CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations August-2023
Course Name: STRENGTH OF MATERIALS-I
(Civil Engineering)

Date: 08.08.2023 AN   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.	State the difference between Failure load and maximum load.	2 M
2.	Name some examples for sudden, impact and shock loadings.	2 M
3.	Define point of contraflexure.	2 M
4.	State the different types of beams.	2 M
5.	Why bending stress occurs in beams?	2 M
6.	Sketch the shear stress distribution for T-Section	2 M
7.	What is meant by determinate and indeterminate beams?	2 M
8.	Write the deflection formula at centre for simply supported beam carrying udl throughout the beam.	2 M
9.	State the conditions for maximum shear stress theory.	2 M
10.	What is meant by Principal stresses and strains?	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). A tensile test was conducted on a mild steel bar. The following data was obtained from the test: 10M
(i) Diameter of the steel bar = 3 cm
(ii) Gauge length of the bar = 20cm
(iii) Load at elastic limit = 250 kN
(iv) Extension at a load of 150 kN = 0.21 mm
(v) Maximum load = 380 kN
(vi) Total extension = 60 mm
(vii) Diameter of rod at failure = 2.25 cm
Determine:
(1) The Young's modulus
(2) The stress at elastic limit
(3) The percentage of elongation
(4) The percentage decrease in area.

OR

11. B). Three bars made of copper; zinc and aluminium are of equal length and have cross section   10M
500, 700, and 1000 sq.mm respectively. They are rigidly connected at their ends. If this compound member is subjected to a longitudinal pull of 250 kN, estimate the proportional of the load carried on each rod and the induced stresses. Take the value of E for copper = 1.3×10^5 N/mm², for zinc = 1×10^5 N/mm² and for aluminium = 0.8×10^5 N/mm².

(P.T.O..)

12. A). A cantilever beam of 2 m long carries a uniformly distributed load of 1.5 kN/m over a length of 1.6 m from the free end. Draws shear force and bending moment diagrams for the beam.   10M

OR

12. B). A simply supported beam of length 10m carries the uniformly distributed load and two point loads of 50kN and 40kN acts at a distance of 2m and 4m from point A and udl of 10kN/m between the 2 point loads. Draw the S.F and B.M diagram for the beam and also calculate the maximum bending moment.   10M

13. A). Derive the bending equation: 10M
$(M/I) = (f/y) = (E/R)$

OR

13. B). A steel beam of I-section is 600mm deep. Each flange is 250mm wide and 25mm thick. The web is 15mm thick. The beam section is subjected to a shear force of 500kN. Determine the shear stress distribution for the beam section i) When the beam is vertical and ii) When the web is horizontal.   10M

14. A). A beam AB of span 6m is simply supported at its ends is subjected to a point load of 20kN at C at a distance of 2m from left end. Using moment area method, Compute the deflection at the point C, slope at the points A, B and C. Take $I = 6 \times 10^8$ mm^4 and $E = 200GPa$.   10M

OR

14. B). Using conjugate beam method, obtain the slope and deflections at A, B, C and D of the beam shown in fig. Take $E = 200GPa$ and $I = 0.02$ m^4 10M
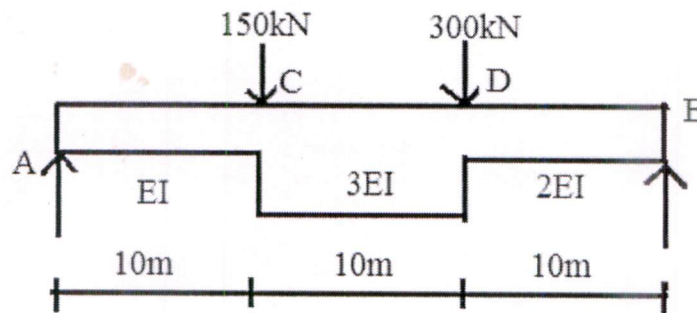
15. A). The principal stresses at a point in the section of a boiler shell are 80N/mm^2 and 40N/mm^2 both tensile. Calculate the normal, tangential and the resultant stresses across a plane through the point inclined at 50° to the plane carrying80 N/mm^2.   10M

