} by adjoint method if

$$A = \begin{bmatrix} 3 & 2 & 1 \\ 0 & 2 & 0 \\ 1 & 2 & 3 \end{bmatrix}$$

22] Find A^{-1} by adjoint method if

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 8 \end{bmatrix}$$

23] Solve the following equations $x + y + z = 3$, $x + 2y + 3z = 4$, $x + 4y + 9z = 6$ by matrix method.

24] Solve the following equations $x - 2y + 3z = 2$, $2x - 3z = 3$, $x + y + z = 0$ by matrix method.

25] solve the following system of equation by adjoint method $3x_1+2x_2+7x_3=5$, $2x_1+3x_2+x_3=8$, $3x_1+4x_2+x_3=3$

26] solve the system of equation by Matrix inversion $5x+3y+7z = 4$, $3x+26y+2z = 9$, $7x+2y+10z = 5$

27] solve by matrix inversion $5x+3y+7z = 48$, $2x+6y-3z = 18$, $8x-3y+2z = 21$ (w-12,6m)

28] solve the following system of equation by adjoint method $x+2y+z = 7$, $x+3z = 11$, $2x-3y = 1$ (W-13,6m)

29] solve the system of equation by Matrix inversion $x+y+z = 3$, $x+2y+3z = 4$, $x+4y+9z = 6$ (S-15,6m)

30] solve the system of equation by Matrix method $3x+y+2z = 3$, $2x-3y-z = -3$, $x+2y+z = 4$

(S-13,5m)31] solve the following system of equation by adjoint method $2x+3y+4z = 15$, $3x-y+2z = 9$, $x+y+z= 5$

(S-14,6m)

32) Find A^{-1} by Partitioning method

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$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$$

33) Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{bmatrix}$$

34) Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 1 & 1 & 4 \\ 1 & 1 & 0 \\ 2 & 3 & 4 \end{bmatrix}$$

35) Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 2 & 1 & -1 & 2 \\ 1 & 3 & 2 & -3 \\ -1 & 2 & 1 & -1 \\ 2 & -3 & -1 & 4 \end{bmatrix}$$

36) Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 5 \\ 1 & 4 & 12 \end{bmatrix}$$

37) Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 1 & 2 & 3 & 1 \\ 1 & 3 & 3 & 1 \\ 2 & 4 & 3 & 3 \\ 1 & 1 & 1 & 1 \end{bmatrix}$$

38) Find A^{-1} by partition method where $A = \begin{bmatrix} 1 & 2 & 31 \\ 1 & 3 & 32 \\ 2 & 4 & 33 \end{bmatrix}$

39) Find the inverse of the matrix $A = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 1 & 1 & 0 \end{bmatrix}$ Using partitioning method.

40) Find inverse of $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$ by partitioning

41) Find the rank of the following matrices

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$$A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & -1 & 4 \\ -2 & 8 & 2 \end{bmatrix}$$

42) Find the rank of the following matrices

$$A = \begin{bmatrix} 3 & -1 & 2 \\ -6 & 2 & 4 \\ -3 & 1 & 2 \end{bmatrix}$$

43) Find the rank of the following matrices

$$A = \begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$$

43) Find the rank of the following matrices

$$A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 5 \\ 1 & 5 & 5 & 7 \\ 8 & 1 & 14 & 17 \end{bmatrix}$$

44) Find the rank of the following matrices

$$A = \begin{bmatrix} 1 & 1 & 1 & 6 \\ 1 & -1 & 2 & 5 \\ 3 & 1 & 1 & 8 \\ 2 & -2 & 3 & 7 \end{bmatrix}$$

45) Find the rank of the following matrices

$$A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$$

46) Find the rank of the following matrices

$$A = \begin{bmatrix} 6 & 1 & 3 & 8 \\ 4 & 2 & 6 & -1 \\ 10 & 3 & 9 & 7 \\ 16 & 4 & 12 & 15 \end{bmatrix}$$

47) Find the rank of the following matrices

$$A = \begin{bmatrix} 5 & 6 & 7 & 8 \\ 6 & 7 & 8 & 9 \\ 11 & 12 & 13 & 14 \\ 16 & 17 & 18 & 19 \end{bmatrix}$$

48) Test for consistency and solve: $2x - 3y + 7z = 5, 3x + y - 3z = 13, 2x + 19y - 47z = 22.$

49) Test for consistency and solve: $x + y + z = 6, 2x + y + 3z = 13, 5x + 2y + z = 12.$

50) Investigate the values of λ and μ so that the equations

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$2x + 3y + 5z = 9$,$7x + 3y - 2z = 8$,$2x + 3y + \lambda z = \mu$ have

(i) No solution (ii) Unique solution (iii) More than one solution.

51) For what values of λ and **μ** do the system of equations

$x + y + z = 6$, $x + 2y + 3z = 10$, $x + 2y + \lambda z = \mu$ have

(i) No solution (ii) Unique solution (iii) More than one solution.

52) Test the foiiowing system for cOnsistency and solve it if consistent

  3x+2y+z =10 ,2x+5y+3z =15 ,5x - 4y - 3z =0

53) show that the condition for the equation 3x+4y+5z =a ,4x+5y+6z =b , 5x+6y+7z =c ,

   To have a solution is a+c =2b .Also solve the equation for a=b=c=-1

54) For what value of k ,the equation x+y+z =1 ,2x+y -4z = k ,4x +y +10z =k^2 have

unique solution and solve them.

55) Find the real value of P for which the following equations will have a nontrivial solution.

        x+2y+3z =Px , 3x+y+2z =Py , 2x+3y+z=Pz .

56) Using the concept of rank ,determine the value of λ so that the following eqation have

a non zero solution. 2x+y+2z =0 ,x+y+3z = 0 ,4x+3y+λz = 0.

57) For what value of λ the equations $x + y + z = 1$, $x + 2y + 4z = \lambda$; $x + 4y + 10z = \lambda^2$

Have a solution and solve them completely in each case.

58) Show that if $\lambda \neq -5$, the system   of   equations $3x - y + 4z = 3$; $x + 2y - 3z - 2$; $6x + 5y + \lambda z = -3$ have a unique solution. If $\lambda = -5$, show that equations are

consistent. Determine the solution in each case.

59) Test the consistency and solve

    $x + 5y + 7z = 15$, $2x + 3y + 4z = 11$, $x - 2y - 3z = -4$, $3x + 11y + 13z = 25$

60) Test the consistency and solve

$5x + 3y + 7z = 4$, $3x + 26y + 2z = 9$, $7x + 2y + 10z = 5$.

61) Test the consistency and solve:

     $3x_1 + 3x_2 + 2x_3 = 1$, $x_1 + 2x_2 = 4$, $2x_1 - 3x_2 - x_3 = 5$.

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62) Find for what values of k the set of equations $2x - 3y + 6z - 5t = 3$,

$y - 4z + t = 1$, $4x - 5y + 8z - 9t = k$ has (i) no solution (ii) infinite number of solutions.

63) Test the consistency and solve

$$x + y + z = 6, x - y + 2z = 5, 3x + y + z = 8$$

64) Investigate the values of λ and μ so that the equations

$2x + 3y + 5z = 9, 7x + 3y - 2z = 8, 2x + 3y - \lambda z = \mu$ have

 (i) No solution (ii) Unique solution (iii) More than one solution.

65) Investigate the values of λ and μ so that the equations

$x + y + z = 6, x + 2y + 5z = 10, 2x + 3y + \lambda z = \mu$ have

 (i) No solution (ii) Unique solution (iii) More than one solution.

66) Find A^{-1} by Adjoint method if $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 3 & 4 \\ 1 & 4 & 3 \end{bmatrix}$

67] Find A^{-1} by Partitioning method

a) $A = \begin{bmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{bmatrix}$

68] Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$$

69] Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 1 & 1 & 4 \\ 1 & 1 & 0 \\ 2 & 3 & 4 \end{bmatrix}$$

70] Find A^{-1} by Partitioning method

$$A = \begin{bmatrix} 2 & 1 & -1 & 2 \\ 1 & 3 & 2 & -3 \\ -1 & 2 & 1 & -1 \\ 2 & -3 & -1 & 4 \end{bmatrix}$$

71] Find A^{-1} by Partitioning method

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$$A = \begin{bmatrix} 0 & cos\theta & -sin\theta \\ 0 & sin\theta & cos\theta \\ 1 & 0 & 0 \end{bmatrix}$$

72] Find rank of matrix

$$A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$$

73] Find rank of matrix

$$A = \begin{bmatrix} 5 & 6 & 7 & 8 \\ 6 & 7 & 8 & 9 \\ 11 & 12 & 13 & 14 \\ 16 & 17 & 18 & 19 \end{bmatrix}$$

74] Find rank of matrix

$$A = \begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$$

75] Test for consistency and solve:

a) $x + y + z = 3, x + 2y + 3z = 4, x + 4y + 9z = 6$

76] Test for consistency and solve:

b) $5x + 3y + 7z = 4, \ 3x + 26y + 2z = 9, \ 7x = 2y = 10z = 5$

77] Test for consistency and solve:

$x + y + z = 6, \qquad 2x + y + 3z = 13, \qquad 5x + 2y + z = 12.$

78] Test for consistency and solve:

$$x - 2y + 3z = 2, \qquad 2x - 3z = 3, \qquad x + y + z = 0$$

80] For what values of λ and μ do the system of equations

$x + y + z = 6, x + 2y + 3z = 10, x + 2y + \lambda z = \mu$ Have

(i) No solution (ii) unique solution (iii) More than one solution.

81] Investigate the values of λ and μ so that the equations

$2x + 3y + 5z = 9, 7x + 3y - 2z = 8, 2x + 3y + \lambda z = \mu$ Have

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(i) No solution (ii) Unique solution (iii) More than one solution.

82] Show that the condition for the equation

$$3x + 4y + 5z = a, 4x + 5y + 6z = b, 5x + 6y + 7z = c,$$

To have a solution is $a + c = 2b$. Also solve the equation for $a = b = c = -1$

83] Find the real value of P for which the following equations will have a nontrivial solution. $x + 2y + 3z = Px, 3x + y + 2z = Py, 2x + 3y + z = Pz.$

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Subject: Engineering Physics
By:Dr.Umashanakrsingh V. Rathod
Question Bank
Section-A

Sr. No.	Question
1	What is LASER? comment how it is differ from ordinary light.
2	What is the principle on which optical signal propagate through an optical fibre?
3	What is Optical fibre? Comment the principle on which signals propagates through optical fibre.
4	Clarify, how the Semiconductor are negative temeperature coefficient material.
5	Exaplain, How N-type semiconductor form?
6	Define Fermi energy in solids.
7	What do you mean by Forward bias of PN junction diode?
8	What is intrinsic & extrinsic semiconductors?
9	Comment, How, Fermi energy level vary with doping concentration in N-type semiconductor.
10	What do you mean by Reverse bias of PN junction diode?
11	What is Lorentz force?
12	What kind of force charge particle experience in magnetic field?
13	What kind of force charge particle experience in Electric field?
14	What is meant by equi-potential surface?
15	What is crossed field configuration?
16	Explain the force experienced by charge particle in uniform Electric field E and Magnetic field B.
17	Write the applications of CRO in medical field.
18	Explain the motion of electron in parallel uniform magnetic field B.
19	Explain the force experienced by charge particle in uniform Magnetic field B.
20	Explain the motion of electron in parallel uniform Electric field E.
21	What is a function of aquadag coating in CRT?
22	Define Interference in wave optics.
23	What is thin film?
24	State Brewster's law.
25	Define polarization of light.
26	Why the wedge shape fringes are straight, parallel and equi-spaced? Comment.
27	What is antireflection coating?
28	Why the Newton's rings are circular? Comment.

29	What are the conditions for thin film to be antireflection coating?
30	What is meant by electromagnetic waves?
31	What do you mean by electromagnetic waves? How it propagates through free space?

Section-B

Sr. No.	Question
1	Discuss four level pumping scheme for Laser.
2	Discuss three level pumping scheme for Laser.
3	Why two level pumping scheme is difficult to achieve?
4	What is the difference between step index fiber and graded index fiber?
5	What is the difference between single mode fiber and multimode fiber?
6	Elaborate the phenomena of Total Internal Reflection of light in an optical fibre.
7	Show that Fermi level in an intrinsic semiconductor lies in the middle of the energy gap.
8	Explain, how Fermi Energy varies with doping concentration in N-type semiconductor.
9	Show that the velocity acquired by an electron in uniform electrostatic field varies as the square root of potential difference through which it is accelerated.
10	Explain the formation of a depletion region in a PN junction diode.
11	Explain the terms: 1.Drift Current 2.Diffusion Current
12	Explain P-N junction diode and illustrate its I-V characteristics in forward and reverse biased.
13	Write comparision between Snell's law and Bethe's law.
14	What is CRO? Draw a block diagram of CRO.
15	Interpret with an expression that electron follows parabolic path in transverse uniform electric field.
16	Obtain an expression for fringe width obtained in wedge shape thin film.
17	What is Brewster's law? Derive an expression for polarizing angle.
18	Obtain an expression for the path difference in case of interference in thin films due to reflected light.

Section-C

Sr. No.	Question
1	Explain with neat diagram the process of 1.absorption transition 2. spontaneous emission 3. stimulated emission of light.
2	Explain the construction and working of Ruby LASER with necessary energy level diagram.
3	Explain the construction and working of He-Ne LASER with necessary energy level diagram.

5	What is Hall effect? Derive the expression for Hall coefficient, Hall voltage, Hall angle and Hall mobility in extrinsic semiconductor.
6	Draw the Band energy diagram of PN junction diode connected in Forward and Reversed biased mode.
7	Discuss the motion of charged particle in transverse uniform magnetic field and obtain the expression for radius, time period and frequency of circular motion.
8	Draw block diagram of CRO. Explain the function of time base circuit in CRO.
9	Draw an energy band diagram for p-n junction when (i) Unbiased (ii) Forward biased (iii) Reverse biased.
10	Write a note on electrical conductivity in Intrinsic semiconductor and derive its expression in terms of Band gap.
11	What is Hall effect? Derive an expression for Hall Coefficient.
12	A n-type germanium sample has a doner density of 10^{21} m^{-3}. It is arranged in Hall experiment having magnetic field of 0.5 tesla and current density is 500 A/m^2. Find the Hall voltage if the sample is 3 mm wide.
13	Write a note on electrical conductivity in Intrinsic semiconductor and derive its expression in terms of Band gap.
14	Find the conductivity of Intrinsic Germanium at 300 ^{0}K. Given that Intrinsic carrier density is 2.5 x 10^{19} m^{-3} and electron and holes mobility is 0.39 and 0.19 m^{2}V^{-1}.S^{-1} respectively.
15	Draw an energy band diagram for p-n junction when (i) Forward biased (ii) Reverse biased.
16	Show that an electron with uniform velocity follows a parabolic path in transverse uniform electric field.
17	What is Bethe's law? Discuss the refraction of the electron beam across an equi-potential surface. Show how this concept is symmetrical with electrostatic lens.
18	Derive an expression for the radius, time period, frequency and pitch for an electron moving with an angle ø in magnetic field.
19	What is CRO? Explain in details the working of CRT.
20	Derive an expression for the radius, time period, frequency and pitch for an electron moving with an angle ø in magnetic field.
21	What is Bethe's law? Discuss the refraction of the electron beam across an equi-potential surface. Explain how it resembles with Snell's law.
22	Derive the condition for path difference for interference in thin parallel film due to reflected light.
23	What is fringe width? Obtain an expression for fringe width in a wedge shape thin film experiment.
24	Write the four Maxwell's equations in differential form & Derive a wave equation for electromagnetic wave in free space.
25	What is Poynting vector? Derive an expression to show that Poynting vector S is vector product of E and H.

