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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : B.Tech III Semester Supplementary Examinations July-2025
Course Name : Strength of Material-I
Course Code : A401302
Branch : Civil Engineering
Date & Session : 01-07-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. Define bulk modulus and strain energy. 1 M
2. Draw stress-strain diagram for mild steel specimen tested under uni-axial tension till fracture and mark all the salient point. 1 M
3. Define point of Contra flexure. 1 M
4. What are the different types of loads acting on a beam? 1 M
5. What are the assumptions made in the theory of simple bending? 1 M
6. What do you mean by shear stresses in beams? 1 M
7. What is a Macaulay's method? Where is it conveniently used? 1 M
8. A cantilever beam of length 4 m carries a uniformly varying load of zero intensity at the free end, and 45 kN/m at the fixed end. Determine the slope at the free end. $E=200 \text{ GPa}$ and $I=80 \times 10^6 \text{ mm}^4$. 1 M
9. Define the term principal stress. 1 M
10. What do you understand by term theories of failure? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). A straight bar 60 cm long consists of three portions the first 18 cm length is of 30 mm diameter, the middle 26 cm length is of 20 mm dia. and the remaining 16 cm length is of 25 mm diameter. If it is subjected to an axial pull of 100 KN find the total extension of the bar. Find also the stresses, strains and changes in length of different portions. Take $E = 200 \text{ GPa}$. 10M

OR

11. B). A bar specimen of 36 mm diameter was subjected to a pull of 90 KN during a tension test. The extension on a gauge length of 200 mm was measured to be 0.089 mm and the change in diameter of 0.0046 mm. Determine the Poisson's ratio and the values of three elastic Moduli. 10M
12. A). A simply supported beam of length 8 m carries point loads of 4 kN and 6 kN at a distance of 2 m and 4 m from the left end. Draw the S.F and B.M diagrams for the beam. 10M

(P.T.O.)

OR

12. B). A cantilever of length 4m carries a uniformly distributed load of 2kN/m run over the whole span and a point load of 2 kN at a distance of 1 m from the free end. Draw the S.F and B.M diagrams for the cantilever. 10M
13. A). A cast iron beam is of T- section of dimensions of top flange 100mm x 20mm, web 80mm x 20mm, the beam is simply supported on a span of 8 m. the beam carries a U.D.L. of 1.5 kN/m length on the entire span. Determine the maximum tensile and maximum compressive stresses. 10M

OR

13. B). A circular beam of 100 mm diameter is subjected to a shear force of 5 KN. Calculate: (i) Average shear stress, (ii) Maximum shear stress, and (iii) Shear stress at a distance of 40 mm from neutral axis. 10M
14. A). A beam 6 m long simply supported at its ends is carrying a point load of 50 kN at its centre. The moment of inertia of the beam is given as equal to $78 \times 10^6 \text{ mm}^4$. If E of the material of the beam $= 2.1 \times 10^5 \text{ N/mm}^2$, Calculate: i) deflection at the centre ii) slope at the supports. 10M

OR

14. B). Derive an expression for slope and deflection for a simply supported beam carrying a U.D.L over the entire length by using Macaulay's method. 10M
15. A). At a certain point in a strained material, the stresses on two planes, at right angles to each other are 20 N/mm^2 and 10 N/mm^2 both tensile. They are accompanied by a shear stress of a magnitude of 10 N/mm^2 . Find graphically or otherwise, the location of principal planes and evaluate the principal stresses. 10M

OR

15. B). Discuss in detail about various theories of failure. 10M

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Examination : B.Tech III Semester Supplementary Examinations July-2025
Course Name : Engineering Geology
Course Code : A401303
Branch : Civil Engineering
Date & Session : 03-07-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions
Each question carries ONE mark.

10x1=10M

1. What is physical geology? 1 M
2. What are the three types of petrology? 1 M
3. Differentiate rock and mineral. 1 M
4. What type of sedimentary rock is jasper? 1 M
5. What is meant by strike? 1 M
6. What are the different parts of the folds? 1 M
7. What are the uses of grouting? 1 M
8. What are the causes of landslides? 1 M
9. State the factors contributing to the success of a reservoir. 1 M
10. What are the parts of the dam? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss the importance of geology in the field of Civil Engineering. 10M
- OR**
- 11.B). Describe briefly different process are responsible for physical and chemical weathering. 10M
- 12.A). Explain important physical properties of minerals that are commonly studied for their identification. 10M
- OR**
- 12.B). Discuss the importance of
i) granite ii) quartzite iii) schist iv) shale v) gneiss 10M
- 13.A). Explain with neat sketches the principal types of faults as recognized on the basis of apparent movement and mode of occurrence. 10M
- OR**
- 13.B). Describe the ground water table and types of ground water. 10M
- 14.A). What is the importance of geophysical methods? Explain the study of magnetic method and gravity method. 10M
- OR**
- 14.B). Enumerate the classification and causes of earthquakes and give their safety measures for construction of building in earthquake prone areas 10M
- 15.A). What is dam? With what purposes it will be constructed? Explain in detail the geological investigations of a good site. 10M
- OR**
- 15.B). Describe the ground water exploration. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech III Semester Supplementary Examinations July-2025
Course Name : Surveying
Course Code : A401304
Branch : Civil Engineering
Date & Session : 05-07-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. Define Map shrinkage. 1 M
2. State the conversion rule for W.C.B to R.B. 1 M
3. What is the principle of leveling? 1 M
4. Mention the temporary adjustments of leveling. 1 M
5. Define median and double median distance. 1 M
6. Differentiate between Transiting & Swinging telescope. 1 M
7. Define stadia method of tacheometry. 1 M
8. Mention the types of curves. 1 M
9. Define GPS. 1 M
10. Mention the uses of Total station. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) What is an obstacle? Explain the various obstacles in chaining. 5M
ii) Explain in detail the various classifications of surveying in detail. 5M

