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R22

Course Code: A401302



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular Examinations February-2024

Course Name: **STRENGTH OF MATERIALS-I**

(Civil Engineering)

Date: 05.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

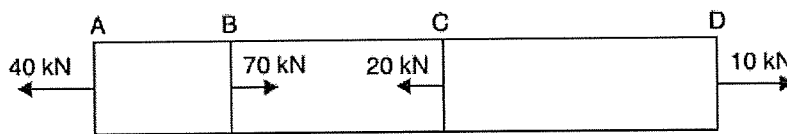
1. Define Stress and Strain. 1 M
2. Define Poissons ratio and Volumetric Strain. 1 M
3. Define Point of Contraflexure. 1 M
4. Define the terms shear force, and bending moment. 1 M
5. Write any three assumptions in the Simple Bending Equation. 1 M
6. Draw shear stress distribution for the triangular section. 1 M
7. Write down the Slope and deflection formula for a Cantilever beam subjected to a Point load at its endpoint. 1 M
8. Write down the two differences between the Moment Area method and Macaulay's Method. 1 M
9. Define Principal Stresses and Strain. 1 M
10. Write down the formula for Maximum principal stress and Strain. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). A brass bar, having cross-section area of 900 mm^2 , is subjected to axial forces as shown in Figure in which $AB = 0.6 \text{ m}$, $BC = 0.8 \text{ m}$ and $CD = 1.0 \text{ m}$. Find the total elongation of the bar. 10M
Take $E = 1 \times 10^5 \text{ N/mm}^2$



OR

- 11.B). Draw Stress Strain diagram for mild steel with neat diagram and mention the salient points. 10M
- 12.A). A cantilever 2 m long is loaded with a uniformly distributed load of 2 kN/m run over a length of 1 m from the free end. It also carries a point load of 4 kN at a distance of 0.5 m from the free end. Draw the shear force and B.M. diagrams. 10M

OR

- 12.B). A simply supported beam of length 8 m carries point loads of 4 kN , 10 kN and 7 kN at a distance of 1.5 m , 2.5 m and 2 m respectively from left end A. Draw the S.F. and B.M. diagrams for the simply supported beam. 10M

(P.T.O.)

13. A). Derive the Bending Equation $\frac{M}{I} = \frac{\sigma}{y} = \frac{E}{R}$ 10M

OR

13. B). Determine the diameter of a solid steel shaft which will transmit 112.5 kW at 200 r.p.m. Also determine the length of the shaft if the twist must not exceed 1.5° over the entire length. The maximum shear stress is limited to 55 N/mm^2 . Take the value of modulus of rigidity = $8 \times 10^4 \text{ N/mm}^2$. 10M

14. A). A simply supported beam of span 5m, carrying a point load of 5kN at a distance of 3m from the left end. Find (i) slope at the left support, (ii) deflection under the load and (iii) maximum deflection. Take $E=2 \times 10^5 \text{ N/mm}^2$ and $I=1 \times 10^8 \text{ mm}^4$. 10M

OR

14. B). A cantilever of length 2 m carries a point load of 20 kN at the free end and another load of 20 kN at its centre. If $E = 10^5 \text{ N/mm}^2$ and $I = 10^8 \text{ mm}^4$ for the cantilever then determine by moment area method, the slope and deflection of the cantilever at the free end. 10M

15. A). At a point within a body subjected to two mutually perpendicular directions, the stresses are 100 N/mm^2 (tensile) and 75 N/mm^2 (tensile). Each of the above stresses, is accompanied by a shear stress of 75 N/mm^2 . Determine the normal, shear and resultant stresses on an oblique plane inclined at an angle of 45° with the axis of minor tensile stress. 10M

OR

15. B). The principal stresses at a point in an elastic material are 22 N/mm^2 (tensile), 110 N/mm^2 (tensile) and 55 N/mm^2 (compressive). If the elastic limit in simple tension is 220 N/mm^2 and $\mu = 0.3$, then determine whether the failure of material will occur or not according to (i) Maximum principal stress theory, (ii) Maximum principal strain theory. 10M

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Course Code: A401303



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular Examinations February-2024

Course Name: **ENGINEERING GEOLOGY**

(Civil Engineering)

