H.T No: | | | | | | | | | | | **R18** **Course Code: A30101**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations July-2025

Course Name: Strength of Materials-I

(Civil Engineering)

Date: 01.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	Distinguish between the brittle and ductile materials.	2 M
2.	What is meant by resilience?	2 M
3.	What is the rate of loading at a section of beam?	2 M
4.	State the relationship between shear force and bending moment.	2 M
5.	Draw the bending and shear stress distribution across triangular section.	2 M
6.	What are the assumptions made in the theory of simple bending?	2 M
7.	Recall the relationship between moment, slope and deflection.	2 M
8.	State the formulas for slope and deflection of cantilever beam of span 'L' carries UDL of 'w/m' over its entire length by double integration method.	2 M
9.	If the two principal stresses are equal and opposite, show how they are represented in the Mohr's circle.	2 M
10.	State the major difference in Mohr's circles for stress and strain.	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	A steel specimen with a 30 mm diameter and a gauge length of 300 mm is tested to failure. It experiences an extension of 0.21 mm under a load of 100 kN, with the load at the elastic limit being 150 kN. The maximum load applied is 180 kN, and the total extension at fracture is 64 mm. The diameter at the neck is 25 mm. Calculate the stresses at the elastic limit, Young's modulus, percentage elongation, percentage reduction in area, and ultimate stress.	10M

OR

11. B).	A steel tube of 25 mm external diameter and 20 mm internal diameter encloses a gunmetal rod of 18 mm diameter, to which it is rigidly joined at both ends. When the temperature of the whole assembly is raised at 120^0 C. Calculate the intensity of stress in the rod and tube, when the value of 'E' for steel and gunmetal are 200 GPa and 100 GPa. The coefficient of linear expansion for steel and gunmetal is 12 X 10^{-6} ^{0}/C and 20 X 10^{-6} ^{0}/C.	10M
12. A).	For an 8m simply supported beam with two point loads of 30 kN and 20 kN positioned 2 meters and 4 meters from the left end support, respectively, and a uniform distributed load (UDL) of 10 kN/m applied over the right half of the span (from the center to the right end support), draw the shear force and bending moment diagrams.	10M

OR

12. B).	A cantilever beam of length 2 meters, subjected to a uniformly distributed load 3 kN/m over a length of 1.5m from the fixed end and a point load of 5 kN at the free end, draw the shear force and bending moment diagrams.	10M

(P.T.O..)

13. A). The cross section of a beam is a T- section with flange size- 100 mm X 12 mm; web size- 12 mm X 88 mm. The beam is subjected to a shear force of 20 kN. Draw the shear stress distribution across depth marking values at salient points. 10M

OR

13. B). Derive the stress distribution for circular section and plot shear stress distribution. 10M

14. A). Calculate the slope and maximum deflection of a cantilever beam with a 7 m span, subjected to a point load of 15 kN at its center and a uniform distributed load (UDL) of 6 kN/m across the entire span, using the Macaulay's method. 10M

OR

14. B). Derive the expressions for the slope and deflection of a cantilever beam of length 'L', which carries a uniformly distributed load over a length extending from the fixed end, using the Moment-Area method. 10M

15. A). An element is subjected to two dimensional direct stresses accompanied by shear stress. The horizontal tensile direct stress of 60 MPa with vertical direct compressive stress of 40 MPa which is perpendicular to horizontal stress is acting on the element. Shear stress is acting all the faces. The shear stress acting parallel to horizontal tends to rotate the element in clockwise direction. Determine the principal stresses, maximum shear stress and their planes. 10M

OR

15. B). A point in a strained material is subjected to stresses of 150 MPa (tensile) and 50 MPa (compression) in two mutually perpendicular directions and accompanied by a shear stress of 20 MPa. Calculate principal stresses and position of principal planes. Also, calculate the normal and tangential stresses on a plane making 30^{o} with the axis of compressive stress. 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30102**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations July-2025

Course Name: Fluid Mechanics

(Civil Engineering)

Date: 03.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	Define specific gravity and viscosity.	2 M
2.	What is Pascals Law?	2 M
3.	Differentiate between path line and streak line.	2 M
4.	What is the relation between stream function and velocity potential function?	2 M
5.	Explain any one application of momentum equation.	2 M
6.	List out the types of orifices.	2 M
7.	What are the characteristics of laminar boundary layer?	2 M
8.	What is the difference between drag and lift?	2 M
9.	Explain the purpose of Reynolds experiment.	2 M
10.	What is total energy line?	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	Derive an expression for the depth of center of pressure of a vertical surface immersed in a liquid.	10M
	OR	
11. B).	An oil film of thickness 1.5 mm is used for lubrication between a square plate of size 0.9 m × 0.9 m and an inclined plane having an angle of inclination 200. The weight of the square plate is 392.4 N and it slides down the plane with a uniform velocity of 0.2 m/s. Find the dynamic viscosity of the oil.	10M
12. A).	Explain in detail the classification of flows.	10M
	OR	
12. B).	Explain flow-net analysis with a neat sketch and also give its uses.	10M
13. A).	Define Euler's equation? Derive the Euler's equation of motion for steady flow along a stream.	10M
	OR	
13. B).	Find the discharge of water flowing over a rectangular notch of 2.5 m length when the constant head over the notch is 320 mm. Take C_d=0.60.	10M
14. A).	Explain the concept of displacement, momentum and energy thickness of a boundary layer.	10M
	OR	
14. B).	Explain different methods of preventing the separation of boundary layers.	10M

(P.T.O.)