OR

15. B). A steel shaft is subjected to an end thrust producing a stress of 100MN/m^2 and the maximum shearing stress on the surface arising from torsion is 70MPa. The yield point of the material in simple tension was found to be 320MN/m^2. Calculate the factor of safety of the shaft according to following theories   10M
i) Maximum shear stress theory
ii) Maximum strain energy theory.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations August-2023
Course Name: FLUID MECHANICS
(Civil Engineering)

Date: 10.08.2023 AN | 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. State Newton's law of viscosity and discuss Newtonian and non-Newtonian fluids with an example. 2 M
2. State the Pascal's Law. 2 M
3. Distinguish between the terms: steady flow and unsteady flow with an example. 2 M
4. Define flow net. 2 M
5. List out the various forces to be considered for fluid flow. 2 M
6. What is an Impulse-momentum equation? List out its various Engineering applications. 2 M
7. What is Navier stoke's equation? 2 M
8. What do you understand by Magnus effect? 2 M
9. Sketch the Reynold's experiment apparatus. 2 M
10. What are the major energy losses and minor energy losses in pipes? 2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). i) Explain the various fluid properties in detail with their units and expressions. 5M

ii) If the velocity distribution over a plate is given by $u = \frac{2}{3}y - y^2$ in which u is the velocity in m/s at a distance y metre above the plate. Determine the shear stress at y = 0 and y = 0.15 meters. Sketch velocity distribution above the plate. Take dynamic viscosity of the fluid as 0.863 Ns/m². 5M

OR

11. B). i) Describe the different types of manometers and explain under what circumstances they are used? 5M

ii) Find the Total Pressure and Centre of Pressure on a triangular plate of base 3.0 m and height 2.0 m which is immersed in a liquid of specific gravity 0.9. The plate makes an angle of 30^0 with the free surface of the liquid. The base of the plate is parallel to the liquid surface and at a depth of 2.50 m from the liquid surface. The apex of the plate is pointing downwards. 5M

12. A). i) Describe the various classifications of fluid flow. 5M
ii) The velocity vector in an incompressible fluid flow is given by the equation $V = x^2y\ \mathbf{i} + y^2z\ \mathbf{j} - (2xyz + yz^2)\ \mathbf{k}$. Prove that it is case of possible steady flow. Calculate the velocity and acceleration at the point (2, 1, 3). 5M

12. B). i) Derive an expression for continuity equation for a three-dimensional, steady and incompressible fluid flow.   5M

ii) Given that $u = -4ax\left(x^2 - 3y^2\right)$ and $v = 4ay\left(3x^2 - y^2\right)$. Examine, whether these velocity components represent a physically two-dimensional fluid flow. If so, verify whether the flow is rotational or irrotational.   5M

13. A). i) State and Prove Bernoulli's theorem, also state clearly the assumptions and limitations involved in the derivation.   5M

ii) Water under a pressure of 345 KN/m^2 flowing through a 30 cm diameter pipe at the rate of 0.25 m^3/s. If the pipe is bent by 135^0. Find the magnitude and direction of the resultant force on the bend. Neglect losses.   5M

OR

13. B). i) Derive an equation for measuring flow rate through a pipe with a Venturimeter.   5M

ii) A pipe carrying oil of specific gravity 0.877 changes in size from 150 mm at section A to 450 mm at a section B. The section A is 3.66 m lower than section B and the pressures are 91.0 kpa and 60.3 kpa respectively. If the discharge is 0.146 $cumecs$, determine the loss of head and direction of flow.   5M

