| Class : 11 | | Register Number | | | | | | |
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# COMMON HALF YEARLY EXAMINATION - 2024 - 25

**Time Allowed : 3.00 Hours]**

## PHYSICS

**[Max. Marks : 70**

### PART-I

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**Note:** (i) Answer all the questions                                      15×1=15

(ii) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer.

1. Which of the following pairs of physical quantities have same dimension?
   a) Force and Power   b) Torque and Energy   c) Torque and Power   d) Force and Torque

2. If a particle has negative velocity and negative acceleration its speed.
   a) Increases   b) Remains same   c) Zero   d) Decreases

3. When a car takes a sudden left turn in the curved road, passengers are pushed toward the right due to
   a) Inertia of motion   b) Inertia of Direction   c) Inertia of rest   d) Absence of Inertia

4. The centrifugal force appears to exist
   a) Only in Inertial frames   b) In any accelerated frame
   c) Both in inertia and Non - Inertial frames   d) only in rotating frames

5. What is the minimum velocity with which a body of mass m must enter a vertical loop of radius R so that it can complete the loop?
   a) $\sqrt{2gR}$   b) $\sqrt{3gR}$   c) $\sqrt{5gR}$   d) $\sqrt{gR}$

6. A body of mass 1 Kg is thrown upwards with a velocity 20 ms⁻¹. It momentarily come to rest after attaining a height of 18 m. How much energy is lost due to air friction (Take g = 10 ms⁻²)
   a) 10 J   b) 40 J   c) 30 J   d) 20 J

7. A particle undergoes uniform circular motion. The angular momentum of the particle remains conserved about,
   a) The centre point of the circle   b) The point on the circumference of the circle
   c) Any point inside the circle   d) Any point outside of the circle

8. A couple produces,
   a) No motion   b) Pure translation
   c) Pure Rotation   d) Rotation and Translation

9. If the distance between the earth and sun were to be doubled from its present value, the number of days in a year would be
   a) 365.25   b) 730.50   c) 1032   d) 64.5

10. The young's modulus for a perfect rigid body is
    a) 0   b) 1   c) 2   d) Infinity

11. Triple point of water is
    a) 372.1K   b) 273.1 K   c) 732.1 K   d) 123.7 K

12. In an Isochoric process, we have
    a) W = 0   b) Q = 0   c) $\Delta U = 0$   d) $\Delta T = 0$

13. The ratio $r = \dfrac{C_P}{C_v}$ for a gas mixture consisting of 8g of helium and 16g of Oxygen is
    a) $\dfrac{23}{15}$   b) $\dfrac{15}{23}$   c) $\dfrac{27}{17}$   d) $\dfrac{17}{27}$

14. In a simple harmonic oscillation, The acceleration against displacement for one complete oscillation will be
    a) an ellipse   b) a circle
    c) a parabola   d) a straight line

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15. In a closed organ pipe, The frequency ratio is

    a) $1:2:3:4:\dots$    b) $1:3:5:7:\dots$    c) $2:4:6:8:\dots$      d) $1:4:8:16:\dots$

## PART - II

**Answer any six questions. Question no.24 is compulsory.**        **6x2=12**

16. Define Accuracy and Precision.
17. Define Scalar and Vector.
18. State Newtons Second law of Motion.
19. Define COR (or) Co efficient of Restitution. (e).
20. Give the examples of Torque in day to day life.
21. Why there is no lunar and solar eclipse everymonth?
22. State Hookes law.
23. Distinguish between Transverse and Longitudinal wave.
24. A Refrigerator has cop of 3. How much work must be supplied to the refrigerator in order to remove 200 J of heat from its interior?

## PART - III

**Answer any six questions. Question no.32 is compulsory.**        **6x3=18**

25. State the laws of Simple Pendulum.
26. Write down the postulates of Kinetic Theory of gases.
27. Define : a) Stefan - Botzman law        b) Wien's law
28. What is Reynold's number? Give its significance.
29. Using free body diagram, Show whether it is easy to pull an object then to push it?
30. Obtain an expression for i) Range and ii) Maximum height of a projectile in the horizontal projection.
31. Explain why a cyclist bends while negotiating a curve road? Arrive at the expression for angle of bending for a given velocity.
32. Two resistors of resistance $R_1 = (100 \pm 3)\ \Omega$ ; $R_2 (150 \pm 2)\ \Omega$ are connected in series. Calculate its effective resistance.
33. State Kepler's law planetary motion.

## PART - IV

**Answer all the questions.**        **5x5=25**

34. (a) Obtain an expression for the time period T of a Simple Pendulum. The time period T depends upon
     (i) mass 'm' of the bob (ii) The length 'l' of the Pendulum and (iii) Acceleration due to gravity 'g' at the place where the Pendulum is suspends (constant K = 2z)

**(OR)**

    (b) Explain how overtones are produced in open Organ pipe.

35. (a) Discuss in detail the energy in Simple Harmonic motion.

**(OR)**

    (b) Derive the kinematic equations of motion for Constant Acceleration.

36. (a) Derive Meyer's relation for an Ideal gas.

**(OR)**

    (b) Explain the need for Banking of Tracks.

37. (a) State and Explain Work - Energy principle

**(OR)**

    (b) Derive the expression for the terminal velocity of a sphere moving in a high viscous fluid using stoke's law.

38. (a) Derive an expression for Escape speed.

**(OR)**

    (b) State and Prove Parallel Axis Theorem.

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