

# GELIA GENIB - Engineering Physics - I

454

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 (2 marks each)
  3. Answer any ONE question from each unit in PART-C (12 marks each)
  4. The question paper contains TWO Pages

## PART-A (1x5=5)

1. Give the S.I. unit for Force.
2. What is capillarity?
3. State Newton's third law of motion.
4. Write any two uses of artificial satellites.
5. What are the two types of wave motion?

## PART-B (2x5=10)

### UNIT-I

6. Write the uses of dimensional formula.
7. State the principles of moment.

### UNIT-II

8. Define Young's modulus.
9. Explain streamline motion.

### UNIT-III

10. Define maximum height of a projectile.
11. Define angle of banking.

### UNIT-IV

12. Define radius of gyration.
13. What is meant by Geo-stationary satellites?

### UNIT-V

14. Define resonance.
15. Define intensity of magnetic field.

## UNIT-I

16. (a) If the resultant of the two equal force is  $\sqrt{2}$  times a single force. Find the angle between them.  
(b) Describe how Lami's theorem is verified in the laboratory.
17. (a) Derive an expression for magnitude and direction of the resultant of two forces acting at a point with an acute angle between them.  
(b) Find the magnitude and direction of the resultant of two forces 30N and 40N acting at a point. If the angle between the forces is  $90^\circ$ .

## UNIT-II

18. (a) Describe an experiment to determine co-efficient of viscosity of a high viscous liquid by Stoke's method.  
(b) The length of a wire increases from 1.25m to 1.2508m when a load of 12 kg is suspended. The radius of the wire is 0.5 mm. Find the stress, strain and Young's modulus of the wire.
19. (a) Derive an expression for the surface tension of a liquid by capillary rise method.  
(b) Calculate the surface tension of water if it rises to a height of 4.2 cm in a capillary tube dipped vertically in it. Radius of the capillary tube is  $3.5 \times 10^{-4}$  m.

## UNIT-III

20. (a) Prove that the path of projectile is a parabola.  
(b) The expected average speed of the traffic on a high way around the curve is 20 kmph. Calculate the angle of banking of the high way if its radius of curvature be 12 m.
21. Obtain expressions for the normal acceleration and centripetal force of a body executing uniform circular motion.

## UNIT-IV

22. (a) Derive an expression for the angular momentum of a rigid body rotating about an axis.  
(b) Obtain an expression for the variation of acceleration due to gravity with altitude.
23. (a) Derive an expression for the orbital velocity of a satellite.  
(b) If the radius of the earth is 6400 km and acceleration due to gravity is  $9.8 \text{ ms}^{-2}$ , Calculate the escape velocity of the earth.

## UNIT-V

24. (a) The length, breadth and the thickness of a magnet are 150 mm, 20 mm and 10 mm respectively. Calculate the intensity of magnetization, if its magnetic moment is  $9 \times 10^{-6} \text{ Am}^2$ .  
(b) Explain about noise pollution.
25. Describe the method of drawing hysteresis loop of a specimen using a solenoid.

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