Section-D

Sr. No.	Question
1	Give the construction and working of He-Ne laser. Draw necessary energy level diagram.
2	Write four modern application of LASER.
3	Derive an expression for acceptance angle for step index fiber with the help of suitable diagram.
4	Find the Numerical aperture for an optical fiber with refractive indices of core and cladding as 1.5 and 1.49 respectively.
5	Outline the construction of Optical fibre and build a relationship of acceptance angle with Numerical aperture.
6	Calculate the numerical aperture, acceptance angle and fractional Refractive index change of an optical fibre whose core and cladding are made of materials of refractive index 1.6 and 1.5 respectively.
7	Show how acceptance angle is related to numerical Aperture, also explain the meaning of acceptance angle.
8	A step-index fibre has a numerical aperture of 0.26 and a core refractive index is 1.5. Calculate the refractive index of cladding and acceptance angle.
9	What is Hall effect? Derive the expression for Hall coefficient, Hall voltage, Hall angle and Hall mobility in extrinsic semiconductor.
10	What is Hall Effect? Derive the formula for Hall voltage and Hall coefficient with necessary diagram and interpretation.
11	A n-type germanium sample has a donor density of 10^{21} m^{-3}. It is arranged in Hall experiment having magnetic field of 0.5 Tesla and current density is 500 A/m^2. Find the Hall voltage if the sample is 3 mm wide.
12	Discuss the motion of charged particle in transverse uniform magnetic field and obtain the expression for radius, time period and frequency of circular motion.
13	Draw block diagram of CRO. Explain the time base circuit in CRO.
14	An Electron accelerated of 250 V enters the electric field at an angle of incidence of 50^0 and get refracted through an angle of 30^0. Find the potential difference between two regions.
15	Derive the condition for path difference for interference in thin parallel film due to reflected light.
16	What is Bethe's law? Derive an expression for it. In what way it resembles and differs from Snell's law.
17	Write the four Maxwell's equations in integral form. Derive a wave equation for electromagnetic wave in free space and show that electromagnetic wave travel with velocity of light C=3 x10^8 m/s in free space.

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Dr.A.N.Gupta,
HOD, BSHD,JDCOEM

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VISION	MISSION
To be a center of excellence imparting professional education satisfying societal and global needs.	1. Transforming students into lifelong learners through, quality teaching, training and exposure to concurrent technologies. 2. Fostering conducive atmosphere for research and development through well-equipped laboratories and qualified personnel in collaboration with global organizations.

Education to Eternity

MBA 2nd Semester
Question Bank: Human Resource Management

Academic Year 2021-22

1. "Human Resource Management is a process consisting of the acquisition, development, motivation and maintenance of human resources." comment on the statement and explain the importance of Human Resource management in today's dynamic business environment.

2. An organization in Nagpur has appointed a new HR Manager who believes in the importance of human element in an organization. Discuss the roles and qualities of a newly appointed HR Manager. Also distinguish between Personnel and HR Management.

3. PNB Enterprises is hiring Business Development Mangers for expanding their business in Maharashtra. Prepare a Job analysis for BDM and develop job analysis and job specification for the same position.

4. Write down the Job Description and Job Specification of a Receptionist of a 5star Hotel.

5. Sunrise Pvt. Ltd. is FMCG Company hiring Executive for sales promotion activities. Design the selection process for the selection of sales promotion executives.

6. Suppose Human Resource Planners forecast that computerization in Wadia Industries Ltd. indicates that the firm needs 25% newer employees in the next 3 years. In today's unpredictable environment it is difficult to project HR demands. How you think HRP can help the Chief Personnel Manager understand HR demand and Forecast.

7. Explain Recruitment and selection process of IT Company.

8. You are HR manager at I-Gate Pvt Ltd an IT Firm which is going through structural changes. As an HR Manager which type of leadership training you will provide to leaders and why?

9. A new Pizza outlet of an established chain is opened in your town and they have hired you as an external trainer to impart training programme to their staff. What will be the methods you will use to make the programme meaningful and beneficial? Justify the answer by giving Merits and Demerits of all the methods which will be used.

10. The superior of Mr. Ashish continuously records the critical incidents of Mr. Ashish's performance and behavior relating to all characteristics in a specifically designed notebook. The superior of Mr. Rohit gives rating to a list of statements representing the characteristics and performance of Mr. Rohit. Identify the performance Appraisal method being followed for Mr. Ashish and Mr. Rohit and explain the merits and demerits of those methods.

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HOD MBA

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Department Of Electrical Engineering
"Igniting minds to illuminate the world"
2021-22 (Odd Sem)

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	1. To impart quality education in the field of Electrical Engineering. 2. To be excellent learning centre through research and industry interaction.

UNIT I: Introduction to Instrumentation

Intoduction:

Instrumentation is the science of automated measurement and control. Applications of this science abound in modern research, industry, and everyday living. From automobile engine control systems to home thermostats to aircraft autopilots to the manufacture of pharmaceutical drugs, power Plants, Oil and Gas, Refineries etc. and automation surrounds us.

The first step, naturally, is measurement. If we can't measure something, it is really pointless to try to control it. This "something" usually takes one of the following forms in industry:

- Fluid pressure
- Fluid flow rate
- The temperature of an object
- Fluid volume stored in a vessel
- Chemical concentration
- Machine position, motion, or acceleration
- Physical dimension(s) of an object
- Electrical voltage, current, or resistance etc…

Once we measure the quantity we are interested in, we usually transmit a signal representing this quantity to an PLC/DCS systems where either human (manual) or automated action then takes place. If the controlling action is automated, the PLC/DCS sends a signal to a final controlling device which then influences the quantity being measured.

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This final control device usually takes one of the following forms:

- Control valve (for throttling the flow rate of a fluid)
- Electric motor
- Electric heater etc…

Both the measurement device and the final control device connect to some physical system which we call the process. To show this as a general block diagram:
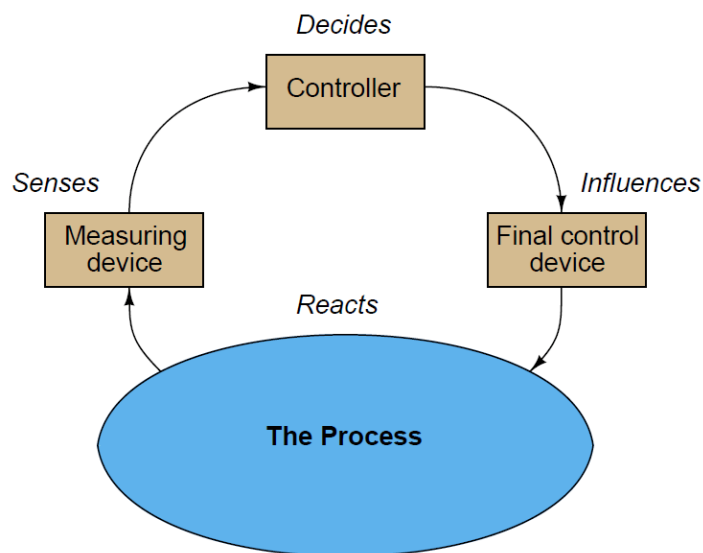
The common home thermostat is an example of a measurement and control system, with the home's internal air temperature being the "process" under control.

In this example, the thermostat usually serves two functions: sensing and control, while the home's heater adds heat to the home to increase temperature, and/or the home's air conditioner extracts heat from the home to decrease temperature.

The job of this control system is to maintain air temperature at some comfortable level, with the heater or air conditioner taking action to correct temperature if it strays too far from the desired value (called the set point).

Industrial measurement and control systems have their own unique terms and standards, which is the primary focus of this article. Here are some common instrumentation terms and their definitions:

Process: The physical system we are attempting to control or measure. Examples: water filtration system, molten metal casting system, steam boiler, oil refinery unit, power generation unit.

Process Variable, or PV: The specific quantity we are measuring in a process. Examples: pressure, level, temperature, flow, electrical conductivity, pH, position, speed, vibration.

Setpoint, or SP: The value at which we desire the process variable to be maintained at. In other words, the "target" value for the process variable.

Primary Sensing Element, or PSE: A device directly sensing the process variable and translating that sensed quantity into an analog representation (electrical voltage, current, resistance; mechanical force, motion, etc.). Examples: thermocouple, thermistor, bourdon tube, microphone, potentiometer, electrochemical cell, accelerometer.

Transducer: A device converting one standardized signal into another standardized instrumentation signal, and/or performing some sort of processing on that signal. Often referred to as a converter and sometimes as a "relay." Examples: I/P converter (converts 4- 20 mA electric signal into 3-15 PSI pneumatic signal), P/I converter (converts 3-15 PSI pneumatic signal into 4-20 mA electric signal).

Note: in general science parlance, a "transducer" is any device converting one form of energy into another, such as a microphone or a thermocouple. In industrial instrumentation, however, we generally use "primary sensing element" to describe this concept and reserve the word "transducer" to specifically refer to a conversion device for standardized instrumentation signals.

Transmitter: A device translating the signal produced by a primary sensing element (PSE) into a standardized instrumentation signal .

Lower- and Upper-range values, abbreviated LRV and URV, respectively: the values of process measurement deemed to be 0% and 100% of a transmitter's calibrated range. For example, if a temperature transmitter is calibrated to measure a range of temperature starting at 300 degrees Celsius and ending at 500 degrees Celsius, its LRV would be 300 degree C and its URV would be 500 degree C.

Zero and Span: alternative descriptions to LRV and URV for the 0% and 100% points of an instrument's calibrated range. "Zero" refers to the beginning-point of an instrument's range (equivalent to LRV), while "span" refers to the

width of its range (URV − LRV). For example, if a temperature transmitter is calibrated to measure a range of temperature starting at 300 degrees Celsius and ending at 500 degrees Celsius, its zero would be 300 deg C and its span would be 200 deg C.

Controller: A device receiving a process variable (PV) signal from a primary sensing element (PSE) or transmitter, comparing that signal to the desired value (called the setpoint) for that process variable, and calculating an appropriate output signal value to be sent to a final control element (FCE) such as an electric motor or control valve.

Input   PSE   Controller   Output (FCE)

Set Point   electric motor
                             or control valve
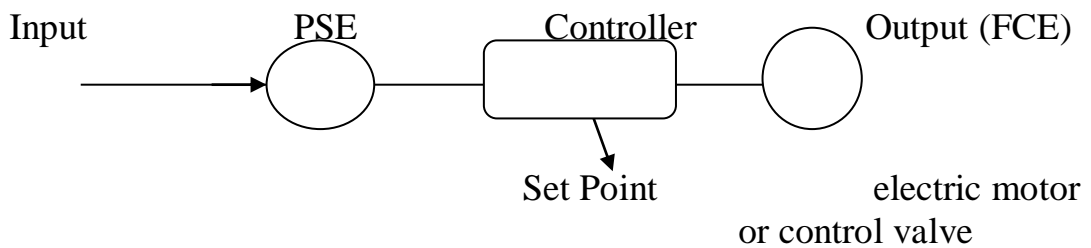
Final Control Element, or FCE: A device receiving the signal output by a controller to directly influence the process. Examples: variable-speed electric motor, control valve, electric heater.

Types of electrical measuring instruments:

Measurements involve the use of instruments as a physical means of data mining quantities or variables.

The history of development of electrical measuring instruments is divided into three categories.

1)Mechanical measuring instruments
2)Electrical measuring instruments
3)Electronic measuring instruments

Electrical methods of indicating the output of the detectors are more Rapid than mechanical methods. It is unfortunate that an electrical system normally depends upon a mechanical meter movement as indicating device. This mechanical movement has some inertia and therefore these instruments have a limited time response.

Electrical measuring instruments are classified into two categories. They are
1) **Absolute instruments**
2) **Secondary instruments**

1) Absolute instruments ::

These **absolute instruments** give the magnitude of the quantity under measurement in terms of physical **constants of the instrument**.
These **absolute instruments** are standard and are used laboratories.

Examples : tangent galvanometer

2) Secondary instruments ::

These instruments are so constructed that the quantity being measured can only be measured by observing the output indicated by the instrument. The instruments are calibrated by comparison with absolute instruments or other secondary instruments which has already been calibrated against an absolute instrument.

Therefore secondary instruments are most commonly used. Absolute instruments are seldom used except in standards institutions while **Secondary instruments** find usage almost in every sphere of measurement.

Examples : A voltmeter, a glass thermometer and pressure gauge

These **secondary instruments** are classified into 3 types :
1) Indicating instruments
2) Recording instruments
3) Integrating instruments

1) Indicating instruments ::

These instruments will give instantaneous values of the quantity to be measured. Scale and pointer mechanism are invalid. PMMC,MI, dynamometer wattmeter, frequency meter, power factor meter are examples.

2) Recording instruments ::

These instruments records the value to be measured or observed. Recorded over a graph paper by a light weight pen.These are used to observe load variation continuously. Examples are recording voltmeter, recording wattmeter, storage oscilloscope.

Strip Chart Recorder
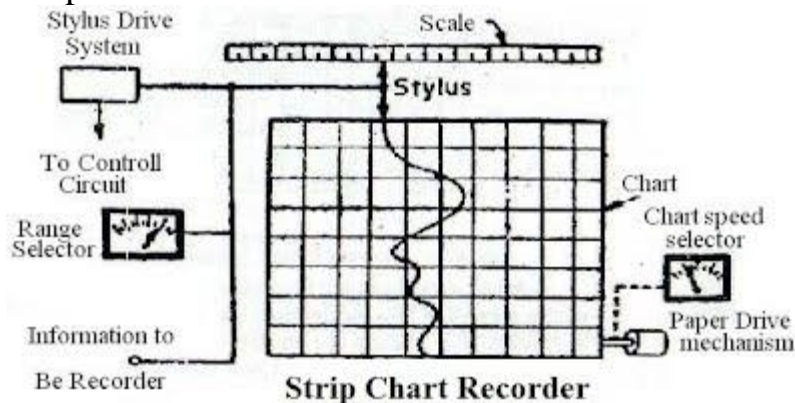
3) Integrating instruments ::

These instruments add the measured value to the existing value. These instruments will give the total electricity consumed over a peroid of time. Energy meter or KWhr meter ,kVARh meter and ampere hour meter.

Torque in Instruments:

In order to ensure proper operation of electrical indicating instruments, these torques are required. These are used in analog meters.

