

Code No.: 40307

MR14

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
GundlapochampALLY (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019

Subject: Mechanics of Solids

Branch: MINING

I. Answer all. Each Questions carry equal marks

5 x 1 = 5

1. Define Hooke's Law
2. List out the types of loads acting on beams
3. Write any two assumption in theory of simple bending
4. Define pure torsion
5. Define longitudinal stress

II. Answer all. Each Questions carry equal marks

10 x 2 = 20M

1. Define the Bulk modulus & Rigidity modulus
2. Write the relationship between the three elastic module
3. Define shear force and bending stress.
4. Draw the S.F. and B.M. diagram for simply supported beam with U.D.L.
5. Write and state the bending equation
6. The section modulus of I section is
7. What is the elastic line of a beam?
8. Write and state the torsion equation
9. What is meant by imperfect frame?
10. Describe the types of possible failures in a thin cylinder subjected to uniform internal pressure?

PART-B

Answer all. Each Questions carry equal marks

5 x 10 = 50M

1. A steel rod of 20 mm dia. and 300 mm long is enclosed centrally inside a hollow copper tube of external dia. 30 mm and internal dia. 25 mm. The ends of the rod and tube are brazed together and the composite bar is subjected to an axial pull of 40kN. If E for steel and copper is 200 GN/m² and 100 GN/m² respectively. Find the stresses developed in the rod and the tube. And also find the extension of the rod.

OR

2. A steel specimen 1.5 cm² in cross-section stretches 0.005 cm over a 5 cm gauge length under an axial load of 30 kN. Calculate strain energy stored in the specimen at this point. If the load at the elastic limit for the specimen is 50 kN, calculate the elongation at elastic limit and the proof resilience.

3. The intensity of loading on a simply supported beam of 5m span increases uniformly from 8kN/m at one end to 16kN/m at the other end. Find the position and magnitude of the maximum bending moment. Also draw shear force and bending moment diagrams.

OR

4. A beam AB, 10 m long is loaded as shown in Figure 1. Draw the B. M., S. F. and axial thrust diagrams.

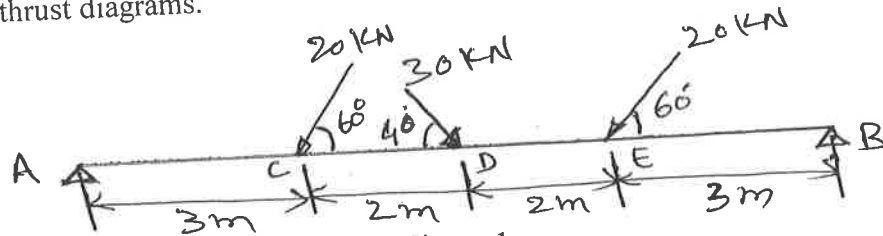


Figure 1

5. The cross-section of a cast-iron beam shown in Figure 2. This beam is simply supported at the ends and carries a u.d.l. of 20kN/m. If the span of the beam is 3 m, determine the maximum tensile and compressive stresses in the beam.

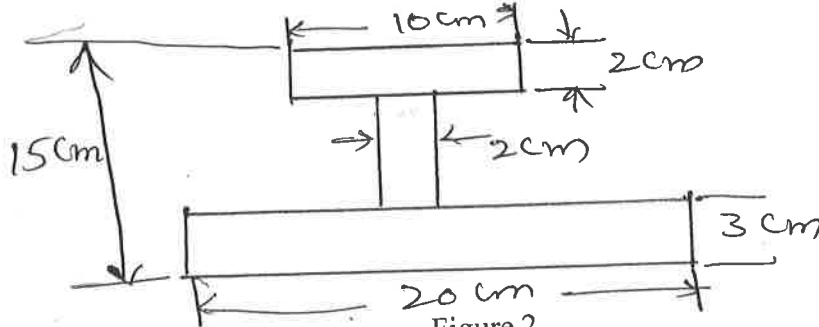


Figure 2

OR

6. The cross section of a beam is a triangle with base 10 cm and height 12 cm being placed horizontally. Draw the distribution of shear stress in the beam if the shear force on the cross section is 10 kN.
7. A horizontal beam AB is freely supported at A and B, 9 m apart and carries a uniformly distributed load of 20 kN/m run (including its own weight). A clockwise moment of 180 kN-m is applied to the beam at a point C, 4m from the left hand support A. Calculate the reactions at A and B, and sketch the bending moment diagram for the beam, starting principal values.

OR

8. A composite shaft consists of a steel rod 10 cm diameter surrounded by a closely fitting tube of brass fixed to it. Find the outside diameter of the tube so that when a torque is applied to the composite shaft it will be shared equally by the two materials G for steel = 80Gpa G for brass = 40 Gpa.

