COMMON HALF YEARLY EXAMINATION - 2025

Standard XI

Reg.No. | | | | | | |

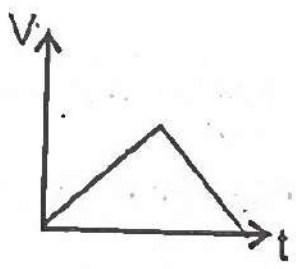
PHYSICS

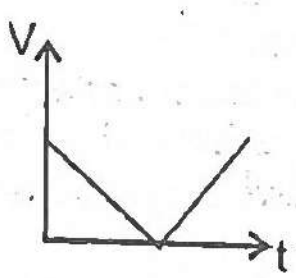
Time : 3.00 hrs *Marks : 70*

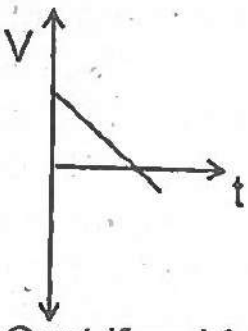
Part – I

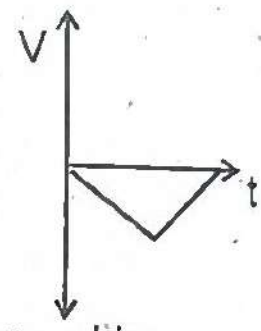
I. Choose the correct answer: **15 x 1 = 15**

1. If $\pi = 3.14$, then the value of π^2 is
   a) 9.8596 b) 9.860 c) 9.86 d) 9.9
2. If the force is proportional to square of velocity then the dimension of proportionality constant is
   a) $[MLT^0]$ b) $[MLT^{-1}]$ c) $[ML^{-2}T]$ d) $[ML^{-1}T^0]$
3. The speed of the centre of a wheel rolling on a horizontal surface is V_0. A point on the rim in level with the centre will be moving at a speed of
   a) zero b) V_0 c) $\sqrt{2}V_0$ d) $2V_0$
4. A uniform force of $(2\hat{i} + \hat{j})$ N acts on a particle of mass 1 kg. The particle displaces from position $(3\hat{j} + \hat{k})$ m to $(5\hat{i} + 3\hat{j})$ m. The work done by the force on the particle is.
   a) 9 J b) 6 J c) 10 J d) 12 J
5. The coefficient of restitution for a material
   a) e = 0 b) 0 < e < 1 c) e = 1 d) 0 > e > 1
6. A ball is projected vertically upwards with a Velocity V. It comes back to ground in time t. Which V – t graph shows the motion correctly?

a) 

b) 

c) 

d) 

7. If a person moving from pole to equator, the Centrifugal force acting on him.
   a) increases b) decreases
   c) remains the same d) increases and then decreases
8. A Sound wave whose frequency is 5000 Hz travels in air and then hits the water surface. The ratio of its wavelengths in water and air is
   a) 4.30 b) 0.23 c) 5.30 d) 1.23
9. Which of the following represents a wave.
   a) $(x-vt)^3$ b) $x(x + vt)$ c) $\frac{1}{(x+vt)}$ d) $\sin(x + vt)$
10. 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
11. The Kinetic energy of the satellite orbiting around the Earth is
    a) equal to potential energy b) less than potential energy
    c) greater than kinetic energy d) zero.
12. If a wire is stretched to double of its original length, then the strain in the wire is
    a) 1 b) 2 c) 3 d) 4
13. When a cycle tyre suddenly bursts, the air inside the tyre expands, This process is
    a) isothermal b) adiabatic c) isobaric d) isochoric

14. The specific heat capacity of water is
    a) 4186 J Kg^{-1} k^{-1} b) 3470 J Kg^{-1} k^{-1} c) 840 J Kg^{-1} k^{-1} d) 1005 J Kg^{-1} k^{-1}
15. Which of the following gases will have least rms speed at a given temperature?
    a) Hydrogen b) Nitrogen c) Oxygen d) Carbon dioxide.

Part - II

II. **Answer any 6 questions. (Q.No.24 is compulsory)** 6 x 2 = 12

16. Define precision and accuracy.
17. Define displacement and distance.
18. Give suggestion a few methods to reduce friction.
19. Give any two examples of torque in day–to–day life.
20. Why is there no lunar eclipse and solar eclipse every month?
21. State Hooke's law.
22. What is meant by free oscillation?
23. Define beat.
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 interion?

Part - III

III. **Answer any 6 questions. (Q.No.33 is compulsory)** 6 x 3 = 18

25. Write a note on triangulation method to measure larger distances.
26. Using free body diagram, show that it is easy to pull an object than to push it.
27. Write the differences between conservative and non–conservative forces.
28. Derive an expression for energy of satellite.
29. Write the applications of Surface Tension.
30. What is Brownian motion? What are the factors affecting Brownian motion?
31. Consider two springs whose force constants are 1 Nm^{-1} and 2 Nm^{-1} which are connected in series. Calculate the effective spring constant (Ks) and comment on Ks.
32. Discuss various modes of heat transfer.
33. Given two vectors $\vec{A} = 2\hat{i} + 4\hat{j} + 5\hat{k}$ and $\vec{B} = \hat{i} + 3\hat{j} + 6\hat{k}$. Find the product $\vec{A}.\vec{B}$ and the magnitudes of $\vec{A}$ and $\vec{B}$. What is the angle between them?

Part - IV

IV. **Answer all the questions.** 5 x 5 = 25

34. a) Obtain an expression for the time period T of a simple pendulam. The time period T depends on (i) mass 'm' of the bob (ii) length 'l' of the pendulam and (iii) acceleration due to gravity g at the place where the pendulam is suspended (Constant k = 2π) ***(OR)***
    b) Write down the postulates of kinetic theory of gases.
35. a) Discuss the properties of vector product. ***(OR)***
    b) Derive an expression for terminal velocity.
36. a) Show that in an inclined plane, angle of friction is equal to angle of repose. ***(OR)***
    b) Derive Mayer's relation for an ideal gas.
37. a) State and explain work energy principle. Mention any three examples for it. ***(OR)***
    b) Explain how overtones are produced in a closed organ pipe.
38. a) State and prove Parallel axis theorem. ***(OR)***
    b) Derive an expression for escape speed.

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