Deflecting torque

• **Definition**: It is the torque which deflects the pointer on a calibrated scale according to the electrical quantity passing through the instrument.
• The **deflecting torque** causes moving system and hence pointer attached to it moves from zero position to indicate electrical quantity being measured on graduated scale.

➤ TD ∝ Measurable quantity

Controlling torque

• **Definition**: It is the torque which controls movement of the pointer on particular scale according to the quantity of electricity passing through it.
• If deflecting torque acts alone, pointer would continue to move indefinitely and would swing over to the maximum deflected position irrespective of magnitude of current (or voltage or power) to be measured.
• The **controlling torque** is opposite to deflecting torque. When deflecting torque equals to controlling torque, pointer comes to final steady state position.

➤ At equilibrium, Tc = TD

➤ Controlling torque is also used to bring the pointer in zero initial position, if there is no deflecting torque.

➤ Controlling torque is provided by spring control and gravity control.
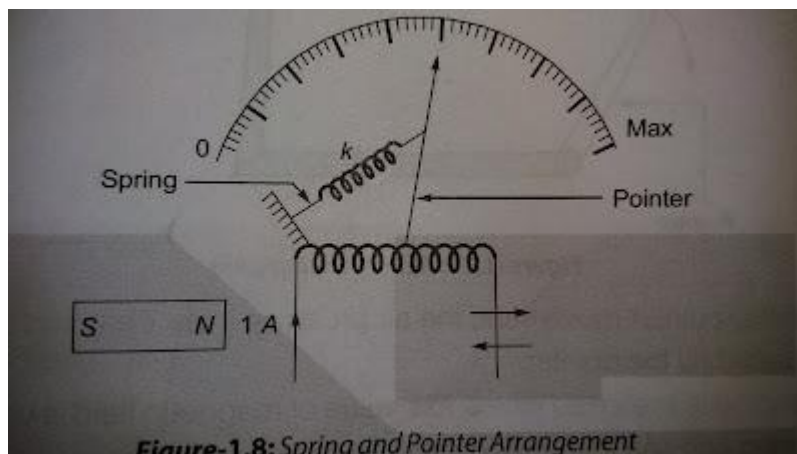
Figure-1.8: Spring and Pointer Arrangement

Damping torque

• **Definition**: This torque is used to damp out oscillation at the final steady state position. The time response of the instrument depends on damping torque.
• Under the action of deflecting torque, moving system of the instrument defects, while the controlling torque is applied on it in the opposite direction so that deflection may be proportional to the quantity under measurement.
• Under the action of these two torques the pointer oscillates at the mean position and delays to come to the final position.
• Damping torque is provided in the instrument which help the moving system of the instrument to reach to the final position at the earliest.

Damping torque is provided by following:

➤Air friction damping: It is used where low magnetic fields are produced.

➤Fluid friction damping: It is used where deflecting torque is minimum.

➤Eddy current damping: It is used where permanent magnet produces the required deflecting torque.

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LEARNING OUTCOMES

In this chapter we will discuss the effects of applying a torsional loading to a long straight member such as a shaft or tube. Initially we will consider the member to have a circular cross section. We will show how to determine both the stress distribution within the member and the angle of twist when the material behaves in a linear elastic manner and also when it is inelastic. Statically indeterminate analysis of shafts and tubes will also be discussed, along with special topics that include those members having noncircular cross sections. Lastly, stress concentrations and residual stress caused by torsional loadings will be given special consideration.

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TORSIONAL DEFORMATION OF CIRCULAR SHAFT

- *Torque* is a moment that tends to twist a member about its longitudinal axis. Its effect is of primary concern in the design of axles or drive shafts used in vehicles and machinery.

- When the torque is applied, the circles and longitudinal grid lines originally marked on the shaft tend to distort into the pattern shown in Fig

- Note that twisting causes the circles to *remain circles*, and each longitudinal grid line deforms into a helix that intersects the circles at equal angles

- The cross sections from the ends along the shaft will remain *flat*—that is, they do not warp or bulge in or out—and radial lines *remain straight* during the deformation

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TORSIONAL DEFORMATION OF CIRCULAR SHAFT

Circles remain circular

Longitudinal lines become twisted

T

T

Before deformation
(a)

Radial lines remain straight
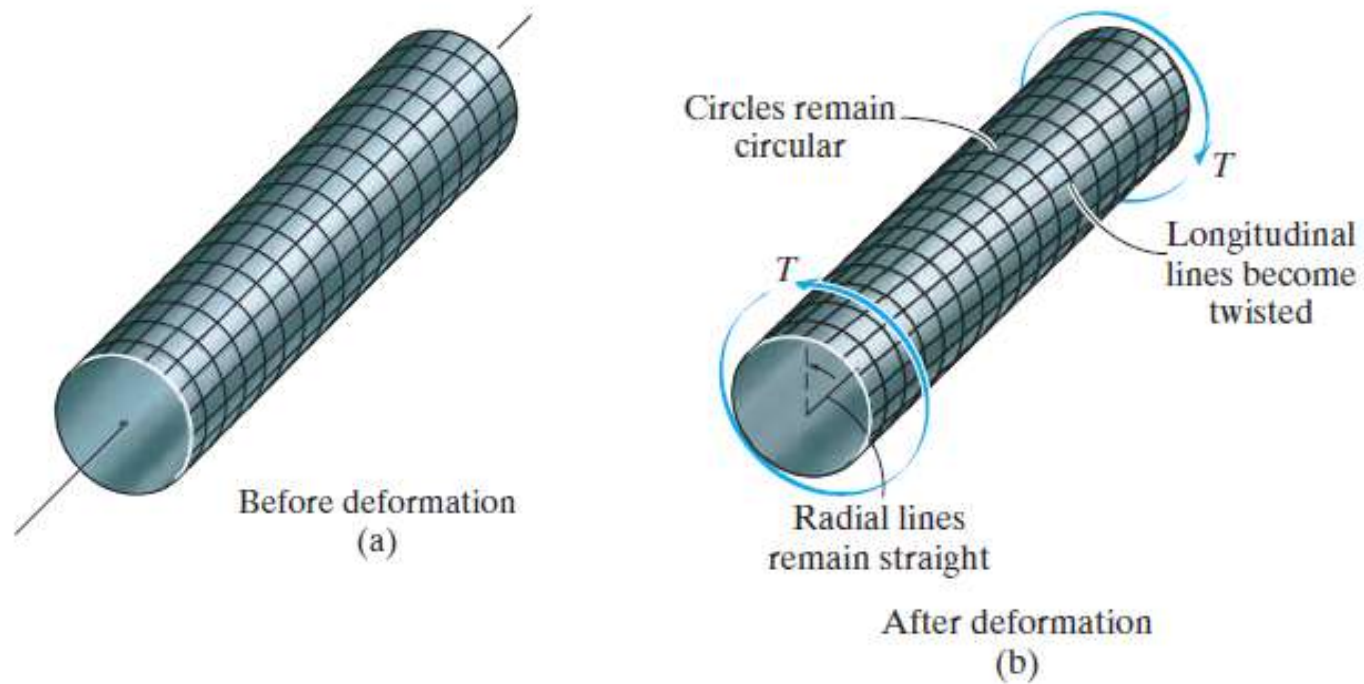
After deformation
(b)

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TORSIONAL DEFORMATION OF CIRCULAR SHAFT

Notice the deformation of the rectangular element when this rubber bar is subjected to a torque.

$\phi(x)$

Deformed plane

Undeformed plane

T
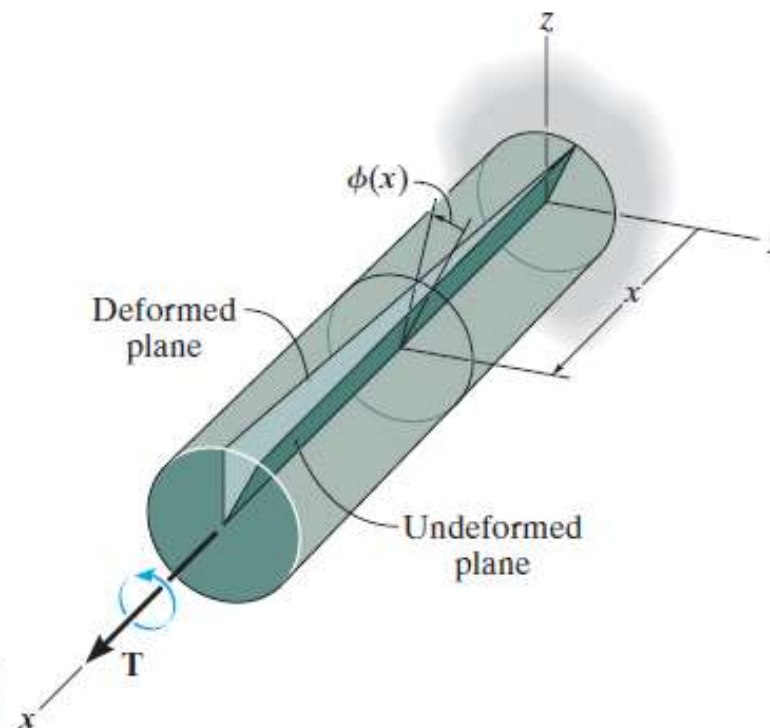
The angle of twist $\phi(x)$ increases as x increases.

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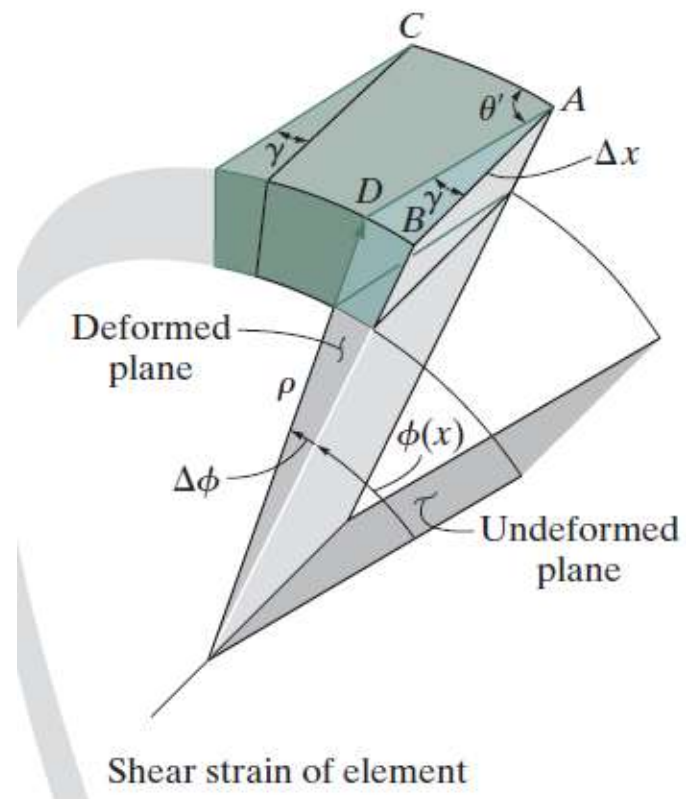
TORSIONAL DEFORMATION OF CIRCULAR SHAFT

TORSIONAL DEFORMATION OF CIRCULAR SHAFT

Shear strain of element

TORSIONAL DEFORMATION OF CIRCULAR SHAFT

SHEAR STRAIN

$$\gamma = \frac{\pi}{2} - \theta'$$

This angle, γ, is indicated on the element. It can be related to the length Δx of the element and the angle $\Delta\phi$ between the shaded planes by considering the length of arc BD, that is

$$BD = \rho\Delta\phi = \Delta x\gamma$$

Therefore, if we let $\Delta x \to dx$ and $\Delta\phi \to d\phi$,

$$\gamma = \rho\frac{d\phi}{dx}$$

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TORSIONAL DEFORMATION OF CIRCULAR SHAFT

Since dx and $d\phi$ are the *same* for *all elements* located at points on the cross section at x, then $d\phi/dx$ is constant over the cross section, and Eq. 5–1 states that the magnitude of the shear strain for any of these elements varies only with its radial distance ρ from the axis of the shaft. In other words, the shear strain within the shaft varies linearly along any radial line, from zero at the axis of the shaft to a maximum γ_{max} at its outer boundary, Fig. 5–4. Since $d\phi/dx = \gamma/\rho = \gamma_{max}/c$, then

$$\gamma = \left(\frac{\rho}{c}\right)\gamma_{max}$$

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TORSIONAL DEFORMATION OF CIRCULAR SHAFT

The results obtained here are also valid for circular tubes. They depend only on the assumptions regarding the deformations mentioned above.
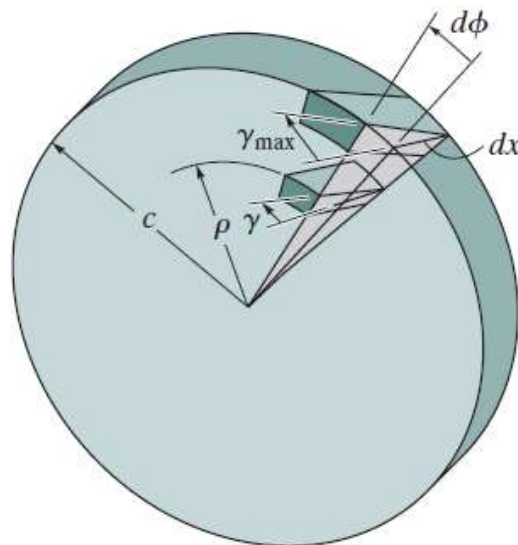
The shear strain at points on the cross section increases linearly with ρ, i.e., $\gamma = (\rho/c)\gamma_{max}$.

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TORSIONAL FORMULA

When an external torque is applied to a shaft it creates a corresponding internal torque within the shaft. In this section, we will develop an equation that relates this internal torque to the shear stress distribution on the cross section of a circular shaft or tube.