14. A). i) With neat sketches explain the development of a boundary layer along a thin, flat and smooth plate held parallel to a uniform flow and explain the salient features.   5M

ii) On a flat plate of 2 m length and 1 m width, experiments were conducted in a wind tunnel with a wind speed of 50 kmph. The plate is kept at suck an angle that the co-efficients of drag and lift are 0.18 and 0.9 respectively. Take density of air = 1.15 kg/m^3. Determine: (i) Drag force and (ii) Lift force.   5M

OR

14. B). i) Discuss about the Von Karman momentum integral equation for boundary layer.   5M

ii) Describe briefly the phenomenon of boundary layer separation and its control.   5M

15. A). i) Derive Darcy-Weisbach equation for calculating loss of head due to friction in a pipeline.   5M

ii) A pipe of length 4000 m is used for power transmission. If 200 kW power is to be transmitted through the pipe in which water having pressure 700 N/cm^2 at inlet is flowing. Find the diameter of the pipe and efficiency of transmission if the pressure drops over the length of the pipe is 200 N/cm^2. Take friction factor f as 0.0085.   5M

OR

15. B). i) Explain the terms, pipes in parallel, pipes in series and equivalent size of a compound pipe.   5M

ii) A horizontal pipe 150 mm in diameter is joined by sudden enlargement to a 225 mm diameter pipe. Water is flowing through it at the rate of 0.05 m^3/s. Find: (i) Loss of head due to abrupt expansion, (ii) Pressure difference in the two pipes, and (iii) Change in pressure if the change of section is gradual without any loss.   5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations August-2023
Course Name: SURVEYING & GEOMATICS
(Civil Engineering)

Date: 12.08.2023 AN   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.	State the principles of surveying.	2 M
2.	Define bearing and angle.	2 M
3.	Define Leveling.	2 M
4.	Define Contour.	2 M
5.	State Trapezoidal rule for area calculations.	2 M
6.	Discuss the difference between Trapezoidal and Simpson's rule of area calculation.	2 M
7.	What are the fundamental lines of a theodolite?	2 M
8.	Why face left and face right observations are taken in Theodolite survey?	2 M
9.	State the principle of Tacheometric surveying.	2 M
10.	Determine the length of the curve, if the radius of circular curve is 200m and deflection angle is 65°.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Define Surveying and discuss the classification of surveying based on instruments.   10M

OR

11. B). The fore bearing of the lines AB, BC, CD and DE are 45° 30', 120° 15', 200° 30' and 280° 45' respectively, find angles B, C, D and show them in a neat sketch.   10M

12. A). The following staff readings were taken with a level. The instrument having been shifted after the 4th, 7th and 10th reading. RL of the starting BM is 100.000m. Enter the readings in the form of level book page and reduce the level by the collimation method and apply usual checks.   10M

2.65, 3.74, 3.83, 5.27, 4.64, 0.38, 0.96, 1.64, 2.84, 3.48, 4.68, and 5.26

OR

12. B). Discuss the methods of contouring.   10M

13. A). Discuss the various methods of determining the areas of irregular boundaries.   10M

OR

13. B). A road embankment is 8m wide and 200m in length, at the formation level, with a side slope of 1.5:1. The embankment has a rising gradient if 1in 100m. The ground levels et every 50m along the center line are as follows: 10M

Distance(m)	0	50	100	150	200
RL(m)	164.5	165.2	166.8	167	167.2

The formation level of zero chainage is 166m.Calculate the volume of earthwork using Trapezoidal rule and Prismoidal Rule.

(P.T.O..)

