

20.01.2020

Revision Exam – I

Marks:70

Std: XI (A-D)

Physics

Time: 3 Hrs

I. Choose the correct answer:

15x1=15

- The dimension of $(\mu_0\epsilon_0)^{1/2}$ is
a) length b) time c) velocity d) force
- The change in the external condition during an experiment leads to _____ error.
a) Personal error b) Least count error
c) External error d) Instrumental error
- The dimensional formula for Faraday constant is _____.
a) $AT \text{ mol}^{-3}$ b) $AT \text{ mol}^{-2}$ c) $A^2 T^3 \text{ mol}^{-3}$ d) $AT \text{ mol}^{-1}$
- When a particle moves in a circle of radius 10m. Its linear speed is given by $v=3t$ where t is in seconds. Then the centripetal acceleration at $t=2s$ is _____.
a) 3.9 m/s^2 b) 3.72 m/s^2 c) 3.6 m/s^2 d) 3.1 m/s^2
- If a particle has negative velocity and negative acceleration its speed _____.
a) increases b) decreases c) remains same d) zero
- An object is dropped in an unknown planet from height 50m, it reaches the ground in 2s the acceleration due to gravity is _____.
a) $g=20 \text{ m/s}^2$ b) $g=25 \text{ m/s}^2$ c) $g=15 \text{ m/s}^2$ d) $g=30 \text{ m/s}^2$
- If an object is thrown vertically up with the initial speed u from the ground, then the time taken by the object to return back _____.
a) $\frac{u^2}{2g}$ b) $\frac{u}{g}$ c) $\frac{u}{2g}$ d) $\frac{2u}{g}$
- Two masses m_1 and m_2 are experiencing the same force where $m_1 < m_2$. The ratio of their acceleration $\frac{a_1}{a_2}$ is _____.
a) 1 b) less than 1 c) greater than 1 d) all the above

9. When a car takes a sudden left turn in the curved road, the passenger are pushed towards the right due to _____.

- a) inertia of direction b) inertia of motion
c) inertia of rest d) all the above

10. If the linear momentum of the object is increased by 0.1% then the kinetic energy is increased by _____.

- a) 0.1% b) 0.2% c) 0.4% d) 0.01%

11. 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) $F = \frac{-\beta}{2}x^2$

12. The workdone by the conservative force for a closed path is _____.
a) always negative b) zero c) always positive d) not defined

13. Which among the following is a Non-conservative force?

- a) Spring force b) Magnetic force
c) Frictional force d) Gravitational force

14. Two vectors \vec{A} and \vec{B} are given in the component form as

$$\vec{A} = 5\hat{i} + 7\hat{j} - 4\hat{k} \text{ and } \vec{B} = 6\hat{i} + 3\hat{j} + 2\hat{k}$$

- a) $11\hat{i} + 10\hat{j} + 7\hat{k}$ b) $11\hat{i} + 10\hat{j} - 2\hat{k}$ c) $10\hat{i} + 12\hat{j} + 7\hat{k}$ d) $11\hat{i} + 8\hat{j} - 3\hat{k}$

15. If the velocity of particle A is $\vec{V}_A = 3\hat{i} - 5\hat{j} + 2\hat{k}$. Then the speed is ____.

- a) $\sqrt{35} \text{ m/s}$ b) $\sqrt{37} \text{ m/s}$ c) $\sqrt{34} \text{ m/s}$ d) $\sqrt{30} \text{ m/s}$

II. Answer any 6 of the following:

6x2=12

16. What is radius of gyration?

17. A cyclist while negotiating a circular path with speed 20m/s is found to bend an angle by 30° with vertical. What is the radius of the circular path $g(10 \text{ m/s}^2)$.

18. Define coefficient of restitution?

19. Write the various types of potential energy with formula.

20. Explain various types of friction. Suggest a few methods to reduce friction.
21. Under what condition will a car skid on a levelled circular road?
22. Define Right hand rule.
23. The length and breadth of a rectangle are (5.7 ± 0.1) cm and (3.4 ± 0.2) cm respectively. Calculate the area of the rectangle.

III. Answer any 6 of the following: 6x3=18

24. Obtain an expression for the force in the circular path depends on i) mass ii) velocity iii) radius take $k=1$
25. Derive the kinematic equations of motion for constant acceleration.
26. A train was moving at the rate of 54km/h when brakes were applied. It came to rest within a distance of 225m. Calculate the retardation produced in the train.
27. Using free body diagram, show that it is easy to pull an object than to push it.
28. State and explain work energy principle.
29. Arrive at an expression for power and velocity.
30. What is the relation between torque and angular momentum.
31. A force of $(4\hat{i}-3\hat{j}+5\hat{k})$ N is applied at a point whose position vector is $(7\hat{i}+4\hat{j}-2\hat{k})$ m find the torque of force.

IV. Answer any 5 in detail: 5x5=25

32. Explain why a cyclist bends while negotiating a curve road, Arrive at the expression for angle of bending for a given velocity.
33. Arrive at an expression for elastic collision in one dimension and discuss various cases.
34. State Newton's third law and discuss their significance.
35. Derive the equations of motion for a particle a) falling vertically b) projected vertically.

36. What do you mean by propagation error? Explain the propagation errors in addition and multiplication.

37. State and explain perpendicular axis theorem.