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KAMALA INSTITUTE OF TECHNOLOGY & SCIENCE, SINGAPUR
23CE28PC403

II.B. Tech. II. Semester Regular Examinations, June- 2025

STRENGTH OF MATERIALS-II

(CE)

Time: 3 Hours

Max. Marks: 60

Note: Question paper consists of Part-A & Part-B.

i) **Part-A** for 10M, ii) **Part-B** for 50marks

- Part A** is compulsory, consists of 10 sub questions from all units carrying equal marks.
- Part-B** consists of **10 questions** (numbered from 2 to 11) carrying **10marks** each. From each unit there are 2 questions and the students should answer one of them. Hence the student should answer **5 questions** from **Part-B**.

PART-A		(10Marks)	
Q. No	Questions	Marks	BTL
1.a)	Define Power transmitted by shafts	1	1
1.b)	What is Springs in series and parallel?	1	1
1.c)	What is meant by axially loaded compression members?	1	1
1.d)	What is the Straight-line formula?	1	1
1.e)	What is the core of symmetrical section?	1	1
1.f)	How can you determine stresses in retaining walls of a sections?	1	1
1.g)	Define thin Spherical shells	1	1
1.h)	What is the radii for shrinkage	1	1
1.i)	What is meant by product of inertia?	1	1
1.j)	What is the shear center for channel sections?	1	1
PART-B		(50Marks)	
Q.No	Questions	Marks	BTL
2. a)	Derive the expression for theory of pure torsion in hollow circular shafts	5M	3
b)	A closely coiled helical spring made of 10mm diameter steel wire has 15 coils of 100mm mean diameter. The spring is subjected to an axial load of 100N.calculate the maximum shear stress induced, the deflection and stiffness of the spring. Take $C=8.16 \times 10^4 \text{N/mm}^2$	5M	4
OR			
3. a)	Explain about helical springs.	7M	2
b)	What are the Assumptions of pure Torsion	3M	1
4. a)	A hollow cylindrical cast iron column is 4m long with both ends fixed. Determine the minimum diameter of the column if it must carry a safe load of 250KN with a FOS of 5. Take the internal diameter as 0.8times the external diameter. Take $\sigma_c = 550 \text{N/mm}^2$ and $\alpha = 1/1600$ in Rankine's formula.	7M	4
b)	What are the assumptions Euler's theorem	3M	1

OR			
5. a)	A rectangular column of width 200mm and thickness 150mm carries a point load of 240KN at an eccentricity of 10mm.i) Determine the maximum and minimum stresses on the section. ii) If the minimum stress on the section is given zero then find eccentricity of the point load acting on the section, also calculate the corresponding maximum stress on the section	7M	4
b)	What are the Slenderness ratio for columns?	3M	1
6. a)	A steel plate 15x50mm is tested by pulling it with a tensile force of 45KN, the line of load being 35mm from one edge .An extensometer set along the line action of the load shows an extension of 0.0055mm over a gauge length of 125mm.Determine the extreme stresses for the plate section and the young's modulus of steel.	7M	4
b)	What are the conditions for stability in case of Chimneys and dams	3M	1
OR			
7. a)	A masonry chimney having the shape of a frustum of a cone is 25m high.The external dia at the top and internal dia at the bottom is 2m.The chimney is 0.5m thick at the base.If the weight of the chimney is 1800KN find the uniform horizontal wind pressure that may act per unit projected area of the chimney in order tension at the base may be just avoided	7M	4
b)	How can you determine stresses in case of retaining walls?	3M	1
8. a)	A thick cylinder of 200mm internal diameter is subjected to an internal fluid pressure of 7N/mm ² . If the permissible tensile stress in the cylinder is 8N/mm ² . Find the thickness of cylinder and minimum value of the hoop stress.	7M	4
b)	What are the Longitudinal and Volumetric strains in thin Cylinder	3M	1
OR			
9. a)	Derive lame's equations for thick cylinders.	7M	3
b)	What are the formulas longitudinal and circumferential stresses in thin cylinders?	3M	1
10.a)	Explain the concept of shear center.	7M	2
b)	Brief note on stresses in beams subjected to unsymmetrical bending.	3M	2
OR			
11.a)	Determine the principal moments of inertia for an unequal angle section 80mm x 60mm x 8mm.	7M	4
b)	What is meant by location of neutral axis	3M	1

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