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Code No. : 14165 AS N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade

B.E. (Civil Engg.) IV-Semester Advanced Suppl. Examinations, Aug./Sept.-2023
Strength of Materials-II

Time: 3 hours

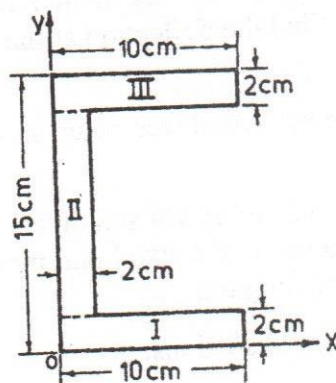
Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Distinguish between real beam and conjugate beam.				
2.	State mohr's theorem.	2	2	1	1
3.	What is a propped cantilever beam?	2	2	1	1
4.	List out the advantages of fixed beam.	2	1	2	1
5.	Define Centroid, Moment of inertia	2	1	2	1
6.	Define shear centre	2	1	3	1
7.	Define Torque	2	1	3	1
8.	Define spring and mention types of springs.	2	1	4	1
9.	What is meant by Equivalent length of a column?	2	1	4	1
10.	Distinguish between short column and long column.	2	1	5	1
	Part-B (5 × 8 = 40 Marks)	2	1	5	1
11. a)	Determine the slope and deflection at free end of a cantilever beam of length L carrying point load W at its free end using moment area method.	4	3	1	1
b)	A beam of uniform rectangular section 100mm width and 240mm deep is simply supported at its ends. It carries a uniformly distributed load of 9.125kN/m run over the entire span of 4m. Find the deflection at the center if $E=2.1 \times 10^5 \text{N/mm}^2$	4	1	1	1
12. a)	Determine the reaction components for a propped cantilever beam subjected to a UDL w/m over a length L.	4	3	2	1
b)	A fixed beam of span 4 m carries two point loads of 40 kN and 60 kN at 1m and 2 m from the left end, respectively. Determine the fixed end moments and draw the Shear force and bending moment diagram.	4	3	2	2
13. a)	Explain briefly about shear centre for symmetrical sections.	4	2	3	1
b)	A two span continuous beam carries a UDL of 20 kN/m over its whole length. The left span is 4m long and right span is 6m long. The beam has the same section through out. Draw the shear force and bending moment diagrams of beam.	4	2	3	2
14. a)	Derive the Torsional equation.	4	2	4	1

- b) A composite spring has two close coiled helical spring connected in series, each spring has 12 coils at a mean diameter of 30mm. Determine the diameter of the wire in one of the springs if the diameter of wire in other spring is 3mm and the stiffness of the composite is 700N/m. 4 3 4 2
15. a) Derive the equivalent length of a column whose both ends are hinged using Euler's theory 4 2 5 1
- b) A vertically hung bar is 2 m long and has a diameter of 25 mm. a weight of 600 N is dropped from a height h on a collar attached to the lower end of the bar. Find the height of drop and determine deflection, if the stress in the bar is not exceed 100 MPa. The elastic limit is 220 N/mm² and $E=200GN/mm^2$. 4 3 5 2
16. a) Derive equations for slope and deflection at the free end of a cantilever beam of length L carrying point load P at its free end using conjugate beam method. 4 2 1 1
- b) A fixed beam of span 6 m carries a UDL of 20 kN/m over the whole span. Determine the fixed end moments and draw the shear force and bending moment diagram. 4 3 2 2
17. Answer any *two* of the following:
- a) Determine the diameter of a solid steel shaft, which transmit 112.5kW at 200rpm. 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/mm². Take $G = 8 \times 10^4$ N/mm². 4 3 3 2
- b) A cast iron column with a 100mm external diameter and 80mm internal diameter is 3m long. Determine the safe load using Rankine's formula if a) both ends hinged (b) both ends fixed. $\sigma_c = 600N/mm^2$, $\alpha = 1/1600$. Adopt factor of safety of 3. 4 3 4 2
- c) A channel section is loaded as shown in the figure. Determine shear centre 4 3 5 2



M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	30%
iii)	Blooms Taxonomy Level – 3 & 4	50%
