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C14-M-305

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BOARD DIPLOMA EXAMINATION, (C-14)
OCTOBER/NOVEMBER-2018
DME-THIRD SEMESTER EXAMINATION

STRENGTH OF MATERIALS

Time : 3 Hours] [Total Marks: 80

PART-A

3X10=30

Instructions :

1. Answer **All** questions.
2. Each question carries **Three** marks.
3. Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. Define the thermal stress.
2. Define (a) Bulk Modulus (b) Poisson's ratio.
3. Prove that stress induced is twice when load is suddenly applied.
4. Define (a) Shear force (b) Bending movement.
5. List the types of beams.
6. State the assumptions made in the theory of simple bending.
7. Define the term section modulus.
8. A solid circular shaft running at 600 r.p.m transmits 400KW power. Calculate the suitable diameter of the shaft if the maximum allowable shear stress is 100N/mm^2.
9. List the applications of springs.
10. Define hoop stress and write the relation between hoop stress and longitudinal stress.

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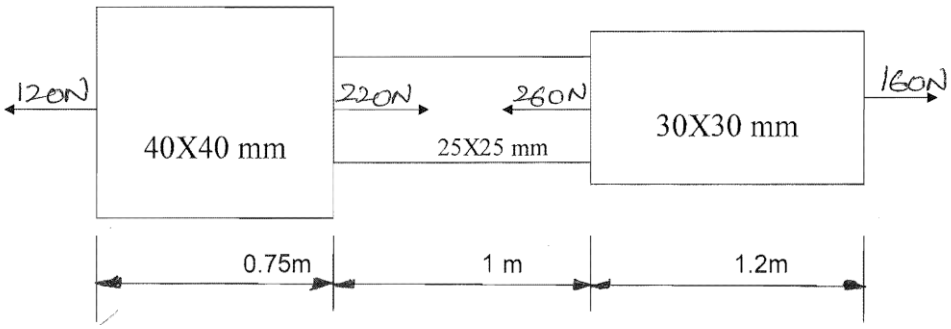
PART-B

10X5=50

Instructions :

1. Answer any **Five** questions.
2. Each question carries **ten** marks.
3. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

11. A bar of varying section is load shown in the figure below Determine the total elongation, if E=2x10^5 N/mm^2.



12. A mild steel bar of length 3m and diameter 50mm hangs vertically. A load of 10kN falls on the collar attached to the lower end. Find the maximum stress when (a) load is applied suddenly without impact, (b) height of fail is 150mm and (c) load is applied gradually. Take E=2x10^5 N/mm^2.
13. Draw of SF and BM diagrams of the cantilever whose length is 3 m subjected to uniformly distributed load of 2kN/m over a length of 1 m from fixed end and two-point loads of 20kN and 50 kN acting at distance of 2 m and 3 m respectively from fixed end. Assume left end is fixed.
14. Derive the bending moment equation.
15. Select a suitable diameter of solid to transmit 110 kW power at 240 r.p.m, if the allowable shear stress is not to exceed 75 N/mm^2 and the twist is not exceed 1^0 in a length of 3.m (Take G= 0.8x10^5 N/mm$^{2.}$
16. (a) A cantilever 2 m long of 100 mm wide and 150mm deep carries a concentrated point load of 20 kN at free end. Find the maximum deflection at free end. Take E=2x10^5 N/mm$^{2.}$

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(b) A closely coiled helical spring of 100mm mean diameter is made of 10mm diameter rod and has 18 turns. The Spring carries an axial load of 190N. Determine the i) Shear stress and (ii) Deflection when carrying this load.(Assume G= 0.8×10^5 N/mm^2)

17. A thin cylinder is subjected to a hoop stress of 50 N/mm^2 Calculate circumferential strain and longitudinal strain. Assume Poisson's ratio as 0.3 and Young's modulus of the material E=2×10^5 N/mm^2
18. (a) A wooden tie 60 mm wide, 120 mm deep and 1.5 meters long. It is subjected to an axial pull of 30 kN. The stretch of the member is found to be 0.625 mm. Find the Young's modulus for the tie material.

    (b) Draw the SFD, BMD of simply supported beam of length 5m with a point load 2kN at distance of 2.5 m from the left support.

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