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6423-B

PHYSICS

Time : 2.30 Hours]

[Maximum Marks : 7(

(Very Very Short Answer Type Questions) 1 eacl

1. Evaluate :

$$\int_{u}^{v} mv.dv$$

2 In which type of circular motion, the object will possess both centripetal and transverse acceleration ?

3. In which collision, the colliding bodies move along the same straight line before and after collision ?

4 What happens to the value of 'g' as we go from equator to poles ?

5. How many degrees of freedom are in a diatomic gas molecule ?

(Very Short Answer Type Questions) 2 each

6. What is the dimensional formula of :

   (a) Torque

   (b) Modulus of rigidity ?

Or

The mass of a body is measured by two persons and is 4.2 kg and 4.24 kg. Which is more accurate and why ?

7 Define power and energy. Give their units.

3. Give two applications of surface tension.

3. Briefly explain the concept of mean free path.

10. A particle executes SHM of amplitude 30 cm and time period 4 s. What is the minimum time required for the particle to move from mean position to *a point 15 cm.*

(Short Answer Type Questions) 3 eacl

11. State and explain work-energy principle.

Or

Briefly analyse elastic collision in two dimensions.

12 Differentiate e^{ax} by ab-initio method.

13 The frequency v of an oscillating drop may depend upon radius (r) of the drop, density (ρ) of liquid and the surface tension (s) of the liquid. Deduce the formula dimensionally.

14. Define uniform velocity of an object moving along a straight line. What will be the shape of position-time and velocity-time graphs of such a motion ?

15 What is a Projectile ? Define trajectory and derive equation of motion of the projectile when projected at an angle θ with horizontal direction.

16 Why are the curved roads banked ? Obtain an expression for angle of banking of a curved road.

17. State the two theorems of moment of inertia.

18. Discuss the physical meaning of angular momentum.

19. Briefly discuss the limitations of first law of Thermodynamics.

20 State zeroth law of Thermodynamics. Define Temperature.

21. State the postulates of kinetic theory of gases.

22 What are longitudinal waves ? Give examples.

(Value Based Questions)

23 Though friction opposes relative motion, yet in certain cases, friction is also the cause of motion.

    (i) Give one example where friction causes motion.

    (ii) Give the direction of friction on front wheel of a bicycle when it is pedalled.

    (iii) Friction is a necessary evil. What does this imply in day-to-day life ?

Turn

(Long Answer Type Questions)

24. Explain Kepler's laws of planetary motion and deduce Newton's law of gravitation from them.

Or

Define Escape Velocity. Derive an expression for it.

25. Define terminal velocity and derive a relation for it.

Or

Define capillarity and deduce ascent formula.

26. Briefly discuss the formation of standing waves in open organ pipes.

Or

Explain displacement, velocity, acceleration and time period in simple harmonic motions. Find the relation for them.