Date: 07.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. List different geological agents that assist weathering. 1 M
2. Differentiate geology and petrology. 1 M
3. State the various agents of metamorphism. 1 M
4. State the physical properties of calcite mineral. 1 M
5. Define out crop. 1 M
6. List the common types of soils. 1 M
7. What are different causes of earthquakes? 1 M
8. Why grouting is necessary? 1 M
9. Write the parts of a dam. 1 M
10. What is primary lining in tunnel? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Describe in detail, the process of weathering of rocks. Add a note on the effect of weathering on the strength of rocks. 10M
- OR**
11. B). Give a brief account of the importance of geology in civil engineering. Explain your answer by giving suitable example. 10M
12. A). Define the term rock. Describe the classification of rocks and their characteristics 10M
- OR**
12. B). Define mineral and describe the various physical properties, which are useful in identification of mineral. 10M
13. A). Explain the advantageous to study the branch of structural geology? Write and explain various faults with the help of neat sketches. 10M
- OR**
13. B). What are the various parts and types of unconformities? Draw suitable sketches. 10M

(P.T.O.)

14. A). Write the importance of seismic refraction methods. 10M

OR

14. B). What are landslides? Classify landslides and their causes. How landslides can be prevented? 10M

15. A). Define the term tunnel and give purposes of tunneling. Discuss in detail about the role of geological consideration for proper tunneling. 10M

OR

15. B). Describe the geological considerations relating to the construction of successful dam site. 10M

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Course Code: A401304



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular Examinations February-2024

Course Name: SURVEYING

(Civil Engineering)

Date: 09.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

- | | |
|--|-----|
| 1. What are types in chain? | 1 M |
| 2. Define magnetic declination. What are the types? | 1 M |
| 3. What is reciprocal leveling? | 1 M |
| 4. Define contour. | 1 M |
| 5. State mid ordinate and average ordinate rules. | 1 M |
| 6. What are the types of theodolite? | 1 M |
| 7. What are the methods of traversing? | 1 M |
| 8. Define the terms point of curve and point of tangency | 1 M |
| 9. Define EDM. | 1 M |
| 10. Mention the segments of GPS. | 1 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) A chain was tested before starting a survey and was found to be exactly 20m and 20cm. The area of the plan drawn to a scale 8cm to 1cm was 220sq.cm. Find the true area of the field. 5M
- ii) Explain the different method of ranging with neat sketch. 5M

OR

11. B). The following are the magnetic bearings of a closed traverse ABCD carried out in an area under the influence of local attraction. Find the correct magnetic bearings, if the magnetic declination of the area is $1^{\circ}45'E$, find also the true bearings. 10M

LINE	MAGNETIC BEARING	
	FB	BB
AB	21°14'	202°30'
BC	138°20'	318°20'
CD	202°18'	23°23'
DA	293°41'	111°20'

12. A). The following observations are recorded with a level on a continuously sloping ground with 4m leveling staff. Enter the observations and compute the reduced levels of all points using height of collimation. The first observation is recorded on the starting point having R.L of 250m. the observations are 1.800, 2.200, 3.400, 3.800, 1.400, 2.600, 3.300, 3.600, 3.750, 0.900, 1.400, 1.600, 2.500 & 2.700 m. 10M

OR

12. B). Explain the direct and indirect methods of contouring. 10M

(P.T.O..)

13. A). A series of offsets were taken from a chain line to a curved boundary line at interval at 15m in the following order: 1.55, 2.85, 3.60, 4.10, 4.95, 4.20, 5.45, 6.35, 7.45, 8.69m. 10M
 Compute the area between the chain line, the curved boundary and the end offsets by a. Average ordinate rule b. Trapezoidal rule and c. Simpson's rule.

OR

13. B). Explain the method of Reiteration and Repitition method with sketch. 10M

14. A). i) Calculate the ordinates at 5m distances for a circular curve having a long chord of 60m and mid ordinate of 4m. 5M

- ii) Explain about Offset from long chord method. 5M

OR

14. B). Determine the gradient from a point P to another point Q from the following observations made with a tacheometer fitted with an anallatic lens. The constants of the instrument were 100 & 0, the staff was held vertical: 10M

Instrument station	Staff station	Bearings	Vertical angles	Staff readings
R	P	120°	+10°30'	1.255, 1.81 0, 2.386
	Q	210°	+6°08'	1.653, 2.30 0, 3.600