If the material is linear-elastic, then Hooke's law applies

$$\tau = G\gamma,$$

consequently a linear variation in shear strain, as noted in the previous section, leads to a corresponding linear variation in shear stress along any radial line on the cross section

Hence τ, will vary from zero at the shaft's longitudinal axis to a maximum value at its outer surface τ_{max}

TORSIONAL FORMULA

$$\tau = \left(\frac{\rho}{c}\right)\tau_{\max}$$

This equation expresses the shear-stress distribution over the cross section in terms of the radial position of the element. Using it, we can now apply the condition that requires the torque produced by the stress distribution over the entire cross section to be equivalent to the resultant internal torque T at the section, which holds the shaft in equilibrium
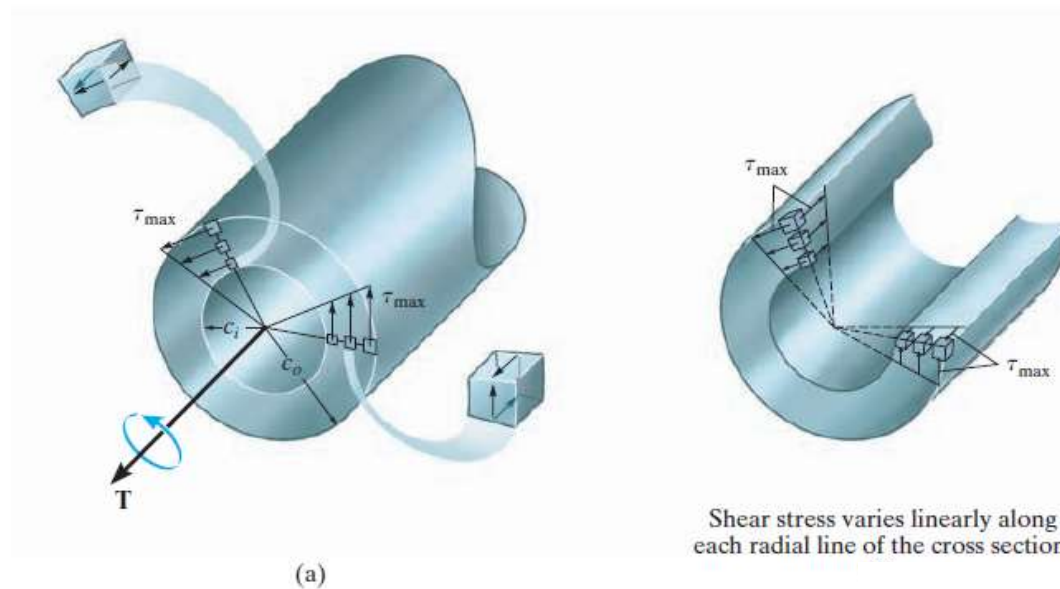
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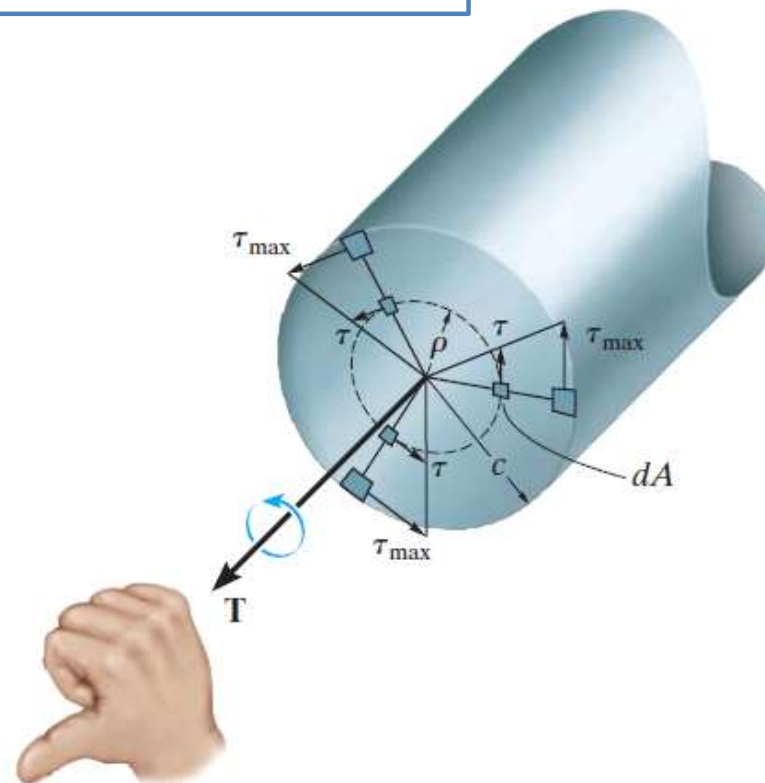
TORSIONAL FORMULA

Shear stress varies linearly along
each radial line of the cross section.

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TORSIONAL FORMULA

Specifically, each element of area dA, located at ρ, is subjected to a force of $dF = \tau\, dA$. The torque produced by this force is $dT = \rho(\tau\, dA)$. We therefore have for the entire cross section

$$T = \int_A \rho(\tau\, dA) = \int_A \rho\left(\frac{\rho}{c}\right)\tau_{max}\, dA$$

Since τ_{max}/c is constant,

$$T = \frac{\tau_{max}}{c}\int_A \rho^2\, dA$$

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TORSIONAL FORMULA

The integral depends only on the geometry of the shaft. It represents the ***polar moment of inertia*** of the shaft's cross-sectional area about the shaft's longitudinal axis. We will symbolize its value as *J*, and therefore the above equation can be rearranged and written in a more compact form, namely,

$$\tau_{max} = \frac{Tc}{J}$$

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TORSIONAL FORMULA

$$\tau_{max} = \frac{Tc}{J}$$

$$\tau = \frac{T\rho}{J}$$

Here

τ_{max} = the maximum shear stress in the shaft, which occurs at the outer surface

T = the resultant *internal torque* acting at the cross section. Its value is determined from the method of sections and the equation of moment equilibrium applied about the shaft's longitudinal axis

J = the polar moment of inertia of the cross-sectional area

c = the outer radius of the shaft

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POLAR MOMENT OF INERTIA

Solid Shaft. If the shaft has a solid circular cross section, the polar moment of inertia J can be determined using an area element in the form of a *differential ring* or annulus having a thickness $d\rho$ and circumference $2\pi\rho$, Fig. 5–6. For this ring, $dA = 2\pi\rho\, d\rho$, and so

$$J = \int_A \rho^2\, dA = \int_0^c \rho^2(2\pi\rho\, d\rho) = 2\pi \int_0^c \rho^3\, d\rho = 2\pi\left(\frac{1}{4}\right)\rho^4 \Big|_0^c$$
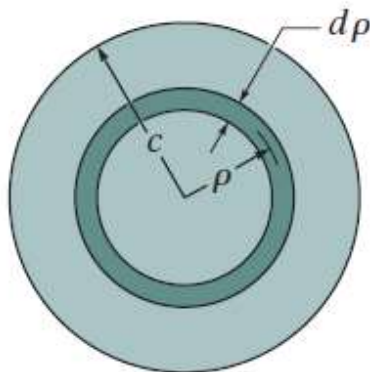
$$J = \frac{\pi}{2}c^4$$

Note that *J is a geometric property of the circular area and is always positive*

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Complimentary Shear

The shear stress has been shown to vary linearly along each radial line of the cross section of the shaft. However, if an element of material on the cross section is isolated, then due to the complementary property of shear, equal shear stresses must also act on four of its adjacent faces as shown in Fig.
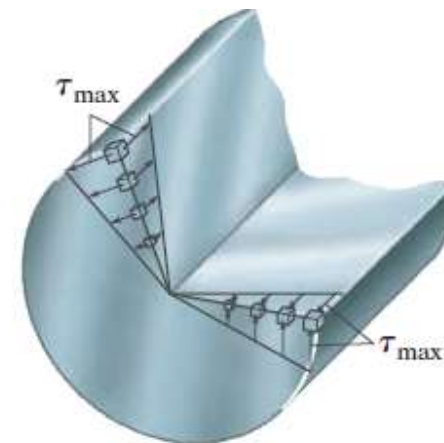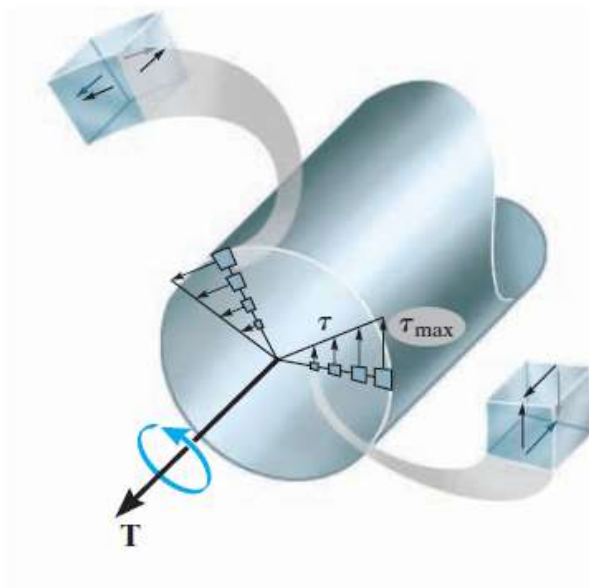
Shear stress varies linearly along
each radial line of the cross section.
(b)

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Complimentary Shear

Not only does the internal torque T develop a linear distribution of shear stress along each radial line in the plane of the cross-sectional area, but also an associated shear-stress distribution is developed along an axial plane,

Failure of a wooden shaft due to torsion.

Prof Rohit Sharma

POLAR MOMENT OF INERTIA

Tubular Shaft. If a shaft has a tubular cross section, with inner radius c_i and outer radius c_o, then from Eq. 5–8 we can determine its polar moment of inertia by subtracting J for a shaft of radius c_i from that determined for a shaft of radius c_o. The result is

$$J = \frac{\pi}{2}(c_o^4 - c_i^4)$$

This tubular drive shaft for a truck was subjected to an excessive torque, resulting in failure caused by yielding of the material.

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VARIATION OF SHEAR STRESS IN TUBULAR SHAFTS

Like the solid shaft, the shear stress distributed over the tube's cross-sectional area varies linearly along any radial line. Furthermore, the shear stress varies along an axial plane in this same manner, Fig

τ_{max}

τ_{max}

c_i

c_o

T

(a)

τ_{max}

τ_{max}

Shear stress varies linearly along each radial line of the cross section.

ABSOLUTE MAXIMUM TORSIONAL STRESSES

If the absolute maximum torsional stress is to be determined, then it becomes important to find the location where the ratio *TcJ is a maximum. In this regard, it* may be helpful to show the variation of the internal torque *T at each* section along the axis of the shaft by drawing a **torque diagram, which is** a plot of the internal torque *T versus its position x along the shaft's length.*

As a sign convention, *T will be positive if by the right-hand rule the thumb* is directed outward from the shaft when the fingers curl in the direction of twist as caused by the torque, Fig. 5–5. Once the internal torque throughout the shaft is determined, the maximum ratio of *Tc/J can then* be identified.
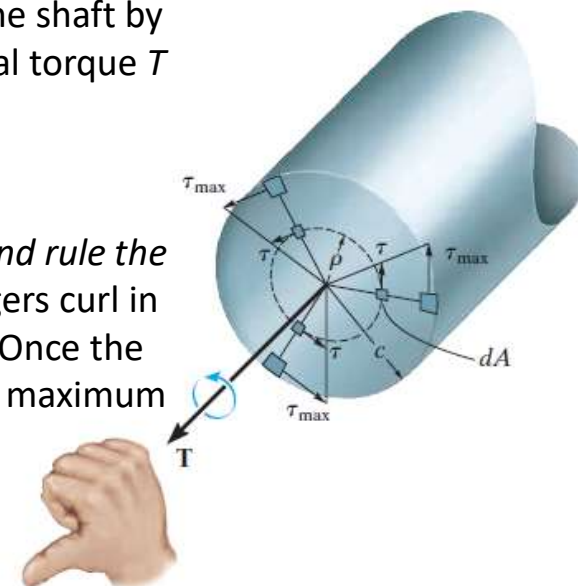
Shear stress varies linearly along each radial line of the cross section.

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IMPORTANT POINTS TO REMEMBER

• When a shaft having a *circular cross section is subjected to a torque, the cross section remains plane while* radial lines rotate. This causes a *shear strain within the material that varies linearly along any radial line,* from zero at the axis of the shaft to a maximum at its outer boundary.

• For linear elastic homogeneous material the *shear stress along any radial line of the shaft also varies linearly, from zero at its axis to a maximum at its outer boundary. This maximum shear stress must not* exceed the proportional limit.

• Due to the complementary property of shear, the linear shear stress distribution within the plane of the cross section is also distributed along an adjacent axial plane of the shaft.

• The torsion formula is based on the requirement that the resultant torque on the cross section is equal to the torque produced by the shear stress distribution about the longitudinal axis of the shaft. It is required that the shaft or tube have a *circular cross section and that it is made of homogeneous material which has linear-elastic behavior.*

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ANALYSIS PROCEDURE

Procedure for Analysis

The torsion formula can be applied using the following procedure.

Internal Loading.

- Section the shaft perpendicular to its axis at the point where the shear stress is to be determined, and use the necessary free-body diagram and equations of equilibrium to obtain the internal torque at the section.

Section Property.

- Calculate the polar moment of inertia of the cross-sectional area. For a solid section of radius c, $J = \pi c^4/2$, and for a tube of outer radius c_o and inner radius c_i, $J = \pi(c_o^4 - c_i^4)/2$.

Shear Stress.

- Specify the radial distance ρ, measured from the center of the cross section to the point where the shear stress is to be found. Then apply the torsion formula $\tau = T\rho/J$, or if the maximum shear stress is to be determined use $\tau_{max} = Tc/J$. When substituting the data, make sure to use a consistent set of units.
- The shear stress acts on the cross section in a direction that is always perpendicular to ρ. The force it creates must contribute a torque about the axis of the shaft that is in the *same direction* as the internal resultant torque **T** acting on the section. Once this direction is established, a volume element located at the point where τ is determined can be isolated, and the direction of τ acting on the remaining three adjacent faces of the element can be shown.

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EXAMPLE 01

The *solid shaft of radius c is subjected to a torque* **T,.** Determine the fraction of *T that is resisted by the material contained* within the outer region of the shaft, which has an inner radius of and outer radius *c.*

(a)

(b)
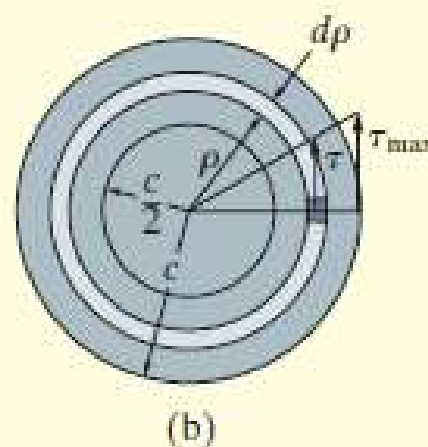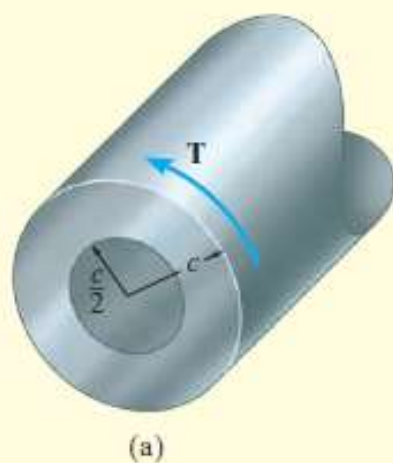
SOLUTION

The stress in the shaft varies linearly, such that $\tau = (\rho/c)\tau_{max}$, Eq. 5–3. Therefore, the torque dT' on the ring (area) located within the lighter-shaded region, Fig. 5–10b, is

$$dT' = \rho(\tau\, dA) = \rho(\rho/c)\tau_{max}(2\pi\rho\, d\rho)$$

For the entire lighter-shaded area the torque is

$$T' = \frac{2\pi\tau_{max}}{c}\int_{c/2}^{c}\rho^3\, d\rho$$

$$= \frac{2\pi\tau_{max}}{c}\frac{1}{4}\rho^4\Big|_{c/2}^{c}$$

So that

$$T' = \frac{15\pi}{32}\tau_{max}c^3 \qquad\qquad (1)$$

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SOLUTION

This torque T' can be expressed in terms of the applied torque T by first using the torsion formula to determine the maximum stress in the shaft. We have

$$\tau_{max} = \frac{Tc}{J} = \frac{Tc}{(\pi/2)c^4}$$

or

$$\tau_{max} = \frac{2T}{\pi c^3}$$

Substituting this into Eq. 1 yields

$$T' = \frac{15}{16}T \qquad\qquad Ans.$$

NOTE: Here, approximately 94% of the torque is resisted by the lighter-shaded region, and the remaining 6% (or $\frac{1}{16}$) of T is resisted by the inner "core" of the shaft, $\rho = 0$ to $\rho = c/2$. As a result, the material located at the *outer region* of the shaft is highly effective in resisting torque, which justifies the use of tubular shafts as an efficient means for transmitting torque, and thereby saving material.

