MEL31/MEM31 Strength of Materials

203

REG. NO

OCTOBER 2021

Time: Three hours Maximum Marks: 75

Note:
1. Answer ALL the questions in PART-A (1 mark each)
2. Answer any ONE question from each unit in PART-B (3 marks each)
3. Answer any ONE question from each unit in PART-C (10 marks each)
4. The question paper contains THREE Pages

PART-A (1x10=10)

1. Define Force.
2. Define Co-efficient of friction.
3. State Hooke's law.
4. Define Composite bar.
5. Define Axis of symmetry.
6. What are the ways by which a thin cylindrical shell may fail?
7. Define Shear force.
8. Define Neutral axis.
9. Define Polar modulus.
10. State the use of spring.

PART-B (3x5=15)

UNIT-I

11. State the parallelogram law of forces.
12. State the law of static friction.

UNIT-II

13. What is ferrous and non-ferrous material?
14. Define stress and strain.

UNIT-III

15. Define centre of gravity and centroid.
16. What is the difference between thin cylindrical shell and thick cylindrical shell?

UNIT-IV

17. Define Cantilever beam and simply supported beam.
18. State the assumptions made in theory of simple bending.

UNIT-V

19. What are the advantages of hollow shaft over solid shaft?
20. What is spring? What are the various types of springs?

PART-C (10x5=50)

UNIT-I

21. Three forces of magnitudes P, 100N and 200N are acting at a point 'O' as shown in the figure-1 are in equilibrium. Determine the magnitude and direction of force 'P'.

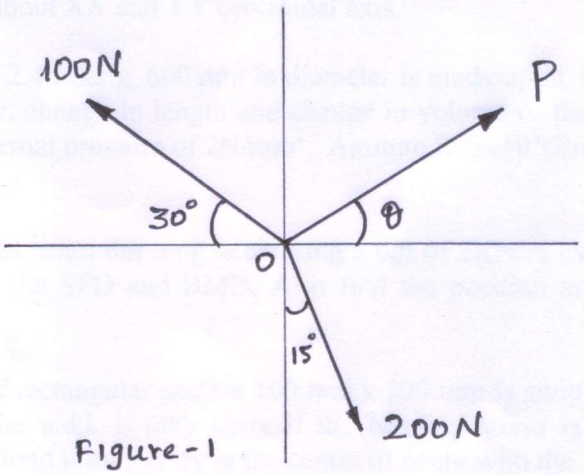

Figure-1

22. Four coplanar forces are acting at a point as shown in figure-2. Determine the magnitude and direction of resultant.

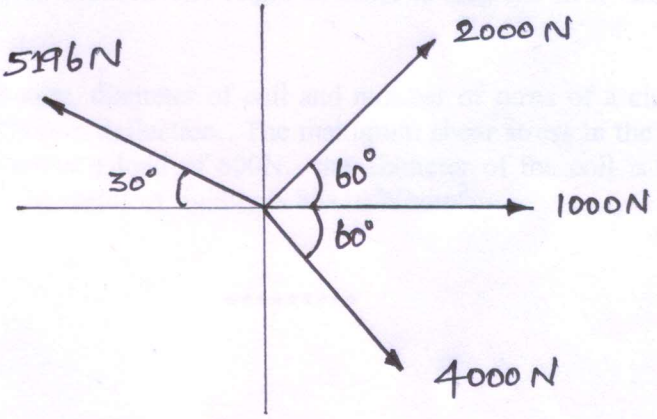

Figure-2.

UNIT-II

23. A Steel bar of 25mm diameter and a length of 1m is subjected to a pull of 25KN. If $E=2x10^5 N/mm^2$, find the elongation, change in diameter and increase in the volume of the bar. Take 1/m=0.25.
24. A copper rod 30mm diameter is surrounded tightly by a cast iron tube 60mm external diameter, their ends being firmly fastened together. When they are subjected to a compressive load of 13KN axially, what load is taken by each member? Also determine the contraction of the bar, if their length is 100 mm originally. The young's modulus of copper is $1x10^5 N/mm^2$, and cast iron is $1.2x10^5 N/mm^2$.