15. A). Discuss the errors in GPS surveying. 10M

OR

15. B). Explain the principle of working of Total station & GIS. 10M

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Course Code: A401305



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular Examinations February-2024

Course Name: **FLUID MECHANICS**

(Civil Engineering)

Date: 12.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Define viscosity and how does it vary with temperature. 1 M
2. Define bulk modulus of elasticity and compressibility. 1 M
3. Differentiate between steady and unsteady flows. 1 M
4. List the characteristics of streamline. 1 M
5. What are the practical applications of Bernoulli's equation? 1 M
6. List the forces exerted by fluid flow on pipe bend. 1 M
7. Define Hydraulic gradient line and total energy line. 1 M
8. Define Water hammer. 1 M
9. Enumerate the factors which affect the thickness of boundary layer. 1 M
10. List the contributions of Prandtl to fluid mechanics. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

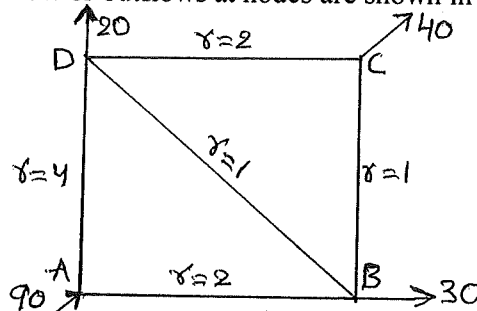
- 11.A). Define and prove the 'Pascal's Law'. 10M
- OR**
11. B). Explain various properties of fluids with their importance. 10M
12. A). The following given stream function represents a two-dimensional steady state flow. $\Psi = 4(x^2 - y^2)$ Check whether the flow is irrotational or not? If it is irrotational, then find out the corresponding velocity potential function. 10M
- OR**
12. B). Develop the continuity equation in three dimensions for steady incompressible fluid flow. 10M
13. A). A closed tank partially filled with water up to a height of 0.9 m having an orifice of diameter 15 mm at the bottom of the tank. The air is pumped into the upper part of the tank. Determine the pressure required for a discharge of 1.5 litres/s through the orifice. Take $C_d = 0.62$. 10M
- OR**
13. B). Water flows over a rectangular weir 1 m wide at a depth of 150 mm and afterwards passes through a triangular right angled weir. Find the depth over the triangular weir. Take $C_d = 0.62$ for rectangular weir and 0.60 for triangular weir. 10M

(P.T.O..)

14. A). Develop an equation for head loss due to friction in pipes by darcy weisbach. 10M

OR

14. B). Calculate the discharge in each pipe of the network shown in fig. the pipe network consists of five pipes. The head loss h_f in a pipe is given by $h_f = rQ^2$. The value of "r" for various pipes and the inflow or outflows at nodes are shown in the fig. 10M



15. A). Define displacement thickness. Develop an expression for the displacement thickness. 10M

OR

15. B). Explain the phenomenon of separation of boundary layer over a thin flat plate. 10M

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Course Code: A402204



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular Examinations February-2024

Course Name: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common for CE & ME)

Date: 14.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Define RMS and Average values of sine waveform. 1 M
2. Classify the electrical sources. 1 M
3. Define Earthing. 1 M
4. What is the Power Factor? 1 M
5. Draw the equivalent circuit of 1-phase transformer. 1 M
6. What is the function of DC Generator? 1 M
7. Draw the i-v characteristics of PN junction diode. 1 M
8. Compare full wave and half wave rectifier. 1 M
9. Name the terminals of BJT. 1 M
10. Draw the connection diagram of FET. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the terms (i) real power (ii) reactive power (iii) apparent power and also discuss the voltage and current relations in star and delta connections. 10M
- OR**
11. B). State and explain the KCL and KVL with suitable example. 10M
12. A). Explain the construction and working principle of MCB 10M
- OR**
12. B). Write short notes on cables and earthing. 10M
13. A). Explain the principle of operation of Induction Motor. 10M
- OR**
13. B). Analyse the construction and principle of operation of Synchronous generator. 10M
14. A). Explain the principle of operation of PN junction diode in both modes. 10M
- OR**
14. B). Write short notes on different types of filters. 10M
15. A). Explain the construction and working principle of BJT. 10M
- OR**
15. B). Compare CE, CB and CC configurations. 10M