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EXAMPLE 2

The shaft shown in Fig. *is supported by two bearings and is* subjected to three torques.
Determine the shear stress developed at points *A and B, located at section a–a of the shaft,*
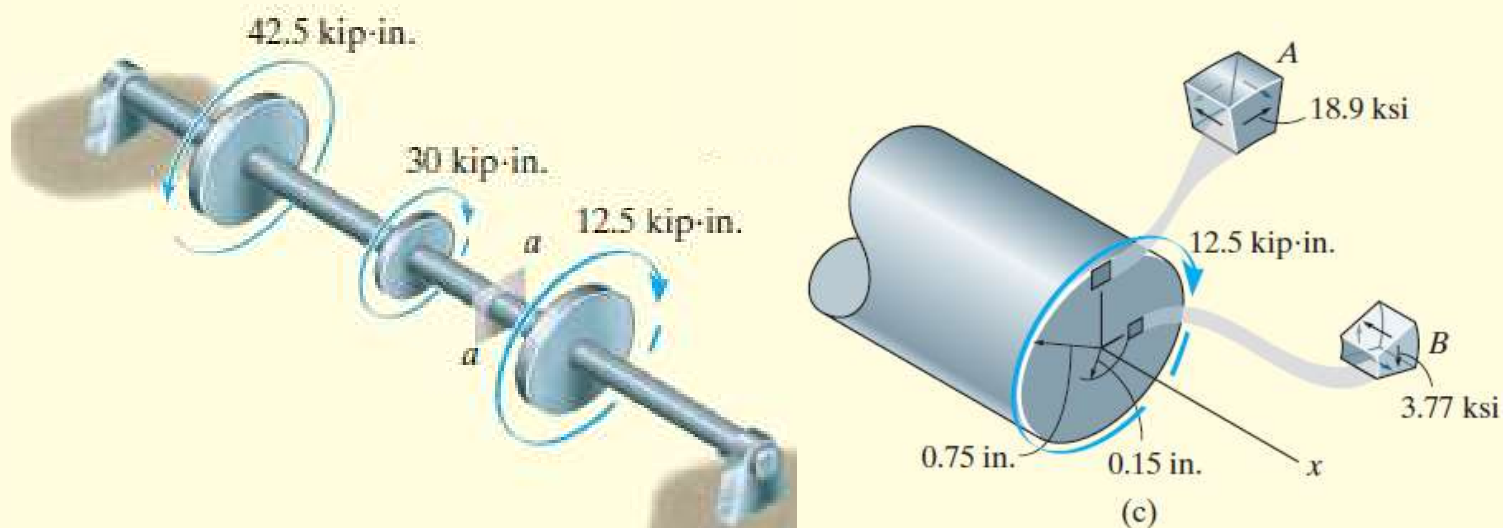
42.5 kip·in.

30 kip·in.

12.5 kip·in.

a

a

A

18.9 ksi

12.5 kip·in.

B

3.77 ksi

0.75 in.

0.15 in.

x

(c)

EXAMPLE 3

The pipe shown in Fig. 5–12a *has an inner diameter of 80 mm and an* outer diameter of 100 mm. If its end is tightened against the support at *A using a torque wrench at B, determine the shear stress developed in* the material at the inner and outer walls along the central portion of the pipe when the 80-N forces are applied to the wrench

(a)
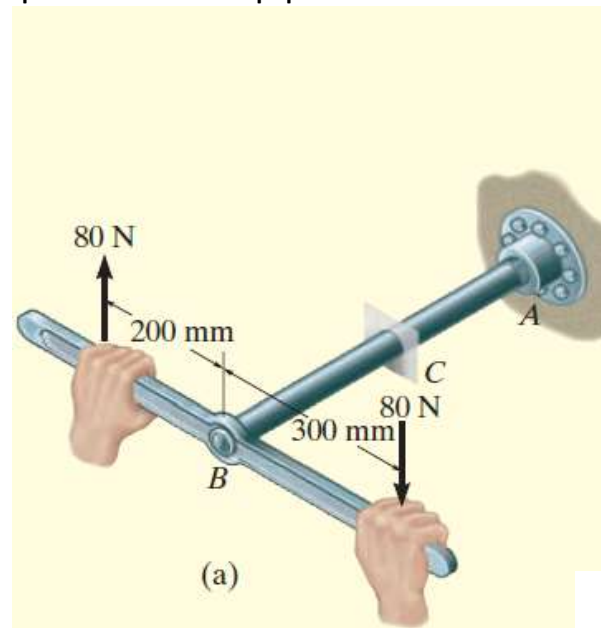
SHAFT DESIGN

Shaft Design. When the power transmitted by a shaft and its frequency of rotation are known, the torque developed in the shaft can be determined from Eq. 5–11, that is, $T = P/2\pi f$. Knowing T and the allowable shear stress for the material, τ_{allow}, we can determine the size of the shaft's cross section using the torsion formula, provided the material behavior is linear elastic. Specifically, the design or geometric parameter J/c becomes

$$\frac{J}{c} = \frac{T}{\tau_{allow}} \qquad (5\text{–}12)$$

For a *solid shaft*, $J = (\pi/2)c^4$, and thus, upon substitution, a *unique value* for the shaft's radius c can be determined. If the shaft is *tubular*, so that $J = (\pi/2)(c_o^4 - c_i^4)$, design permits a wide range of possibilities for the solution. This is because an *arbitrary choice* can be made for either c_o or c_i and the other radius can then be determined from Eq. 5–12.

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SHAFT DESIGN

A solid steel shaft AB shown in Fig. 5–13 is to be used to transmit 5 hp from the motor M to which it is attached. If the shaft rotates at $\omega = 175$ rpm and the steel has an allowable shear stress of $\tau_{allow} = 14.5$ ksi, determine the required diameter of the shaft to the nearest $\frac{1}{8}$ in.
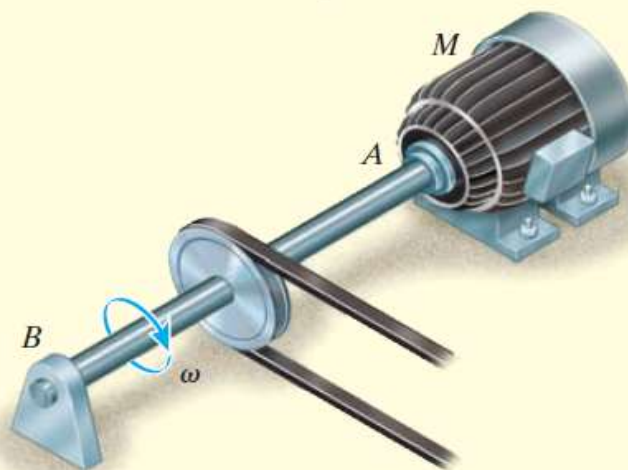
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SHAFT DESIGN

Determine the shear stress developed at point *A on* the surface of the shaft. Represent the state of stress on a volume element at this point. The shaft has a radius of 40 mm.
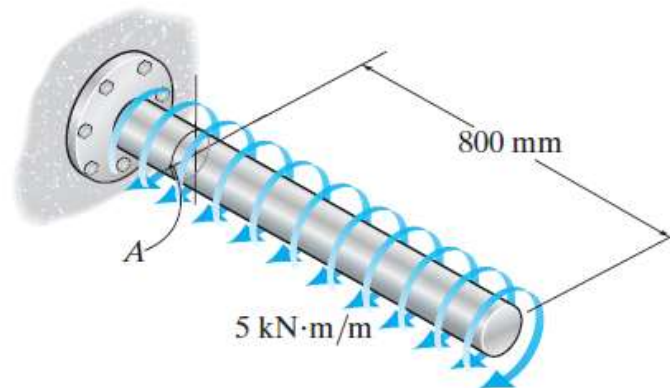
ANGLE OF TWIST

Occasionally the design of a shaft depends on restricting the amount of rotation or twist that may occur when the shaft is subjected to a torque. Furthermore, being able to compute the angle of twist for a shaft is important when analyzing the reactions on statically indeterminate shafts.

In this section we will develop a formula for determining the *angle of twist (phi) of one end of a shaft with respect to its other end.The shaft* is assumed to have a circular cross section that can gradually vary along its length, Fig. 5–14*a. Also, the material is assumed to be homogeneous* and to behave in a linear-elastic manner when the torque is applied.
Like the case of an axially loaded bar, we will neglect the localized deformations that occur at points of application of the torques and where the cross section changes abruptly.

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ANGLE OF TWIST

$$dφ = γ \frac{dx}{ρ}$$
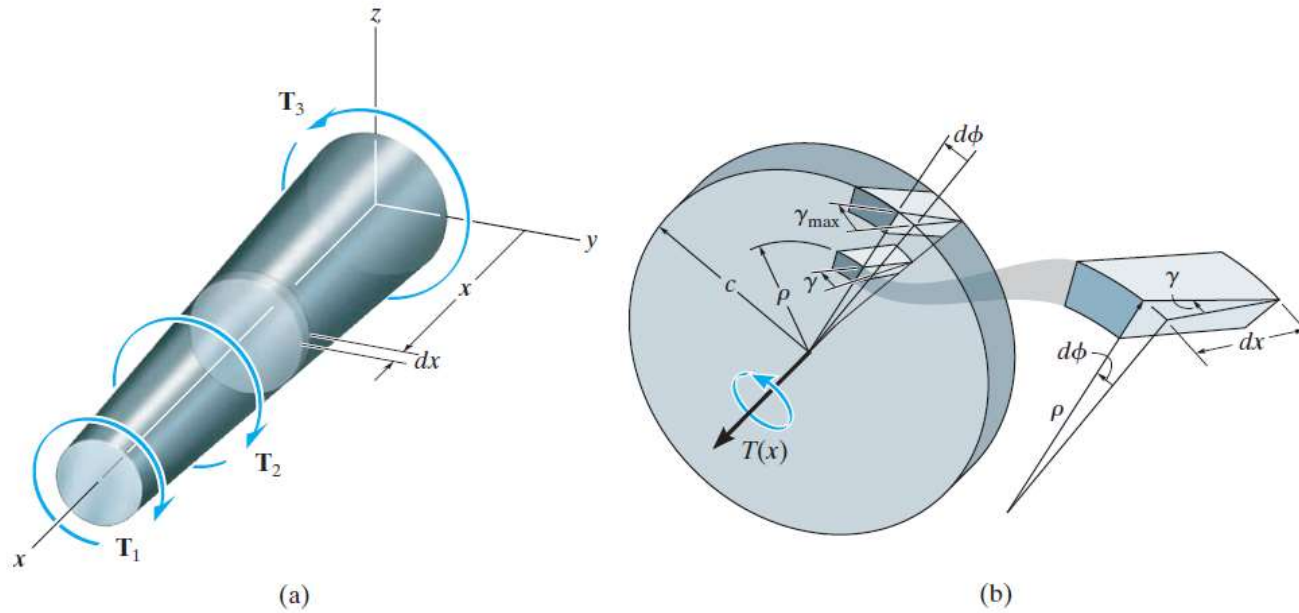
(a)

(b)

ANGLE OF TWIST

Since Hooke's law, $\gamma = \tau/G$, applies and the shear stress can be expressed in terms of the applied torque using the torsion formula $\tau = T(x)\rho/J(x)$, then $\gamma = T(x)\rho/J(x)G$. Substituting this into Eq. 5–13, the angle of twist for the disk is

$$d\phi = \frac{T(x)}{J(x)G}\,dx$$

Integrating over the entire length L of the shaft, we obtain the angle of twist for the entire shaft, namely,

ANGLE OF TWIST

$$\phi = \int_0^L \frac{T(x)\, dx}{J(x)G}$$

(5–14)

Here

ϕ = the angle of twist of one end of the shaft with respect to the other end, measured in radians

$T(x)$ = the *internal torque* at the arbitrary position x, found from the method of sections and the equation of moment equilibrium applied about the shaft's axis

$J(x)$ = the shaft's polar moment of inertia expressed as a function of position x

G = the shear modulus of elasticity for the material

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ANGLE OF TWIST

Constant Torque and Cross-Sectional Area. Usually in engineering practice the material is homogeneous so that G is constant. Also, the shaft's cross-sectional area and the external torque are constant along the length of the shaft, Fig. 5–15. If this is the case, the internal torque $T(x) = T$, the polar moment of inertia $J(x) = J$, and Eq. 5–14 can be integrated, which gives

$$\phi = \frac{TL}{JG} \qquad (5\text{–}15)$$

The similarities between the above two equations and those for an axially loaded bar ($\delta = \int P(x)\,dx/A(x)E$ and $\delta = PL/AE$) should be noted.