OR

11. B). The following angles were observed in clockwise direction in an open traverse $\angle ABC = 124^\circ 15'$, $\angle BCD = 156^\circ 30'$, $\angle CDE = 102^\circ 0'$, $\angle DEF = 95^\circ 15'$, $\angle EFG = 215^\circ 30'$ magnetic bearing of line AB was $241^\circ 30'$. what would be the bearing of line FG = ? 10M

12. A). Explain the characteristics of contours with sketches. 10M

OR

12. B). The following consecutive readings were taken along AB with a 4m leveling staff on continuously sloping ground at intervals of 20m :
0.34, 1.450, 2.630, 3.875, 0.655, 1.745, 2.965, 3.945, 1.125, 2.475, 3.865 on B. The elevation A was 60.350m. Enter the above readings in a level book form and work out RLs by Rise and Fall method. Also find the gradient of the line AB. 10M

(P.T.O.)

13. A). Calculate the volume of earth work by prismatic and trapezoidal formulae in a road embankment with the following data: 10M

Chainage along the center line	0	100	200	300	400
Ground level	201.70	202.90	202.40	204.70	206.90

Formation level at chainage 0 is 202.30, top width is 10m, side slopes are 2:1. The longitudinal gradient of the embankment is 1 in 100 rising. The ground is assumed to be level along the longitudinal section

OR

13. B). What are the temporary adjustments of Theodolite and explain. 10M

14. A). The elevation of a point P is to be determined by observations from two adjacent stations of a tachometric survey. The staff was held vertically upon the point and the instrument is fitted with an anallatical lens, the constant of the instrument being 100. 10M

Compute the elevation of the point P from the following data:

Inst.st.	Ht. of Axis	Staff point	Vertical angle	Staff reading	Elevation of station
A	1.42	P	+2°24'	1.230, 2.055, 2.880	77.750 m
B	1.40	P	-3°36'	0.785, 1.800, 2.815	97.135 m

OR

14. B). Explain about offset from long chord method and perpendicular offset from the tangent. 10M

15. A). Explain the essential components of total station also mention the advantages over the other instruments. 10M

OR

15. B). Explain about Electromagnetic wave theory. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech III Semester Supplementary Examinations July-2025
Course Name : Fluid Mechanics
Course Code : A401305
Branch : Civil Engineering
Date & Session : 08-07-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. State the Newton's law of viscosity. 1 M
2. Define mass density of the fluid with its SI unit. 1 M
3. Define steady and unsteady flow. 1 M
4. Write-down the functions of manometer. 1 M
5. What is Venturimeter? 1 M
6. Define the terms: Notch and Weir. 1 M
7. What do you understand by the term major energy loss in pipes? 1 M
8. What do you understand by the term minor energy losses in pipes? 1 M
9. What is Magnus effect? 1 M
10. What is the concept of boundary layer theory? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Describe the phenomenon of capillarity. 5M
ii) Two horizontal plates are placed 1.25 cm apart, the space between them being filled with oil of viscosity 14 poises. Calculate the shear stress in oil if upper plate is moved with a velocity of 2.5 m/s. 5M

OR

11. B). i) Differentiate between Simple manometer and Differential manometer. 4M
ii) What do you mean by single column manometers? How are they used for the measurement of pressure. 6M
12. A). Define the equation of continuity. Derive an expression for continuity equation for a three-dimensional flow. 10M

OR

12. B). Describe the following and give one practical example for each: 10M
(i) Laminar flow; (ii) Turbulent flow; (iii) Uniform flow; (iv) Non-Uniform flow; (v) Compressible flow.

(P.T.O.)

13. A). Describe the principle of Venturimeter with a neat sketch. Derive the expression for the rate of flow of fluid through it. 10M

OR

13. B). i) Explain how are the notches and weirs classified. 4M

ii) Find the discharge of water flowing over a rectangular notch of 2 m length when the constant head over the notch is 300 mm. Take $C_d = 0.60$. 6M

14. A). Derive the expression for Darcy-Weisbach formula used for calculating the loss of head in pipes due to friction. 10M

OR

14. B). Describe the terms: (i) Pipes in series; (ii) Pipes in parallel; (iii) Equivalent pipes; (iv) Water hammer in pipes. 10M

15. A). Explain the terms: (i) Laminar boundary layer; (ii) Turbulent boundary layer; (iii) Laminar sub-layer and (iv) Boundary layer thickness. 10M

OR

15. B). Define the term drag and lift. Also explain how will you find the drag on a flat plate due to laminar and turbulent boundary layers. 10M