15. A). Explain the minor losses in pipe in series and parallel. 10M

OR

15. B). Water is flowing through a pipe of 5cm diameter under a pressure of 29.43N/cm2 (gauge) and with mean velocity of 2.0m/s. Determine the total head or total energy per unit weight of the water at a cross-section, which is 5m above the datum line. 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30103**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations July-2025

Course Name: Surveying & Geomatics

(Civil Engineering)

Date: 05.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. List the objectives of surveying. 2 M
2. Define true meridian and magnetic meridian. 2 M
3. Define contour and contour interval. 2 M
4. List the temporary adjustments of a leveling instrument. 2 M
5. Differentiate between trapezoidal formula and prismoidal formula for volume computation. 2 M
6. List the methods used to compute the volume of a reservoir. 2 M
7. Mention any three uses of a theodolite in surveying. 2 M
8. What is an electronic theodolite? 2 M
9. What is tacheometry, and where is it used? 2 M
10. Define degree of curve. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Describe any two methods of plane table surveying with illustrations. 10M

OR

11. B). Explain the working principle and applications of Electronic Distance Measurement (EDM) instruments. 10M

12. A). Explain the different types of leveling methods and their applications. 10M

OR

12. B). The following staff readings were recorded: 10M
BS: 2.150 m, 1.850 m
FS: 1.250 m, 1.550 m
RL of the starting point = 200.000 m, Calculate the RL of the last point using the rise and fall method and apply usual checks?

13. A). Explain the process of determining the capacity of a reservoir using contour maps. 10M

OR

13. B). The following perpendicular offsets were taken from a chain line to an irregular boundary at an interval of 20 m: 10M
Offsets: 2.5 m, 3.1 m, 4.0 m, 3.8 m, 3.0 m
Compute the area enclosed between the boundary and the chain line using the trapezoidal rule.

(P.T.O.)

14. A). Discuss the steps involved in conducting a traverse survey using a theodolite and explain how to adjust a closed traverse using the Transit rule. 10M

OR

14. B). The following are the observed bearings and lengths of a traverse: 10M

Line	Bearing	Length (m)
AB	N 30° E	150
BC	S 60° E	200
CD	S 45° W	180
DA	N 75° W	160

Calculate the latitude and departure of each line and check for closure.

15. A). Explain the stadia method of tacheometry. Derive the formula for distance and elevation when the staff is held vertically. 10M

OR

15. B). A simple curve is to be set out with a radius of 250 m. The tangents intersect at an angle of 60°. Compute the data required for setting out the curve using the *deflection angle method* with a chord length of 20 m. 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30105**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations July-2025

Course Name: Building Construction, Planning and Drawing

(Civil Engineering)

Date: 15.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	Mention the difference between artificial and natural seasoning.	2 M
2.	List out the various types of stone masonry.	2 M
3.	Write the uses of Distempering.	2 M
4.	Distinguish between isolated and strip footings.	2 M
5.	Define building Bye-laws	2 M
6.	What are the requirements of ventilation in residential building?	2 M
7.	Define Floor Area Ratio.	2 M
8.	How is the plan of a building different from section and elevation?	2 M
9.	List out the classification of roofs.	2 M
10.	What are the types of sloping roof?	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	Describe brick masonry, including its types and the various bonds used.	10M
	OR	
11. B).	i) Describe the field tests performed on stones.	5M
	ii) Describe the structure of timber and its parts, with a neat sketch.	5M
12. A).	Elaborate various types of foundations used for buildings with neat sketches.	10M
	OR	
12. B).	i) In what ways is the application of distemper more cost-effective compared to other types of paint?	5M
	ii) What are the various factors affecting the selection of foundations?	5M
13. A).	What are building bye laws? Explain the importance of building bye laws.	10M
	OR	
13. B).	i) Explain the following terms: Open space requirements and Built up area limitations.	5M
	ii) Explain the classification of buildings.	5M
14. A).	Discuss the requirements of different rooms in a residential building.	10M
	OR	
14. B).	Describe the characteristics of various types of residential buildings.	10M
15. A).	List out the types of roofs and explain any one type with a neat sketch.	10M
	OR	
15. B).	i) Outline the classification of stairs along with their requirements.	5M
	ii) Discuss the reinforcement details for a RCC stair case.	5M

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