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**Rajiv Gandhi University of Health Sciences, Karnataka**

**First Year Bachelor in Prosthetics and Orthotics Degree Examination – OCT-2019**

**Time: Three Hours**

**Max. Marks: 80 Marks**

**APPLIED MECHANICS AND STRENGTH OF MATERIALS - (RS3)**

**Q.P. CODE: 2964**

**(QP Contains Two Pages)**

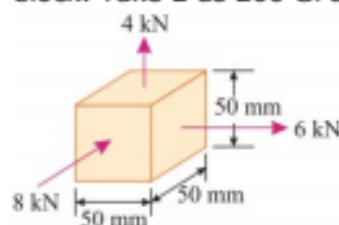
Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

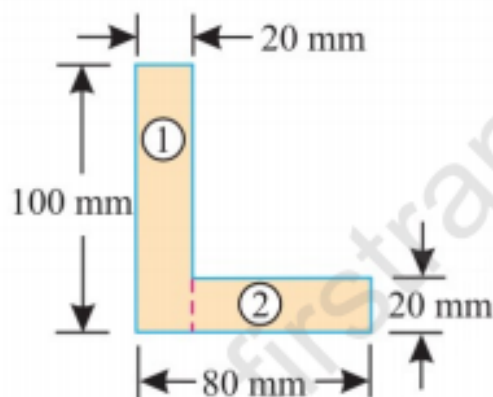
**ESSAYS TYPE (answer any Two)**

**2 x 10 = 20 Marks**

1. A steel cube block of 50 mm side is subjected to a force of 6 kN (Tension), 8 kN (Compression) and 4 kN (Tension) along x, y and z direction respectively. Determine the change in volume of the block. Take E as 200 GPa and  $\mu$  as 10/3.



2. Find the moment of inertia about the centroidal X-X and Y-Y axes of the angle section shown in Fig



3. A simply supported beam of span 3 m is subjected to a central load of 10 kN. Find the maximum slope and deflection of the beam. Take  $I = 12 \times 10^6 \text{ mm}^4$  and  $E = 200 \text{ GPa}$

**SHORT ESSAYS TYPE (answer any Six)**

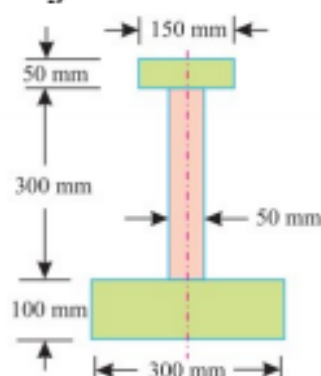
**6 X 5 = 30 Marks**

4. Define Principles of equilibrium.
5. Define Limiting Friction. Write characteristics of Limiting Friction.
6. Draw stress-strain diagram for mild steel subjected to tensile load and indicate the salient points.
7. Define Principal of Superposition.
8. An I-section has the following dimensions in mm units :  
Bottom flange =  $300 \times 100$   
Top flange =  $150 \times 50$   
Web =  $300 \times 50$   
Determine mathematically the position of centre of gravity of the section.

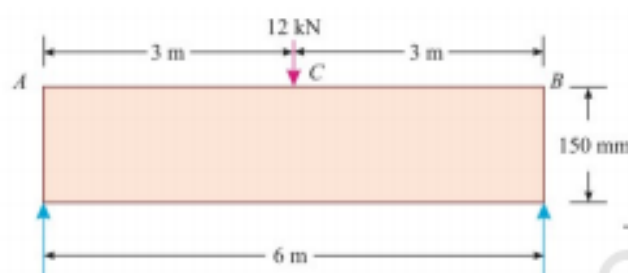


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9. A rectangular beam 60 mm wide and 150 mm deep is simply supported over a span of 6 m. If the beam is subjected to central point load of 12 kN, find the maximum bending stress induced in the beam section.



10. A circular shaft of 50 mm diameter is required to transmit torque from one shaft to another. Find the safe torque, which the shaft can transmit, if the shear stress is not to exceed 40 MPa.
11. State Newton's Law of Motions.

**SHORT ANSWERS TYPE (answer any Ten)**
**10 x 3 = 30 Marks**

12. State Lami's theorem.
13. State & explain Mohr's Theorem 1 & Theorem 2
14. Define Poisson's ratio.
15. Define modulus of rigidity.
16. Define Bulk Modulus.
17. Define Classifications of beams.
18. Define Bending Moment.
19. Define Lateral Strain.
20. Define coefficient of friction.
21. State and Explain sign convention for Bending moment and Shear forces in beams.
22. Define relation between Bulk modulus and Young's modulus.
23. Define units of stress and linear strain.

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