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PART – A

1. Define resultant of forces.

2. What is meant by coplanar force?

3. Define Poisson's ratio.

4. Define polar moment of inertia.

5. Define neutral axis.

6. Define section modulus.

7. Define stiffness of a spring.

8. Distinguish between centre of gravity and centroid.

PART – B

9. Differentiate between static friction and dynamic friction.

10. Define hardness and list its characteristics.

11. Differentiate between thin cylinder and thick cylinder.

12. What is point load and uniformly distributed load?

13. Write down the assumptions made in theory of simple bending.

14. What is laminated spring? List its applications.

15. List out the advantages of hollow shaft over solid shaft.

16. Define support. List the various types of loads.

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PART – C

17. (a) (i) Explain the various methods of supports and reactions.
       (ii) State the laws of dynamic friction.

    (Or)

    (b) The resultant of two concurrent forces is 1500N and angle between the forces is 90°. The resultant makes an angle of 36° with on the force. Find the magnitude of each force.

18. (a) State and explain the three types of elastic constants.

    (Or)

    (b) List out the various alloying elements used in steel and explain their major effects.

19. (a) Find the values of I_{XX} and I_{YY} of a T-section 120mm wide, 120mm deep overall. Both the wed and flange are 10mm thick.

    (Or)

    (b) A long steel tube 70mm internal diameter and wall thickness 2.5mm has closed ends and subjected to an internal pressure of $10N/mm^2$. Calculate the magnitude of loop stress and longitudinal stresses setup in the tube. If the efficiency of the longitudinal joint is 80%, state the stress which is affected and what is its revised value?

20. (a) Write down the expressions for section modulus of rectangular and circular beam.

    (Or)

    (b) A simply supported beam of span 10m carries an udl of 20kN/m over the left half of the span and a point load of 30kN at the mid span. Draw SFD and BMD. Find also, the position and magnitude of maximum bending moment.

21. (a) Prove the torsion equation.

    (Or)

    (b) The mean diameter of a closely coiled helical spring is 5 times the diameter of wire. If elongates 8mm under an axial pull of 120N. If the permissible shear stress is $40N/mm^2$, find the size of wire and number of coils in the spring. $N = 0.8 \times 10^5 \ N/mm^2$.

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