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Subject:	Physics
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Max. Marks:	70
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Duration:	3:15 hrs.
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PART-A

I Answer ALL the following questions

10 x 1 = 10

1. Name the scientist who discovered X-rays.
2. What does the area under force – displacement graph represent?
3. Which component of velocity of a projectile is zero at maximum height?
4. Why athletes run a few steps before taking a jump?
5. Give the SI unit of moment of inertia.
6. What is the effect of temperature on elasticity?
7. State Bernoulli's principle.
8. Mention the value of Reynold's number for streamline flow of a liquid.
9. Give the significance of first law of thermodynamics.
10. Mention the distance between node and a consecutive antinode in a stationary wave.

PART-B

II Answer any FIVE of the following questions

5 x 2 = 10

11. Write the dimensional formula for the terms (i) linear momentum and (ii) pressure.
12. What is impulsive force? Give one example.
13. When will be the dot product of two vectors (i) maximum and (ii) minimum?
14. Write Stoke's formula and explain the terms.
15. Give the general conditions for equilibrium of a rigid body.
16. Mention any two uses of polar satellites.
17. State and explain the law of equipartition of energy.
18. Distinguish between transverse and longitudinal waves.

PART-C

III Answer any FIVE of the following questions

5 x 3 = 15

19. Explain parallax method of determining the size of moon.
20. Obtain the expression for time of flight of a projectile.
21. Give any three methods of reducing friction.
22. Prove work – energy theorem for a constant force.
23. State Kepler's laws of planetary motion.
24. Using perpendicular axes theorem, obtain an expression for moment of inertia of a disc about its diameter.
25. Draw schematic diagram of refrigerator and define its coefficient of performance.
26. Mention three characteristics of simple harmonic motion.

PART-D**IV Answer any TWO of the following questions****2 x 5 = 10**

27. What is velocity – time graph? Derive $v^2 \propto u^2 \propto 2aS$ using velocity – time graph.
 28. Define centripetal acceleration. Obtain the expression for it.
 29. Prove the law of conservation of mechanical energy in the case of a freely falling body.

V Answer any TWO of the following questions**2 x 5 = 10**

30. Define escape velocity of a body and hence obtain the expression for it.
 31. (i) Distinguish between isothermal and adiabatic process.
 (ii) Derive an expression for work done in isothermal process.
 32. Explain Newton's formula and Laplace's correction for speed of sound in gases.

VI Answer any THREE of the following questions**3 x 5 = 15**

33. A cricketer can throw a ball to a maximum horizontal distance of 100 m . How much high above the ground can the cricketer throw the same ball? Given: $g \propto 9.8 \text{ ms}^{-2}$
34. A grenade of mass 10 kg moving with velocity of 36 kmph breaks into two parts. The larger part moves with velocity of 25 ms^{-1} in the original direction. The other part moves with a velocity of 1.5 ms^{-1} in the opposite direction. Find the masses of the two parts.
35. The angular speed of a wheel increases from 600 rpm to 1200 rpm in 20 seconds. Calculate (i) angular acceleration
 (ii) angular displacement and
 (iii) number of revolutions does it make in this period of time.
36. A Carnot engine operating between temperatures T_1 and T_2 has an efficiency of $\frac{1}{6}$. When T_1 is lowered by 62 K , its efficiency increases to $\frac{1}{3}$. What are the values of T_1 and T_2 ?
37. The displacement y of an oscillating particle varies with time t according to the equation $y \propto 2\sin(0.5\pi t)$ where y is in metre and t in second. Find
 (i) amplitude of the oscillation
 (ii) time period
 (iii) maximum velocity and
 (iv) maximum acceleration of the particle