14. A). Discuss the temporary adjustments of a theodolite and differentiate a theodolite and tacheometer. 10M

OR

14. B). In running a traverse, the lengths and bearings of the lines observed are tabulated. Point F is situated at the center of the line joining A and E. Find out the true length and bearing of the line CF. 10M

Line	Length(m)	Bearing
AB	150	N75°42'E
BC	100	N32°48'E
CD	300	S28°54'E
DE	800	S5°36'E

15. A). A tacheometer was setup at a station 'A' and the readings on a Vertically held staff at B were 2.255, 2.605 and 2.955. The line of sight being at a inclination of +80 24'. Another observations on the vertically held staff at B.M gave the readings 1.640, 1.920, and 2.200, the inclination of the line of sight being +10 6'. Calculate the horizontal distance between A and B, and the elevation of B if the RL of BM is 418.685 metres. The constants of the instruments were 100 and 0.3. 10M

OR

15. B). A circular curve has a 200m radius and 65 ° deflection angles. Determine the following components: 10M
   - i) Tangent Length
   - ii) Length of the curve
   - iii) Length of the long chord
   - iv) Degree of curve
   - v) Apex distance
   - vi) Mid-ordinate

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations August-2023
Course Name: ENGINEERING MATERIALS & GEOLOGY
(Civil Engineering)

Date: 17.08.2023 AN   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 petrology & mineralogy.   2 M
2. What do you understand by the term mining substances?   2 M
3. Differentiate igneous and sedimentary rock.   2 M
4. What is dykes?   2 M
5. What is fault?   2 M
6. Outline the importance of study on ground water.   2 M
7. Summarize the term seismic belts.   2 M
8. List the factors influencing success of a reservoir.   2 M
9. Measure the factors influencing tunnels in rock.   2 M
10. Classify the tunneling effects.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).   Evaluate the test for bricks.   10M

OR

11. B). Examine the qualities of good building stone.   10M

12. A). Construct the megascopic study of the following: 10M
         i) Flint
         ii) Olivine

OR

12. B). Construct the physical properties of the following: 10M
         i) Granite
         ii) Basalt

13. A). Demonstrate precautions taken for building construction in seismic areas.   10M

OR

13. B). Explain the types of folds with neat diagrams.   10M

14. A). Analyze the fundamental aspects of rock mechanics.   10M

OR

14. B). Classify the types of dams.   10M

15. A). Inspect the tunneling over break in tunnels.   10M

OR

15. B). Recommend the effects of tunneling on ground.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations August-2023
Course Name: BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(Common for CE & ME)

Date: 19.08.2023 AN   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.	State Kirchhoff's voltage and current laws.	2 M
2.	Distinguish between moving coil and moving iron instruments.	2 M
3.	What are basic parts of a DC machine?	2 M
4.	What is the back emf in DC motor?	2 M
5.	Enumerate the various losses in a transformer.	2 M
6.	How synchronous impedance is calculated from OCC and SCC?	2 M
7.	Draw the volt-ampere characteristics of P-N junction silicon diode.	2 M
8.	What is a Bi-polar Junction Transistor (BJT)? How are its terminals named?	2 M
9.	Name the main components of a CRO.	2 M
10.	List the applications of CRO.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). For the electrical network shown in figure. Find the value of load resistance R_L for which   10M
source will supply maximum power to the load. Also find the maximum power.
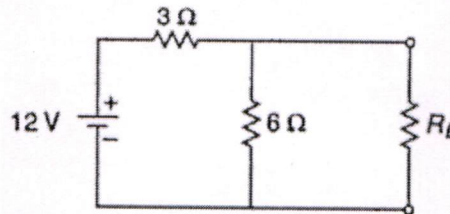
OR

11. B). State Superposition theorem and explain it.   10M

12. A). Give the classification of DC generator and explain with neat diagrams.   10M

OR

12. B). Derive the torque equation of DC motor.   10M

13. A). Discuss the principle of operation of three phase induction motor.   10M

OR

13. B). Derive an expression for the emf induced in a transformer winding.   10M

(P.T.O..)