9. Determine the magnitude and nature of the forces in the member of the truss shown in figure 3.

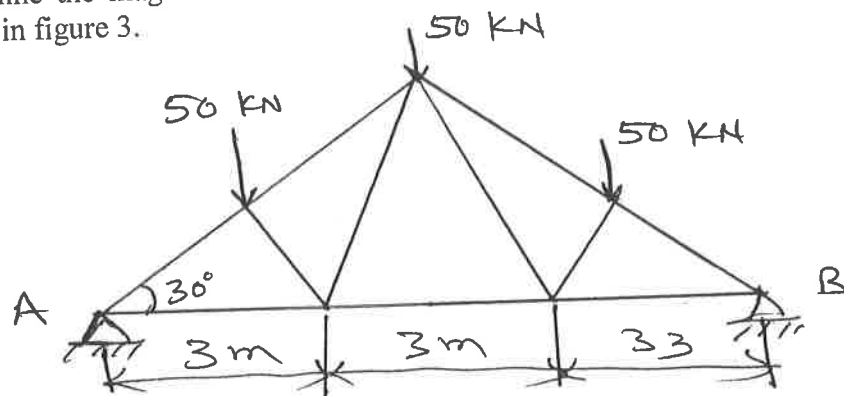


Figure 3.
OR

10. A cylindrical shell 1 m long, 150 mm internal diameter having thickness of metal as 10 mm is filled with fluid at atmospheric pressure. If an additional 15 cm^3 of fluid is pumped into the cylinder, find the pressure exerted by the fluid on the cylinder and corresponding hoop stress induced.

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019**Subject: Drilling and BlastingBranch: **MINING**Time: **3 hours**Max. Marks: **75****PART – A****I.** Answer **ALL** questions of the following**5x1Mark=5 Marks**

1. What is Exploration drilling?
2. List any two cause of Bit wear.
3. What is Blasting agent?
4. What is BOS?
5. What is crest of bench?

II. Answer **ALL** questions of the following**10x2Marks=20 Marks**

1. What is Bore hole survey? Why is it important in drilling?
2. What are fishing tools used in drilling? How is it helpful in drilling?
3. What is drilling index?
4. What is Micro bit drilling?
5. What is LOX explosive?
6. What are ANFO and HANFO?
7. What is Induced blasting?
8. What is burn cut?
9. What is Under water blasting?
10. What are waves generated in the blasting?

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. What is Core recovery? How does core recovery to be done in the coal deposit?

OR

2. Write the merits and demerits of the core barrel.
3. What is Production drilling? Explain the working principle of drilling with neat sketch.

OR

4. A open cast coal mine is being operated by shovel and dumper combination, drilling parameters are burden and spacing are 5 m and 6.5 m. Determine the number of holes to be drilled to excavate the production of 10,000 T of coal per day if the height of the bench is 10 m. Assume specific gravity of coal is 1.5.
5. What is Explosive? What is role of Explosive in the Mine? What are SMS and SME?

OR

6. Write the following i. Nonel Blasting ii. Storage and Transportation of explosive
7. A coal seam of 3 m thick located at 100 m is under development with 4.2 m gallery and 40 m size pillars. There are 12 holes are drilled in the face of 4.2 m x 3 m gallery, the depth of hole is 6 feet, explosive per hole is 450 gms. What is powder factor if the pull per blast is 1.2 m. What will be the production per day if three blasts are to be performed in a day.

OR

8. Describe the working principle of the Gallery blasting with neat sketch?
9. Explain the how the blasting operation to be carried out in the large opencast chromite mine.

OR

10. Explain the blasting for Trench cutting and road constructions.

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019**Subject: Basic Electrical and Electronics Engineering

Branch: Common to CE & MINING

Time: 3 hours

Max. Marks: 75

PART – A**I.** Answer **ALL** questions of the following**5x1Mark=5 Marks**

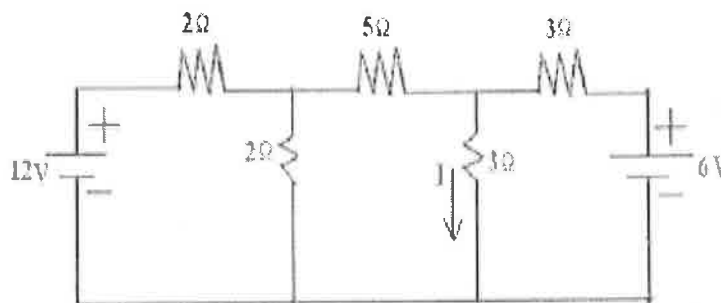
1. Define the magnetic flux density
2. Define Ohms law
3. What is synchronous speed?
4. Define cut-in voltage for a diode.
5. Define sensitivity for a CRO.