Fig. 5–15

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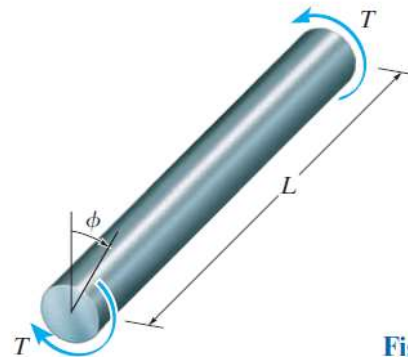
ANGLE OF TWIST

Multiple Torques. If the shaft is subjected to several different torques, or the cross-sectional area or shear modulus changes abruptly from one region of the shaft to the next, Eq. 5–15 can be applied to each segment of the shaft where these quantities are all constant. The angle of twist of one end of the shaft with respect to the other is then found from the vector addition of the angles of twist of each segment. For this case,

$$\phi = \sum \frac{TL}{JG} \qquad (5\text{–}16)$$

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SIGN CONVENTION

In order to apply this equation, we must develop a sign convention for both the internal torque and the angle of twist of one end of the shaft with respect to the other end. To do this, we will use the right-hand rule, whereby both the torque and angle will be *positive,* provided the *thumb is directed outward from the shaft when the fingers* curl to give the tendency for rotation,
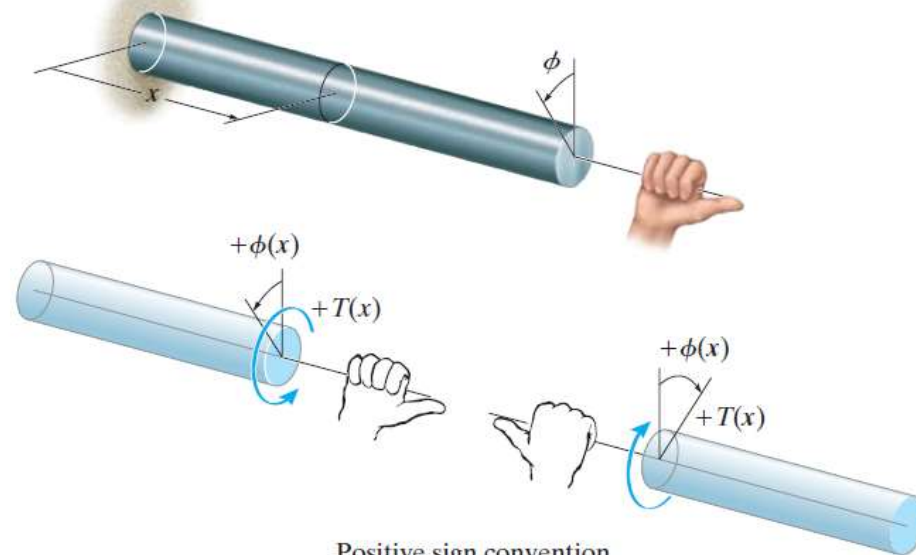
Positive sign convention
for T and ϕ.
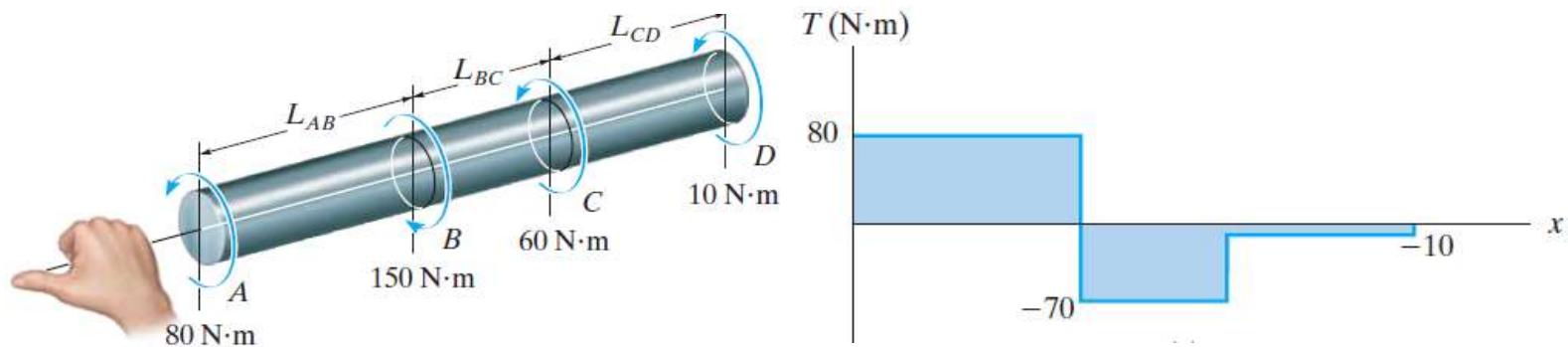
EXAMPLE

$$\phi_{A/D} = \frac{(+80 \text{ N} \cdot \text{m}) \, L_{AB}}{JG} + \frac{(-70 \text{ N} \cdot \text{m}) \, L_{BC}}{JG} + \frac{(-10 \text{ N} \cdot \text{m}) \, L_{CD}}{JG}$$

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EXAMPLE

The gears attached to the fixed-end steel shaft are subjected to the torques shown in Fig. 5–19a. If the shear modulus of elasticity is 80 GPa and the shaft has a diameter of 14 mm, determine the displacement of the tooth P on gear A. The shaft turns freely within the bearing at B.

40 N·m
D

280 N·m
C

0.5 m

150 N·m B
P
100 mm

0.3 m

0.4 m

A

(a)

E
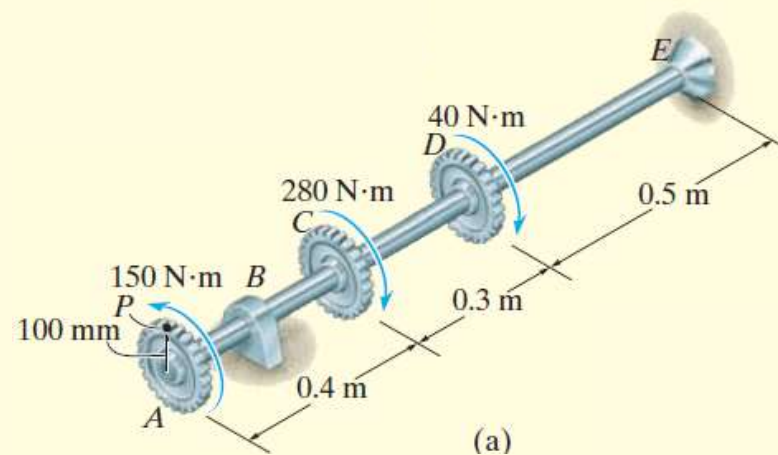
EXAMPLE

Internal Torque.

T (N·m)

(b)

150

0.4   0.7   1.2 x (m)

0

-130

-170
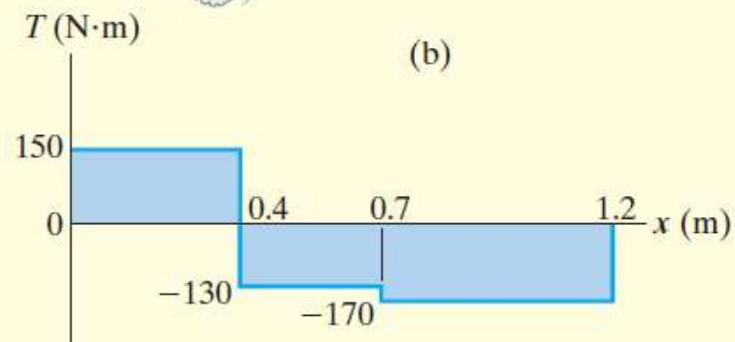
$$T_{AC} = +150 \, \text{N} \cdot \text{m} \qquad T_{CD} = -130 \, \text{N} \cdot \text{m} \qquad T_{DE} = -170 \, \text{N} \cdot \text{m}$$

Angle of Twist. The polar moment of inertia for the shaft is

$$J = \frac{\pi}{2}(0.007 \, \text{m})^4 = 3.771(10^{-9}) \, \text{m}^4$$

Applying Eq. 5–16 to each segment and adding the results algebraically, we have

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EXAMPLE

$$\phi_A = \sum \frac{TL}{JG} = \frac{(+150 \text{ N} \cdot \text{m})(0.4 \text{ m})}{3.771(10^{-9}) \text{ m}^4 \, [80(10^9) \text{ N/m}^2]}$$

$$+ \frac{(-130 \text{ N} \cdot \text{m})(0.3 \text{ m})}{3.771(10^{-9}) \text{ m}^4 \, [80(10^9) \text{ N/m}^2)]}$$

$$+ \frac{(-170 \text{ N} \cdot \text{m})(0.5 \text{ m})}{3.771(10^{-9}) \text{ m}^4 \, [80(10^9) \text{ N/m}^2)]} = -0.2121 \text{ rad}$$

$\phi_A = 0.212$ rad

100 mm

(d)
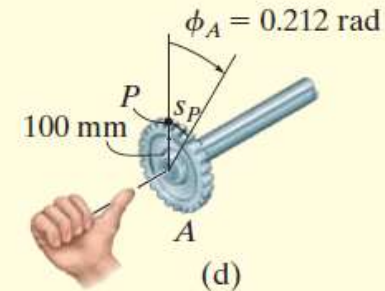
Since the answer is negative, by the right-hand rule the thumb is directed *toward* the end E of the shaft, and therefore gear A will rotate as shown in Fig. 5–19d.

The displacement of tooth P on gear A is

$$s_P = \phi_A r = (0.2121 \text{ rad})(100 \text{ mm}) = 21.2 \text{ mm} \qquad Ans.$$

NOTE: Remember that this analysis is valid only if the shear stress does not exceed the proportional limit of the material.

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Statically Indeterminate Torque-Loaded Members

(a)
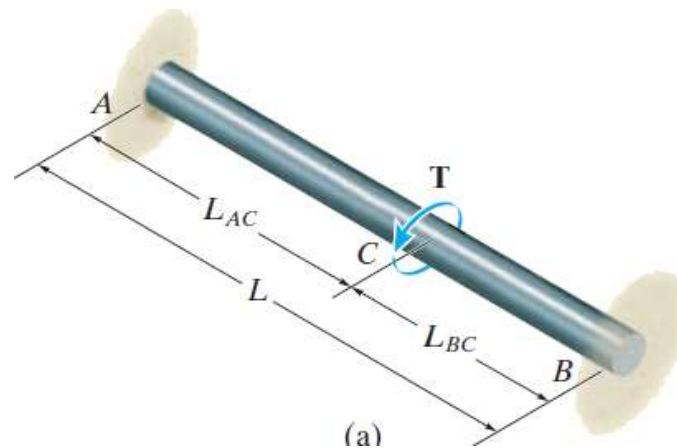
A torsionally loaded shaft may be classified as statically indeterminate if the moment equation of equilibrium, applied about the axis of the shaft, is not adequate to determine the unknown torques acting on the shaft.

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Statically Indeterminate Torque-Loaded Members

$$\Sigma M_x = 0; \qquad T - T_A - T_B = 0$$

The necessary condition of compatibility, or the kinematic condition, requires the angle of twist of one end of the shaft with respect to the other end to be equal to zero, since the end supports are fixed. Therefore,

Provided the material is linear elastic, we can apply the load–displacement relation $\phi = TL/JG$ to express the compatibility condition in terms of the unknown torques. Realizing that the internal torque in segment AC is $+T_A$ and in segment CB it is $-T_B$, Fig. 5–22c, we have

$$\frac{T_A L_{AC}}{JG} - \frac{T_B L_{BC}}{JG} = 0$$

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Statically Indeterminate Torque-Loaded Members

(b)

(c)
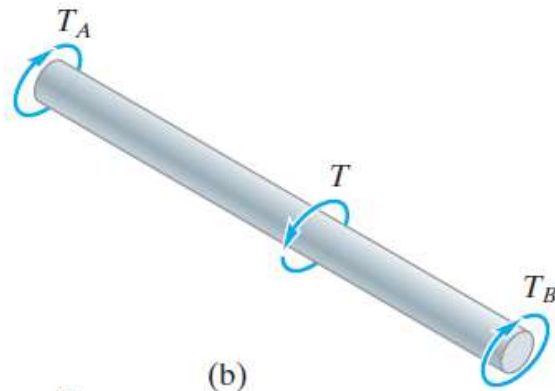
Solving the above two equations for the reactions, realizing that

$$L = L_{AC} + L_{BC}, \text{ we get}$$

$$T_A = T\left(\frac{L_{BC}}{L}\right) \quad \text{and} \quad T_B = T\left(\frac{L_{AC}}{L}\right)$$

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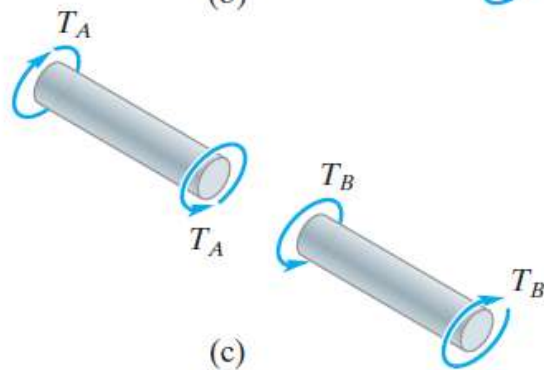
PROCEDURE FOR ANALYSIS

The unknown torques in statically indeterminate shafts are determined by satisfying equilibrium, compatibility, and torque-displacement requirements for the shaft.

Equilibrium.

- Draw a free-body diagram of the shaft in order to identify all the external torques that act on it. Then write the equation of moment equilibrium about the axis of the shaft.

Compatibility.

- Write the compatibility equation between two points along the shaft. Give consideration as to how the supports constrain the shaft when it is twisted.

- Express the angles of twist in the compatibility condition in terms of the torques, using a torque-displacement relation, such as $\phi = TL/JG$.

- Solve the equilibrium and compatibility equations for the unknown reactive torques. If any of the magnitudes have a negative numerical value, it indicates that this torque acts in the opposite sense of direction to that shown on the free-body diagram.
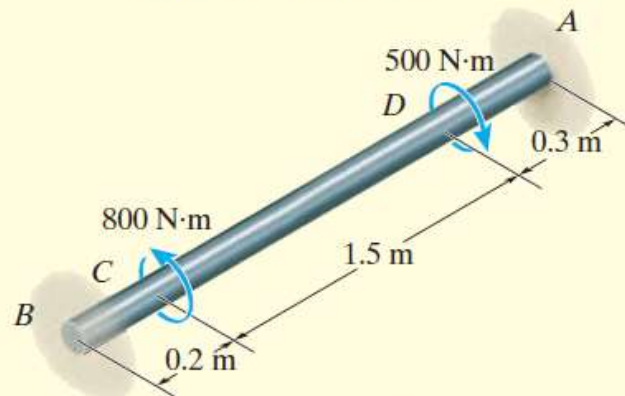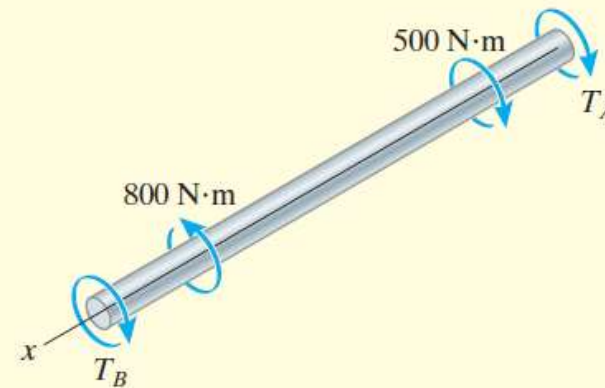
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EXAMPLE Statically Indeterminate Torque-Loaded Members

The solid steel shaft shown in Fig. 5–23a has a diameter of 20 mm. If it is subjected to the two torques, determine the reactions at the fixed supports A and B.