14. A). Explain the operation of half wave rectifier with neat sketch and derive the necessary expressions.   10M

<div align="center">OR</div>

14. B). Draw the static V-I characteristics of SCR and mark latching current and holding current.   10M

15. A). Discuss about the electrostatic focusing deflection system of a CRO with necessary diagrams.   10M

<div align="center">OR</div>

15. B). Describe the voltage, current and frequency measurements using CRO.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations August-2023
Course Name: PYTHON PROGRAMMING
(Common for CE, EEE, ME, ECE, CSE, IT, CSC & CSM)

Date: 22.08.2023 AN   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.	Interpret the process of Reading input from the key board.	2 M
2.	Distinguish between while and for loop.	2 M
3.	Outline the idea of Definite Iteration.	2 M
4.	What are Global Values and Global Constants?	2 M
5.	Determine the need of Lists.	2 M
6.	Classify the String Methods	2 M
7.	Show the difference between Classes and Functions.	2 M
8.	Discuss the Importance of Object Oriented programming.	2 M
9.	Summarize the tkinter module.	2 M
10.	Identify the need of widgets.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). i) Discuss various operators available in python with example.   5M
ii) Compare different repetition Structures with examples   5M

OR

11. B). i) Illustrate the Principle of Types Conversion with an example.   5M
ii) Discuss about Nested Decision Structures with an example.   5M

12. A). i) Classify Process of Defining and calling of Void Function.   5M
ii) Outline the features of Value-Returning Functions.   5M

OR

12. B). i) Develop the steps to write a Python function that prints all factors of a given number.   5M
ii) What is the purpose to use Math Module?   5M

13. A). i) Demonstrate the comparison between lists, tuples, dictionaries and sets.   5M
ii) Illustrate a Python program that interchanges the first and last characters of a given string.   5M

OR

13. B). i) Discuss about recursive, and the Python function that recursively computes sum of elements in a list of lists. Sample Input: [1, 2, [3,4], [5,6]] Expected Result: 21   5M
ii) Show a Python program read a word and print the number of letters, vowels and percentage of vowels in the word using a dictionaries.   5M

(P.T.O..)

14. A). i) Evaluate the implementation of Object Oriented Programming. 5M
ii) Identify the Python program that overloads + operator, to add two objects of a class. 5M

OR

14. B). i) Can you Analyze inheritance class with suitable example in Python? 5M
ii) Show the working of method overriding works in Python? Explain with an example. 5M

15. A). i) Construct the Two Dimensional Shapes in Python. 5M
ii) Summarize the process of Display text with Label Widgets in Python. 5M

OR

15. B). i) Demonstrate the behavior of terminal based programs and GUI based Programs. 5M
ii) Determine the implementation of Button Widgets and info Dialog Boxes in Python. 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations August-2023
Course Name: BUILDING CONSTRUCTION, PLANNING & DRAWING
(Civil Engineering)

Date: 24.08.2023 AN   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.	What are the different types of brick bonds?	2 M
2.	Mention the levels of qualities of a good timber.	2 M
3.	Enumerate the properties of distemper.	2 M
4.	What is the concept of foundation and why are we using foundation for all structure?	2 M
5.	Write the importance of open space in planning of a residential building.	2 M
6.	What are the limitations of a built up area?	2 M
7.	List out the types of residential building.	2 M
8.	Mention the objectives of building byelaws?	2 M
9.	Draw plan of open well stair case.	2 M
10.	Mention the different types of sloping roofs.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	Draw the neat sketch showing the cross-section of a tree structure. Explain each component.	10M

OR

11. B).	Explain the process of natural seasoning. Mention its advantages and disadvantages.	10M
12. A).	What are the different types of foundation? Explain each briefly.	10M

OR

12. B).	Mention different types of varnishes and describe the process of varnishing on wood work.	10M
13. A).	Write different classifications of buildings. Explain each with neat sketch.	10M

OR

13. B).	Draw the foundations for walls and columns in RCC structure.	10M
14. A).	Write short note on i) Floor Area Ratio (FAR) ii) Floor Space Index (FSI)	10M

OR

14. B).	Draw line diagram, plan, elevation and section for flat roof residential building.	10M
15. A).	Draw the king post, queen post trusses and mention each component.	10M

OR

15. B).	Design the dog legged stair case for office building with reinforcement detailing.	10M

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