II. Answer **ALL** questions of the following**10x2Marks=20 Marks**

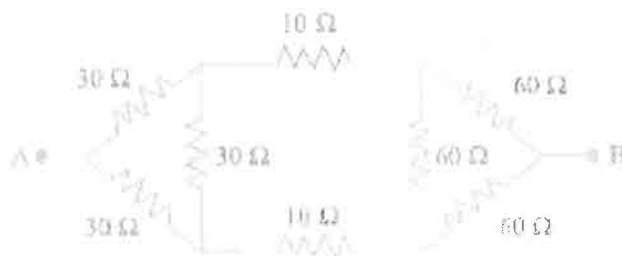
1. Two $1.2\text{ k}\Omega$ resistors are in series and this series combination is in parallel with a $3.3\text{ k}\Omega$ resistor. Find the total resistance?
2. Two resistors with 50 ohms resistance are connected in parallel to a voltage source of 50 volts , find current in each resistor.
3. Write the operating principle of Transformer.
4. Define transformation ratio and write down the equations of it.
5. State Fleming's Left and Right Hand Rules.
6. What is significance of Back EMF in a Dc machine?
7. What is approximate diode voltage drop?
8. Define drift current and diffusion current
9. How to measure frequency using CRO?
10. Explain the intensity control in CRO

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. Find the current **I** in the circuit shown below

**OR**

2. Find the resistance between the terminals A and B for the network shown in Fig.



3. Explain OC tests of transformer with neat circuit diagram.

OR

4. a) Write the advantages of transformer tests.
b) Write and explain about hysteresis and eddy current losses.
5. Determine developed torque and shaft torque of 220V, 4-pole series motor with 800 conductors wave connected supplying a load of 8.2KW by taking 45A from the mains, the flux per pole is 25mWb and its armature circuit resistance is 0.6 Ohm.

OR

6. A DC motor is connected to a 460V supply takes an armature current of 120A on full load. If the armature has resistance of 0.25 Ohm, calculate back emf.
7. Explain the V-I characteristics of Diode?

OR

8. Explain working of diode and transistor along with VI characteristics
9. Explain the construction and working of a Wein bridge Oscillator.

OR

10. a) Explain the principle and operation of an oscillator.
b) Write short notes about the essentials of transistor oscillator.

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Gundlapochamp ALLy (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019**Subject: Mathematics –IIBranch: **Common to ME & MINING****Time: 3 hours****Max. Marks: 75****PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. If $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$, then find the value of $\text{div } \vec{r}$.
2. Find the Fourier coefficient a_0 of the function $f(x) = x$ in $(0, 2\pi)$
3. Write the Newton's forward interpolation formula.
4. Define Transcendental Equations with example.
5. Write the second order Runge - Kutta formula.

II. Answer ALL questions of the following**10x2Marks=20 Marks**

1. Use Green's theorem to evaluate $\oint_C (x + y^2)dx + (x^2 + y) dy$ where C is the circle of radius 2 with centre at the origin O of the x y plane.
2. Prove that $\text{div grad } F = \nabla^2 f = \frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} + \frac{\partial^2 f}{\partial z^2}$
3. State the change of scale property of Fourier transform.
4. Obtain the fourier series for $f(x) = x^2$ in $(-\pi, \pi)$
5. Using Newton's backward interpolation formula, find $f(2.5)$ from the following table

x	0	1	2	3
f(x)	1	3	5	6

6. Fit a straight line to the following data

x	1	2	3	4
y	8	9	11	15

7. Explain the convergence criteria for system of simultaneous linear equations.
8. Find a positive root of the equation $x^3 - 4x - 9 = 0$ using bisection method.
9. Evaluate $\int_0^1 \frac{dx}{1+x}$ applying the Simpson's 1/3rd rule.
10. Find the value of y for $x=0.1$ by picard's method, given that $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks**

1. For a solenoidal vector \vec{F} , show that $\text{curl curl curl curl } \vec{F} = \nabla^4 \vec{F}$
OR
2. Show that $\nabla^2 (r^n \vec{r}) = n(n+3)r^{n-2} \vec{r}$

3. Obtain the Fourier series for the function $f(x) = e^x$, from $x = 0$, to $x = 2\pi$

OR

4. If $f(x) = \begin{cases} 0, & -\pi \leq x \leq 0 \\ \sin x, & 0 \leq x \leq \pi \end{cases}$ Prove that $f(x) = \frac{1}{\pi} + \frac{\sin x}{2} - \frac{2}{\pi} \sum_{n=1}^{\infty} \frac{\cos 2nx}{4n^2 - 1}$. Hence, show that

$$\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \dots = \frac{1}{4}(\pi - 2)$$

