

Padasalai.Net's Quarterly Exam Model Question Paper

11TH PHYSICS

Time : 2.30 hrs

Marks : 70

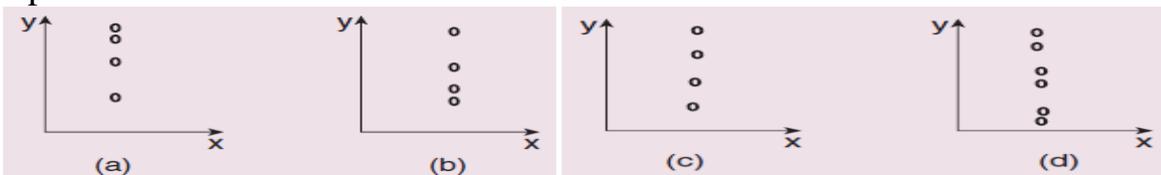
I. Choose the correct answer

15x1=15

- If the error in the measurement of radius is 2%, then the error in the determination of volume of the sphere will be a) 8% b) 2% c) 4% d) 6%
- 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
- A length-scale (l) depends on the permittivity (ϵ) of a dielectric material, Boltzmann constant (k_B), the absolute temperature (T), the number per unit volume (n) of certain charged particles, the particles. Which of the following expression for l is dimensionally correct?

(a) $l = \sqrt{\frac{nq^2}{\epsilon k_B T}}$ (b) $l = \sqrt{\frac{\epsilon k_B T}{nq^2}}$ (c) $l = \sqrt{\frac{q^2}{\epsilon n^2 k_B T}}$ (d) $l = \sqrt{\frac{q^2}{\epsilon n k_B T}}$

- Which one of the following physical quantities cannot be represented by ascalar?
(a) Mass (b) length
(c) momentum (d) magnitude of acceleration
- If an object is dropped from the top of a building and it reaches the ground at $t = 4$ s, then the height of the building is (ignoring air resistance) ($g = 9.8 \text{ ms}^{-2}$)
(a) 77.3 m (b) 78.4 m (c) 80.5 m (d) 79.2 m
- If the velocity is $\vec{v} = 2\hat{i} + t^2\hat{j} - 9\hat{k}$, then the magnitude of acceleration at $t = 0.5$ s is
(a) 1 m s^{-2} (b) 2 m s^{-2} (c) zero (d) -1 m s^{-2}
- A ball is dropped from some height towards the ground. Which one of the following represents the correct motion of the ball?



- The resultant of two vectors A and B is perpendicular to vector A and its magnitude is equal to half of the magnitude of vector B. Then the angle between A and B is
a) 30° b) 45° c) 150° d) 120°
- An object of mass m held against a vertical wall by applying horizontal force F as shown in the figure. The minimum value of the force F is
(a) Less than mg (b) Equal to mg (c) Greater than mg (d) Cannot determine
- A book is at rest on the table which exerts a normal force on the book. If this force is considered as reaction force, what is the action force according to Newton's third law?
(a) Gravitational force exerted by Earth on the book (b) Gravitational force exerted by the book on Earth
(c) Normal force exerted by the book on the table (d) None of the above

12. An object of mass m begins to move on the plane inclined at an angle θ . The coefficient of static friction of inclined surface is μ_s . The maximum static friction experienced by the mass is

(a) mg (b) $\mu_s mg$ (c) $\mu_s mg \sin \theta$ (d) $\mu_s mg \cos \theta$

13. A ball of mass 1 kg and another of mass 2 kg are dropped from a tall building whose height is 80 m. After, a fall of 40 m each towards Earth, their respective kinetic energies will be in the ratio of

(a) $\sqrt{2} : 1$ (b) $1 : \sqrt{2}$ (c) $2 : 1$ (d) $1 : 2$

14. 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}

15. If the potential energy of the particle is $\alpha - \frac{\beta}{2}x^2$, then force experienced by the particle is

(a) $F = \frac{\beta}{2}x^2$ (b) $F = \beta x$ (c) $F = -\beta x$ (d) $F = -\frac{\beta}{2}x^2$

II. Answer the following one or two sentences (any6).Q.NO.24 is compulsory.

6X2=12

16. What is significant figures. Give example.

17. What is non uniform circular motion?

18. The radius of the circle is 3.12 m. Calculate the area of the circle with regard to significant figures.

19. Convert the vector $r = 3\hat{i} + 2\hat{j}$ into a unit vector.

20. State the number of significant figures in the following

i) 600800 ii) 400 iii) 0.007 iv) 5213.0 v) $2.65 \times 10^{24}m$ vi) 0.0006032

21. When walking on ice one should take short steps. Why?

22. Define power.

23. Define potential energy.

24. A box is pulled with a force of 25 N to produce a displacement of 15 m. If the angle between the force and displacement is 30° , find the work done by the force.



III. Short answer question.(any 6) Q.NO.30 is compulsory 6x3=18

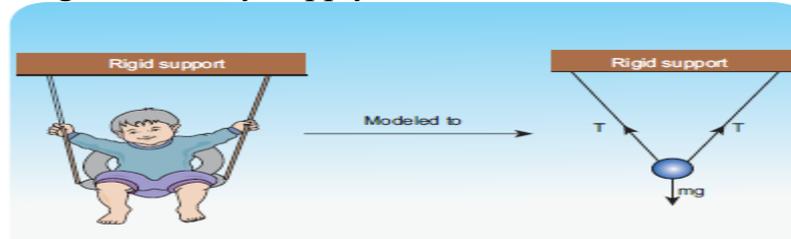
25. What are the limitations of dimensional analysis?
26. Write down the kinematic equations for angular motion.
27. The position vectors particle has length 1m and makes 30° with the x -axis. What are the lengths of the x and y components of the position vector?
28. What are the resultants of the vector product of two given vectors given by $\vec{A} = 4\hat{i} - 2\hat{j} + \hat{k}$ and $\vec{B} = 5\hat{i} + 3\hat{j} - 4\hat{k}$?
29. What are concurrent forces? State Lami's theorem.
30. The physics books are stacked on each other in the sequence: +1 volumes 1 and 2; +2 volumes 1 and 2 on a table .
- a) Identify the forces acting on each book and draw the free body diagram.
- b) Identify the forces exerted by each book on the other.
31. Why does a parachute descend slowly?
32. Explain the characteristics of elastic and inelastic collision.
33. Define
- a) Coefficient of restitution
- b) Law of conservation of energy

IV. Answer the following questions in one paragraph: 5x5=25

34. Obtain an expression for the time period T of a simple pendulum. The time period T depends on (i) mass ' m ' of the bob (ii) length ' l ' of the pendulum and (iii) acceleration due to gravity g at the place where the pendulum is suspended. (Constant $k = 2\pi$)(OR) Convert 76 cm of mercury pressure into Nm^{-2} using the method of dimensions.
35. Explain in detail the triangle law of addition.(OR)
Explain the motion of blocks connected by a string in
i) Vertical motion ii) Horizontal motion.
36. State and explain work kinetic energy principle(OR)
Arrive at an expression for elastic collision in one dimension and discuss various cases.
37. Arrive at an expression for power and velocity and arrive at an expression for K.E and momentum.
(OR) Explain with graphs the difference between work done by a constant force and by a variable force.

38. A baby is playing in a swing which is hanging with the help of two identical chains is at rest.

Identify the forces acting on the baby. Apply Lami's theorem and find out the tension



acting on the chain.

(OR)

Derive the kinematic equations of motion for constant acceleration.

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