(a)

(b)

EXAMPLE Statically Indeterminate Torque-Loaded Members

Equilibrium. By inspection of the free-body diagram, Fig. 5–23b, it is seen that the problem is statically indeterminate since there is only *one* available equation of equilibrium and there are two unknowns. We require

$$\Sigma M_x = 0; \qquad -T_B + 800 \text{ N} \cdot \text{m} - 500 \text{ N} \cdot \text{m} - T_A = 0 \qquad (1)$$

Compatibility. Since the ends of the shaft are fixed, the angle of twist of one end of the shaft with respect to the other must be zero. Hence, the compatibility equation becomes

$$\phi_{A/B} = 0$$

This condition can be expressed in terms of the unknown torques by using the load–displacement relationship, $\phi = TL/JG$. Here there are three regions of the shaft where the internal torque is constant. On the free-body diagrams in Fig. 5–23c we have shown the internal torques acting on the left segments of the shaft which are sectioned in each of these regions. This way the internal torque is only a function of T_B. Using the sign convention established in Sec. 5.4, we have
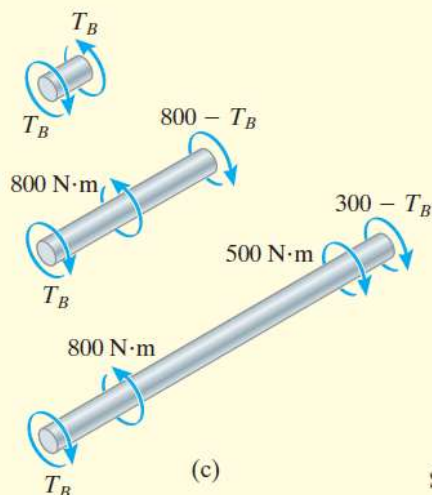
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EXAMPLE Statically Indeterminate Torque-Loaded Members

$$\frac{-T_B(0.2 \text{ m})}{JG} + \frac{(800 - T_B)(1.5 \text{ m})}{JG} + \frac{(300 - T_B)(0.3 \text{ m})}{JG} = 0$$

so that

$$T_B = 645 \text{ N} \cdot \text{m} \qquad \textit{Ans.}$$

Using Eq. 1,

$$T_A = -345 \text{ N} \cdot \text{m} \qquad \textit{Ans.}$$

The negative sign indicates that $\mathbf{T}_A$ acts in the opposite direction of that shown in Fig. 5–23b.

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To be a center of excellence imparting professional education satisfying societal and global needs.	1. Transforming students into lifelong learners through, quality teaching, training and exposure to concurrent technologies. 2. Fostering conducive atmosphere for research and development through well-equipped laboratories and qualified personnel in collaboration with global organizations.

Academic Year 2021-22
MBA Semester- I
SUBJECT: BUSINESS RESEARCH
Subject Code: (1T3)
Module 1: Theory Building and Research Proposal

INTRODUCTION

Business research is a systematic investigation that seeks to provide relevant information to guide decision-making in the business environment. It involves the process of gathering, analyzing, interpreting, and presenting data and insights to address specific challenges or opportunities within an organization.


Key Components of Business Research:

- ➢ **Purpose and Objectives-**Define the purpose of the research and the specific objectives it aims to achieve. Clarify the problems or questions that the research seeks to address.

- ➢ **Literature Review:-** Conduct a review of existing literature related to the research topic. Identify gaps, trends, and theoretical frameworks that can inform the current study.

- ➢ **Research Design:-**Choose the appropriate research design (e.g., exploratory, descriptive, experimental) based on the nature of the research question.
  Specify the research methods and data collection techniques (e.g., surveys, interviews, observations) to be employed.

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- **Sampling:-** Define the target population and select a representative sample for data collection.
  Justify the sampling method and ensure the sample's relevance to the research objectives.
- **Data Collection:-** Collect data using the chosen methods, ensuring reliability and validity. Employ both quantitative and qualitative approaches as needed.

- **Data Analysis:-** Analyze the collected data using appropriate statistical or qualitative analysis techniques. Interpret the results and draw meaningful conclusions.
- **Findings and Recommendations:-** Present the key findings of the research. Provide actionable recommendations based on the findings.
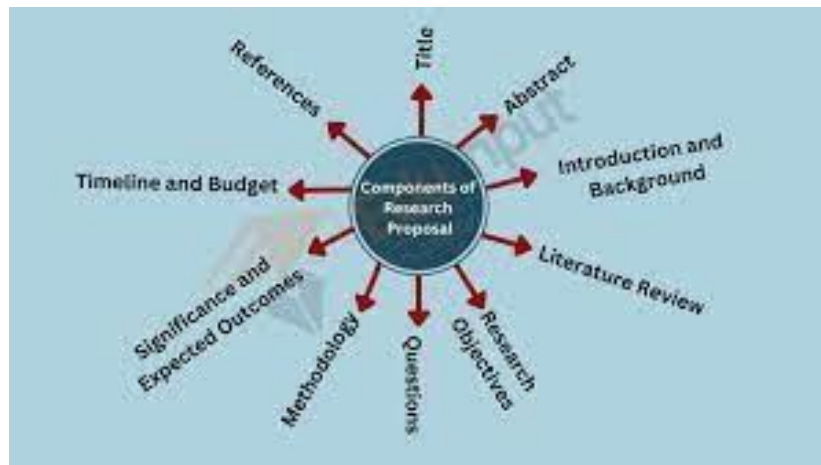

❖ DEFINITION OF RESEARCH

- Research can be defined as a systematic and organized process of inquiry that involves the collection, analysis, interpretation, and presentation of information or data. It is a methodical investigation with the goal of gaining new knowledge, solving problems, or validating existing knowledge. Research is conducted across various disciplines and industries, using specific methods and approaches tailored to the nature of the inquiry. It is characterized by a structured and logical process, often involving the formulation of hypotheses, data collection, analysis, and drawing conclusions.

- Research can take various forms, including basic or fundamental research, which explores theoretical concepts, and applied research, which addresses practical problems. Additionally, research can be quantitative, involving numerical data, or qualitative, involving non-numerical data such as observations and interviews. Overall, research is a

critical process that contributes to the advancement of knowledge and understanding in a wide range of fields.
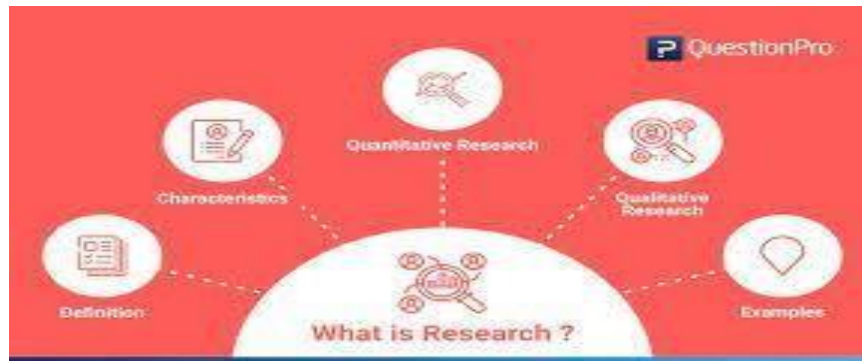
❖ NEED OF BUSINESS RESEARCH

The need for business research arises from the dynamic and complex nature of the business environment. Conducting research in the business context is essential for several reasons.

1. **Informed Decision-Making**:
   - Business research provides accurate and relevant information to support decision-making processes. Executives and managers can make more informed choices based on data-driven insights rather than relying solely on intuition or experience.
2. **Market Understanding**:
   - Research helps businesses understand market trends, consumer behaviors, and competitive landscapes. This knowledge is crucial for identifying opportunities, staying ahead of industry changes, and developing effective marketing strategies.
3. **Risk Management**:
   - Businesses operate in environments with inherent risks. Research enables organizations to identify potential risks, assess their impact, and develop strategies to mitigate or manage these risks effectively.
4. **Innovation and Product Development**:
   - Research plays a key role in driving innovation. It helps businesses identify gaps in the market, customer needs, and emerging trends, leading to the development of new products, services, or processes.
5. **Competitive Advantage**:
   - Through research, businesses can gain a competitive edge by understanding their competitors, benchmarking their performance, and identifying unique selling points. This information is valuable for developing strategies that set a company apart in the market.
6. **Performance Measurement**:
   - Research allows businesses to measure their performance against key indicators and industry benchmarks. This information is crucial for assessing the effectiveness of strategies and making adjustments to improve overall performance.
7. **Customer Satisfaction and Loyalty**:

- Research helps businesses understand customer satisfaction levels, preferences, and expectations. By aligning products and services with customer needs, companies can build customer loyalty and enhance their overall reputation.

8. **Strategic Planning**:
   - Business research is a cornerstone of strategic planning. It provides the necessary data and insights for setting long-term goals, defining objectives, and developing action plans to achieve organizational success.

9. **Adaptation to Change:**
   - The business environment is constantly evolving. Research helps businesses stay adaptable by providing insights into emerging trends, technological advancements, and shifts in consumer behavior, enabling them to proactively adapt to change.

10. **Resource Allocation**:
    - Businesses operate with finite resources. Research helps in optimizing resource allocation by identifying areas where investments are likely to yield the highest returns and avoiding unnecessary expenditures.

11. **Legal and Ethical Compliance**:
    - Research assists businesses in staying compliant with legal and ethical standards. Understanding industry regulations and societal expectations is crucial for maintaining a positive corporate image and avoiding legal issues.

❖ QUESTIONS IN RESEARCH

Formulation of Research Problem The process of business research:-

Formulating a research problem is a crucial step in the business research process. A well-defined research problem sets the stage for the entire study and helps guide the research design, data collection, and analysis. Here are key questions to consider during the formulation of a research problem in the business research process:

1. **What is the Research Topic?**
   - Clearly define the topic or area of interest for your research. This provides a starting point for identifying the specific issues or questions you want to address.

2. **What is the Purpose of the Research?**
   - Clearly articulate the purpose of your research. Are you aiming to explore, describe, explain, or predict a phenomenon? Understanding the purpose helps in selecting the appropriate research design and methodology.

3. **What is the Scope of the Study?**

- Define the boundaries of your research. Specify the time frame, geographical scope, and any other limitations to focus the study on a manageable and relevant context.

4. **What is the Background or Context?**
   - Provide a brief overview of the existing knowledge and literature related to your research topic. This helps identify gaps in knowledge and informs the formulation of research questions.

5. **What Are the Research Questions or Hypotheses?**
   - Clearly state the specific research questions or hypotheses that your study aims to address. These should be focused, concise, and directly related to the research problem.

6. **Why is the Research Important?**
   - Justify the significance of your research. Explain why addressing the research problem is important for the field, industry, or organization. Highlight potential contributions to knowledge or practical applications.

7. **Who are the Key Stakeholders?**
   - Identify the key stakeholders or individuals who will benefit from the research findings. Understanding the audience helps in tailoring the research problem to address relevant concerns.

8. **What Are the Expected Outcomes?**
   - Clarify the anticipated outcomes or contributions of your research. What insights or recommendations do you expect to provide? This helps in setting clear expectations for the study.

9. **Are There Any Assumptions or Constraints?**
   - Identify any assumptions or constraints that might impact the research. This could include assumptions about the behavior of variables, data availability, or limitations due to resource constraints.

10. **How Will the Research Be Conducted?**
    - Provide an initial overview of the research design and methodology you plan to employ. Consider whether your research will be qualitative, quantitative, or a mix of both, and outline the data collection methods.

11. **What Ethical Considerations Exist?**
    - Consider ethical implications related to your research. How will you ensure the rights and well-being of participants? Are there any potential conflicts of interest that need to be addressed?

12. **What Are the Limitations of the Study?**
    - Acknowledge any potential limitations or constraints of your research. This could include issues such as sample size, data quality, or external factors beyond your control.

❖ **Literature review-**
A literature review is a critical and comprehensive examination of existing literature in a specific field of study or topic area. It is an integral part of the

research process and serves several important purposes. Here are key aspects and considerations related to conducting a literature review

1. **Definition and Purpose:**
   - A literature review involves systematically gathering, evaluating, and synthesizing relevant scholarly works and other sources to provide a comprehensive overview of existing knowledge on a particular subject.
   - The primary purpose is to identify gaps, trends, theories, methodologies, and findings in the existing literature, which helps inform the direction and focus of the researcher's own study.
2. **Scope and Selection Criteria:**
   - Define the scope of the literature review by specifying the key themes, concepts, and time frame relevant to the research question or topic.
   - Establish clear criteria for including or excluding sources, such as the publication date, relevance to the research question, and the credibility of the author.
3. **Search and Information Retrieval**:
   - Conduct a systematic and thorough search of academic databases, libraries, and other relevant sources to identify scholarly articles, books, reports, and other publications.
   - Use keywords, Boolean operators, and other search strategies to refine and narrow down the literature.
4. **Organization and Synthesis**:
   - Organize the reviewed literature into themes, categories, or chronological order based on the identified patterns and connections.
   - Provide a summary of each source, highlighting key concepts, methodologies, and findings.
   - Synthesize information to discuss commonalities, conflicts, and trends across the reviewed works.
5. **Critical Evaluation**:
   - Critically evaluate the quality and relevance of each source. Consider the credibility of the authors, the research methodologies employed, and the significance of the findings.
   - Identify any biases or limitations in the existing literature.
6. **Identification of Gaps**:
   - Highlight gaps or unresolved issues in the current body of literature. This helps justify the need for the researcher's own study and contributes to the formulation of research questions.
7. **Theoretical Framework:**
   - Identify and discuss relevant theories, models, or frameworks that are foundational to the research area.
   - Explain how existing theories have been applied in previous studies and their implications for the current research.
8. **Methodological Considerations**:
   - Discuss the research methods employed in the reviewed literature. Evaluate the strengths and weaknesses of different methodologies and consider how they may inform the design of the researcher's own study.
9. **Writing Style:**

- Write the literature review in a clear, organized, and coherent manner.
- Use proper citations and referencing styles according to the academic or research guidelines.

10. **Revision and Updates**:
- Regularly revisit and update the literature review as the research progresses. New studies may be published, and the researcher may need to incorporate the latest findings into their review.

❖ **Concepts and theories :-**

Concepts:

1. **Definition:**
- A concept is an abstract idea or general notion representing a class of objects, phenomena, or events. It helps in understanding and categorizing the world by providing mental representations of shared characteristics.

2. **Example:**
- "Sustainability" is a concept that encompasses practices and processes that aim to meet present needs without compromising the ability of future generations to meet their own needs.

3. **Role in Research**:
- Concepts serve as building blocks for theories and are essential in the formulation of research questions and hypotheses. They help researchers categorize and analyze phenomena.

4. **Operationalization**:
- Operationalization involves defining and measuring concepts in a way that can be observed or measured. For example, the concept of "employee satisfaction" may be operationalized through a survey asking about job satisfaction.

5. **Hierarchical Structure**:
- Concepts can be organized in a hierarchical structure, with broader, more abstract concepts encompassing narrower, more specific ones. This hierarchy helps in organizing knowledge systematically.

Theories:

1. **Definition**:
- A theory is a systematic and coherent set of principles or statements that explains the relationships among a set of observed phenomena. It provides a framework for understanding and predicting how certain variables interact.

2. **Example:**
- "Theory of Evolution" in biology explains the processes through which species change over time, based on natural selection and adaptation to the environment.

3. **Components of a Theory:**
- Concepts: The basic building blocks of a theory.
- Variables: Concepts that can vary or take different values.
- Relationships: Descriptions of how variables are related or interact.