5. Find the polynomial $f(x)$ by using Lagrange's formula and hence find $f(3)$ for

x	0	1	2	5
f(x)	2	3	12	147

OR

6. a) Find $f(22)$ from the Gauss forward formula

x	20	25	30	35	40	45
F(x)	354	332	291	260	231	204

- b) For $x = 0, 1, 2, 3, 4$, $f(x) = 1, 14, 15, 5, 6$ find $f(1.3)$ using Newton Forward interpolation formula

7. Find the root of the equation $\cos x = x e^x$ using regula falsi method correct to four decimal places.

OR

8. Represent graphically some of the procedures in numerical computations for root finding problem. Apply Newton —Raphson iterative method with good initial approximation $x = x_0$ to a root ξ of the equation $e^x \sin x = 1$.

9. Tabulate all the computations, by the following methods, of value of integral, for comparison,

$$\int_0^1 \frac{1}{1+x} dx; \text{ i) Gauss-Legendre three-point ii) Simpson's 1/3 rule (iii) Trapezoidal method with } h = 0.1.$$

OR

10. Use Runge -Kutta method of 4th order find y when $x=1.2$ in steps of 0.1 given that $\frac{dy}{dx} = x^2 + y^2$ and $y(1) = 0$

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1. Define Odd function
2. State linear property of Z-Transformation
3. Write down simpson's 1/3 rd rule.
4. Write a demerit of the Taylor series.
5. Give examples of partial differential equation

II. Answer ALL questions of the following**10x2Marks=20 Marks**

1. Find Fourier transform of $f(x) = e^{-\frac{x^2}{2}}, -\infty < x < \infty$
2. Express $f(x) = x$ as a half range sine series in $0 < x < 2$.
3. Find Z [coshat sinbt]
4. State convolution theorem of Z-transforms
5. A curve passes through (2, 8); (3, 27) ; (4, 64) & (5, 125). Find the area of the curve between the x-axis and the lines $x = 2$ and $x = 5$
6. Derive trapezoidal rule.
7. Using Taylor's method, find $y(0.1)$, given that $\frac{dy}{dx} = x - y^2, y(0) = 1$
8. If $dy = y - \frac{2x}{y}; y(0)=1, h=0.1$ then find $y(0.2)$ using Euler's method.
9. Form a partial differential equation by eliminating the arbitrary function from $z = xy + f(x^2 + y^2)$
10. Solve $y^2 zp + x^2 zq = y^2 x$

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks**

1. Using Fourier integral show that $e^{-ax} - e^{-bx} = \frac{2(b^2 - a^2)}{\pi} \int_0^\infty \frac{\lambda \sin \lambda x d\lambda}{(\lambda^2 + a^2)(\lambda^2 + b^2)}, a, b > 0$

OR

2. Find the Fourier transform of $f(x) = \begin{cases} 1, & \text{for } |x| < 1 \\ 0, & \text{for } |x| > 1 \end{cases}$. Hence evaluate $\int_0^\infty \frac{\sin x}{x} dx$

3. Using Z- transform solve $4u_n - u_{n+2} = 0$ given that $u_0 = 0$ and $u_1 = 2$.

OR

4. Use the Z-transform to solve $u_{n+2} + 4u_{n+1} + 3u_n = 3^n$ with $u_0 = 0, u_1 = 1$.

5. Using method of least squares, fit a relation of the form $y = ab^x$ to the given data

x	2	3	4	5	6
y	144	172.8	207.4	248.8	298.5

OR

6. If p is the pull required to lift a load w by means of a pulley block, find a linear law of the form $p = mw + c$ connecting p and w using the following data

p=	12	15	21	25
w=	50	70	100	120

Where p and w are taken in kg.wt compute p when $w=150$ kg.wt.

7. Using Adam's -Bash forth method, obtain the solution of $\frac{dy}{dx} = x - y^2$ at $x = 0.8$ given the values

x	0	0.2	0.4	0.6
y	0	0.0200	0.0795	0.1762

OR

8. Solve $\frac{dy}{dx} = x + z$, $\frac{dz}{dx} = x - y^2$ with $y(0) = 2$, $z(0) = 1$ to get $y(0.1)$, $y(0.2)$, $z(0.1)$ and $z(0.2)$ approximating by Taylor's algorithm.
9. Solve the equation $\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u$, where $u(x,0) = 6e^{-3x}$ by method of separation of variables.

OR

10. Find solution for one dimensional Wave equation.