

FIRST REVISION EXAMINATION - 2024

CLASS: XI

PHYSICS

Reg.No

Time : 3.00 Hours

MAX MARKS : 70

PART I

I Answer all the questions

15X 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. Which one of the following physical quantities cannot be represented by a scalar?
a) Mass b) length c) momentum d) magnitude of acceleration
3. Force acting on the particle moving with constant speed is
a) Always zero b) need not be zero c) always non zero d) cannot be concluded
4. A spring of force constant k is cut into two pieces such that one piece is double the length of the other. Then, the long piece will have a force constant of
a) $\frac{2}{3} k$ b) $\frac{3}{2} k$ c) $3 k$ d) $6 k$
5. A couple produces
a) Pure rotation b) pure translation c) rotation and translation d) no motion
6. 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
7. For a given material, the rigidity modulus is $[\frac{1}{3}]^{\text{rd}}$ of Young's modulus. Its poisson's ratio is
a) 0 b) 0.25 c) 0.3 d) 0.5
8. In an isochoric process, we have
a) $W = 0$ b) $\Delta U = 0$ c) $\Delta T = 0$ d) $Q = 0$
9. Which of the following gases will have least rms speed at a given temperature?
a) Hydrogen b) Nitrogen c) oxygen d) Carbon dioxide
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. A sound wave whose frequency is 5000 Hz travels in air and then hits the water surface. The ratio of its wavelengths and air is
a) 4.30 b) 0.23 c) 5.30 d) 1.23
12. Capillary rise, height h is
a) directly proportional to the radius b) inversely proportional to the radius
c) independent of the radius d) none
13. If a particle has negative velocity and negative acceleration, its speed
a) increase b) decreases c) remains same d) zero
14. An object having mass 2 Kg and momentum 20 Kg m s^{-1} , kinetic energy of the mass is
a) 50 J b) 100 J c) 150 J d) 75 J
15. The value of acceleration due to gravity at the Mount Everest is
a) g b) $> g$ c) $< g$ d) zero

PART-II

II. Answer any six of the following questions. Question No.24 is compulsory

6 X 2 = 12

16. Write any two rules for determining significant figures.
17. Define Time of Flight.
18. Write the various types of potential energy. Explain the formulae.
19. State conservation of angular momentum.
20. Is potential energy the property of a single object? Justify.
21. Define stress and strain.
22. Write the expression for rms speed, average speed and most probable speed of a gas molecule.
23. What are transverse waves? Give one example.
24. If a stone of mass 0.25kg tied to a string executes uniform circular motion with a speed of 2 m s^{-1} of radius 3m, what is the magnitude of tensional force acting on the stone?

PART-III

III. Answer any six of the following questions. Question No.33 is compulsory

6 X 3 = 18

25. Write a note on triangulation method to measure long distance.
26. Derive the expression for centripetal acceleration.
27. Explain the concept of inertia. Write two examples each for inertia of motion, inertia of rest and inertia of direction.
28. What are the difference between conservative force and non-conservative force.
29. What are the conditions in which force cannot produce torque?
30. State Kepler's three laws.
31. Write down any six postulates of kinetic theory of gases.
32. State the laws of simple pendulum?
33. A wire 10 m long has a cross-sectional area $1.25 \times 10^{-4} \text{ m}^2$. It is subjected to a load of 5 kg. If Young's modulus of the material is $4 \times 10^{10} \text{ N m}^{-2}$, calculate the elongation produced in the wire.
Take $g = 10 \text{ ms}^{-2}$.

PART-IV

IV. Answer all the following questions

5X 5 = 25

34. (a) If the value of universal gravitational constant in SI is $G_{SI} = 6.6 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$, then find its value in CGS System?

(OR)

(b) State and prove parallel axis theorem.

35. (a) Briefly explain the origin of friction. Show that in an inclined plane, angle of friction is equal to angle of repose.

(OR)

(b) Derive the expression for Carnot engine efficiency.

36. (a) Derive the kinematic equations of motion for constant acceleration.

(OR)

(b) What is inelastic collision? In which way it is different from elastic collision. Mention few examples in day to day life for inelastic collision.

37. (a) State and prove Bernoulli's theorem for a flow of incompressible, non-viscous, and streamlined flow of fluid.

(OR)

(b) Explain in detail the four different types of oscillations.

38. (a) Describe Newton's formula for velocity of sound waves in air and also discuss the Laplace's correction.

(OR)

(b) Explain the variation of g with latitude