- Assumptions: Basic premises or conditions underlying the theory.
4. **Types of Theories:**
   - Grand Theories: Broad and encompassing, often providing a framework for an entire discipline.
   - Middle-range Theories: More focused and specific, addressing particular aspects of a phenomenon.
   - Micro Theories: Focused on individual or small-group behaviors.
5. **Role in Research:**
   - Theories guide research by providing a conceptual framework for understanding and interpreting observations. They help researchers generate hypotheses, design studies, and analyze data.
6. **Testing and Validation:**
   - The validity of a theory is often tested through empirical research. Successful predictions and explanations contribute to the credibility and acceptance of a theory.
7. **Evolution of Theories:**
   - Theories may evolve over time as new evidence emerges. They can be refined, expanded, or even replaced by more comprehensive theories that better explain observed phenomena.
8. **Interdisciplinary Nature**:
   - Theories may be interdisciplinary, drawing on concepts and principles from multiple fields to provide a more comprehensive understanding of complex phenomena.

❖ Research questions:-

Research questions are specific queries that a researcher aims to answer through a systematic investigation or study. These questions guide the research process by defining the scope, focus, and objectives of the study. Well-formulated research questions are clear, concise, and directly related to the research problem. They serve as a foundation for the entire research design, guiding the choice of methodology, data collection, and analysis. Here are key characteristics and considerations related to research questions:

1. **Clarity and Precision:**
   - Research questions should be clearly and precisely formulated to ensure that the study's goals are unambiguous. Ambiguous or vague questions can lead to confusion in the research process.
2. **Specificity and Scope:**
   - Each research question should address a specific aspect of the research problem. Avoid overly broad questions, as they may be challenging to answer comprehensively within the scope of a single study.
3. **Connection to the Research Problem:**
   - Research questions should directly relate to the research problem or topic identified in the initial stages of the research. They provide a focused approach to addressing specific gaps or uncertainties.

4. **Feasibility:**
   - Consider the feasibility of answering the research questions within the available resources, time constraints, and ethical considerations. Ensure that the questions are realistic and achievable.
5. **Relevance to Audience:**
   - Research questions should be relevant to the intended audience, including academic researchers, practitioners, or policymakers. They should address issues that are of interest and importance to the target audience.
6. **Testability and Empirical Investigation:**
   - Formulate questions that are testable through empirical investigation. Research questions should lead to the collection of data that can be analyzed to provide meaningful insights and conclusions.
7. **Hierarchy and Structure:**
   - If the research involves multiple questions, consider organizing them in a hierarchical structure. Primary questions may be supported by sub-questions, creating a logical flow in the study.
8. **Alignment with Theoretical Framework:**
   - Ensure that research questions align with any theoretical frameworks or conceptual models that guide the study. This connection enhances the theoretical underpinning of the research.
9. **Open-Ended vs. Closed Questions:**
   - Research questions can be open-ended, allowing for exploration and discovery, or closed, seeking specific answers. The choice depends on the nature of the research and the desired depth of investigation.
10. **Evolution and Refinement:**
   - Research questions may evolve or be refined as the study progresses. It is common for researchers to revisit and modify questions based on initial findings, literature reviews, or unforeseen challenges.

   ❖ **Sampling:-**

Sampling is a crucial process in research that involves selecting a subset of elements from a larger population for the purpose of making inferences about the entire population. The goal of sampling is to gather data from a representative group in order to draw valid conclusions about the broader population without having to study every individual or element within it. Here are key concepts and considerations related to sampling:
1. **Population:**
   - The population is the entire group of individuals or elements that share a common characteristic and are of interest to the researcher. It can be finite or infinite, depending on the scope of the study.

2. **Sample:**
   - The sample is the subset of the population selected for study. It should be representative of the larger population to ensure that findings can be generalized.
3. **Sampling Frame:**
   - The sampling frame is a list or a source from which the sample is drawn. It is essential that the sampling frame accurately represents the population to avoid bias in the selection process.

   - ❖ **Data collection:**
     Data collection is the process of gathering information or data from various sources for the purpose of analysis, interpretation, and drawing conclusions. It is a crucial step in the research process and can involve a variety of methods depending on the nature of the study. Here are key aspects and considerations related to data collection:

1. **Research Design:**
   - The choice of data collection methods is closely linked to the research design. The research design, whether it's experimental, observational, qualitative, or quantitative, influences the selection of appropriate data collection techniques.
2. **Types of Data:**
   - **Quantitative Data:** Involves numerical information and can be analyzed using statistical methods. Examples include survey responses, test scores, and numerical measurements.
   - **Qualitative Data:** Involves non-numerical information, often gathered through methods such as interviews, observations, or content analysis. Examples include narratives, interview transcripts, and observational notes.
3. **Data Collection Methods:**
   - **Surveys and Questionnaires:** Gathering information through structured questions presented to respondents.
   - **Interviews:** Conducting one-on-one or group discussions to gather in-depth information.
   - **Observations:** Systematically watching and recording behavior or events in a natural setting.
   - **Experiments:** Manipulating variables in a controlled environment to observe their effects.
   - **Document Analysis:** Examining existing documents, records, or artifacts for relevant information.
   - **Focus Groups:** Facilitating group discussions to explore opinions and perceptions.
4. **Sampling and Participants:**
   - Identify and select the participants or sample from which data will be collected. The sampling method should align with the research goals and provide a representative group.
5. **Data Collection Instruments:**
   - Choose or design instruments for data collection. This may include surveys, interview guides, observation checklists, or experimental protocols.
6. **Pilot Testing:**

- Before implementing the main data collection, conduct a pilot test to identify and address any issues with the instruments or procedures. This helps ensure the reliability and validity of the data.

7. **Data Collection Procedures:**
   - Clearly define and follow standardized procedures for collecting data to maintain consistency and minimize bias. This includes training data collectors and ensuring ethical considerations are met.

8. **Quantitative Data Collection:**
   - For quantitative data, establish procedures for administering surveys, tests, or experiments. Ensure that the data collected are reliable and valid.

9. **Qualitative Data Collection:**
   - For qualitative data, implement strategies for conducting interviews, observations, or focus groups. Pay attention to the depth and context of the information gathered.

10. **Technology in Data Collection:**
    - Leverage technology for efficient and accurate data collection. This may include online surveys, digital recording devices, or specialized software for qualitative analysis.

11. **Ethical Considerations:**
    - Adhere to ethical principles throughout the data collection process. Obtain informed consent from participants, protect their privacy, and ensure that the study benefits outweigh potential risks.

12. **Data Management:**
    - Develop a system for organizing and managing collected data. This includes data entry, coding, and storage in a secure and accessible format.

13. **Triangulation:**
    - Consider using multiple data sources or methods (triangulation) to enhance the validity of the findings. Combining quantitative and qualitative data can provide a more comprehensive understanding.

14. **Data Quality Assurance:**
    - Implement measures to ensure data quality, including data validation checks, double-entry verification, and regular monitoring of data collection processes.

15. **Adaptability:**
    - Be prepared to adapt data collection methods or procedures based on unexpected challenges or changes in the research context.

❖ **Data analysis:-**

Data analysis is the process of inspecting, cleaning, transforming, and modelling data with the goal of discovering useful information, drawing conclusions, and supporting decision-making. It is a critical step in the research process and can involve various techniques depending on the type of data and the research objectives. Here are key aspects and considerations related to data analysis:

Research Objectives and Questions:
Align data analysis with the research objectives and questions. Clearly define what insights or conclusions you aim to derive from the data.

Data Cleaning and Pre-processing:
Clean and pre-process the data to address missing values, outliers, and inconsistencies. This step ensures that the data is accurate and ready for analysis.

Descriptive Statistics:
Use descriptive statistics to summarize and describe the main features of the data. This may include measures of central tendency (mean, median), dispersion (range, standard deviation), and graphical representations (histograms, box plots).

Inferential Statistics:
Apply inferential statistics to make inferences or predictions about a population based on a sample. This includes hypothesis testing, confidence intervals, and regression analysis.

Exploratory Data Analysis (EDA): Conduct EDA to explore patterns, relationships, and trends in the data. Visualization techniques such as scatter plots, heatmaps, and histograms can be valuable in this phase.

Qualitative Data Analysis:
If dealing with qualitative data, use methods such as thematic analysis, content analysis, or grounded theory to identify patterns and themes in the data.

Coding and Categorization: Code and categorize data, especially in qualitative research, to organize information into meaningful groups or themes.

Statistical Analysis Software (SAS):
Utilize statistical analysis software such as SPSS, R, Python, or other specialized tools to perform advanced statistical analyses and generate meaningful insights.
Data Visualization:

Present the findings through effective data visualization techniques. Graphs, charts, and dashboards can enhance the communication of results.

Interpretation: Interpret the results in the context of the research questions and objectives. Discuss the implications of the findings and how they contribute to the overall understanding of the topic.

Statistical Significance: Determine the statistical significance of findings to assess whether observed effects are likely due to actual relationships or random chance.

Comparisons and Contrasts:
Compare and contrast groups or variables to identify differences or similarities. This is particularly relevant in experimental or comparative studies.

Validity and Reliability: Assess the validity and reliability of the data and the analysis. Validity refers to the accuracy of the results, while reliability focuses on the consistency of measurements.

Ethical Considerations: Adhere to ethical guidelines during the analysis, ensuring that privacy and confidentiality are maintained, and results are presented in an unbiased and transparent manner.

Iteration and Refinement:
Iterate and refine the analysis based on feedback, peer review, or additional insights. Continuous refinement improves the robustness of the findings.

Report Writing:
Clearly present the results in a research report or paper. This includes detailing the methodology, summarizing the findings, and discussing the implications of the study.
Effective data analysis is a key component of producing meaningful and reliable research outcomes. It involves a combination of statistical techniques, critical thinking, and a thorough understanding of the research context and objectives.

❖ ADVANTAGES OF BUSINESS RESEARCH
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Business research offers several advantages for organizations seeking to understand, improve, and succeed in the dynamic and competitive business environment. Here are some key advantages

1. **Informed Decision-Making:**
   - Business research provides valuable information and insights that enable organizations to make informed and evidence-based decisions. This is crucial for strategic planning and day-to-day operations.
2. **Identification of Opportunities:**
   - Through research, businesses can identify new market opportunities, emerging trends, and areas for innovation. This allows organizations to stay competitive and capitalize on untapped potential.
3. **Risk Management:**
   - Research helps organizations assess and mitigate risks by providing a comprehensive understanding of market conditions, industry trends, and potential challenges. This allows for proactive risk management strategies.
4. **Customer Understanding:**
   - Businesses can use research to gain a deeper understanding of customer needs, preferences, and behaviours. This knowledge is essential for developing products and services that align with customer expectations.
5. **Competitive Advantage:**
   - Research helps businesses analyze their competitors, benchmark performance, and identify unique selling propositions. This information can be leveraged to gain a competitive advantage in the market.

6. **Innovation and Product Development:**
   - Research contributes to innovation by providing insights into customer demands, technological advancements, and market gaps. This information guides product development and enhances the organization's ability to meet evolving customer needs.
7. **Operational Efficiency:**
   - Through research, businesses can identify opportunities to streamline operations, reduce costs, and improve efficiency. This is crucial for maintaining profitability and sustainability.
8. **Strategic Planning:**
   - Business research is a cornerstone of strategic planning. It helps organizations set clear objectives, define strategies, and allocate resources effectively to achieve long-term goals.
9. **Market Positioning:**
   - Research assists businesses in understanding their current market position and identifying strategies to enhance their brand image. This includes positioning products/services in a way that resonates with target audiences.
10. **Adaptation to Change:**
    - The business environment is dynamic, and research enables organizations to adapt to changes in technology, regulations, and consumer behavior. Being proactive in response to change is crucial for survival and growth.
11. **Employee Satisfaction and Productivity:**
    - Research on employee satisfaction and engagement contributes to a positive work environment. Satisfied employees are more likely to be productive and contribute to the overall success of the organization.
12. **Legal and Ethical Compliance:**
    - Research helps organizations stay informed about legal and ethical standards in their industry. Adhering to these standards is essential for maintaining a positive corporate image and avoiding legal issues.
13. **Financial Performance:**
    - Research contributes to financial success by providing insights into market demand, pricing strategies, and cost optimization. This information supports financial planning and contributes to overall profitability.
14. **Investor Confidence:**
    - Organizations that demonstrate a commitment to research and evidence-based decision-making often instill confidence in investors. Transparent and informed decision-making can attract and retain investors.

❖ **DISADVANTGES OF BUSINESS RESERCH**

While business research offers numerous advantages, it also comes with certain disadvantages and challenges. It's essential to be aware of these potential drawbacks to conduct research effectively. Here are some disadvantages of business research

1. **Cost:**
   - Conducting comprehensive research can be expensive. Costs may include data collection, analysis tools, software, and hiring skilled researchers. Small businesses, in particular, may find these expenses challenging to manage.

2. **Time-Consuming:**
   - Business research, especially when rigorous and thorough, can be time-consuming. Gathering data, analyzing results, and drawing meaningful conclusions may require a significant investment of time, which could impact decision-making timelines.

3. **Complexity:**
   - The complexity of research methodologies and statistical analyses can be a barrier. Businesses without specialized research expertise may struggle to design and implement studies effectively.

4. **Data Quality and Reliability:**
   - The quality and reliability of data depend on various factors, including the accuracy of data collection methods. Poorly designed surveys or biased sampling can result in unreliable data, undermining the validity of research findings.

5. **Data Privacy and Security Concerns:**
   - Collecting and managing sensitive information raises privacy and security concerns. Organizations need to adhere to ethical standards and data protection regulations to avoid legal and reputational risks.

6. **Resistance from Stakeholders:**
   - Some stakeholders may be resistant to change or skeptical about the value of research findings. Convincing individuals or teams to adopt new strategies based on research outcomes may be challenging.

7. **Incomplete or Biased Information:**
   - Incomplete or biased information can lead to flawed conclusions. Researchers may unintentionally introduce bias during the study design, data collection, or analysis phases, impacting the accuracy of results.

8. **Overreliance on Quantitative Data:**
   - Overreliance on quantitative data without considering qualitative insights can limit the depth of understanding. A holistic approach that combines both quantitative and qualitative data may be more informative.

9. **Difficulty in Forecasting:**
   - While research provides insights, predicting future market conditions accurately is challenging. External factors such as economic changes or unforeseen events can impact the validity of forecasting models.

10. **Inability to Control External Variables:**
    - Businesses may find it challenging to control external variables that could influence the research outcomes. Factors beyond the organization's control, such as changes in government policies or global economic conditions, can impact results.

11. **Limited Generalization:**

- Findings from a specific research study may not be easily generalizable to different contexts. The unique characteristics of a particular industry, market, or time period may limit the broader applicability of results.

12. **Difficulty in Measuring Intangible Factors:**
   - Some aspects of business, such as brand image, customer satisfaction, or organizational culture, are intangible and challenging to measure accurately. This can limit the depth of analysis in certain areas.

13. **Impact of Research on Operations:**
   - Implementing changes based on research findings can disrupt existing operations and workflows. Organizations need to carefully manage the transition to avoid resistance and minimize operational disruptions.

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