



# COMMON QUARTERLY EXAMINATION - 2022

Standard - XI

Reg.No.

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Time: 3.00 hrs.

PHYSICS

Marks: 70

## PART - I

Answer all the questions:

15×1=15

- Which of the following pairs of physical quantities have the same dimension?
  - force and torque and energy
  - torque and power
  - torque and force and torque power
  - force and torque power
- The length of a body is measured as 3.51m if the accuracy is 0.01m, then the percentage error in the measurement is
  - 351%
  - 1%
  - 0.28%
  - 0.035%
- A rope is wound around a hollow cylinder of mass 3Kg and radius 40cm. What is the angular acceleration of cylinder if the rope is pulled with a force of 30N?
  - 0.25 rad S<sup>-2</sup>
  - 25 rad S<sup>-2</sup>
  - 5MS<sup>-2</sup>
  - 25MS<sup>-2</sup>
- If the potential energy of the particle is  $\alpha - \frac{\beta}{2}x^2$ , then the force experienced by the particle is
  - $F \frac{\beta}{2}x^2$
  - $F = \beta x$
  - $F = -\beta x$
  - $F = -\frac{\beta}{2}x^2$
- Two masses  $m_1$  and  $m_2$  are experiencing the same force where  $m_1 < m_2$ , Then ratio of their acceleration  $\frac{a_1}{a_2}$  is
  - 1
  - less than 1
  - greater than 1
  - all the three cases
- An object is dropped in an unknown planet from height 50m, It reaches the ground in 2s. The acceleration due to gravity in this unknown planet is
  - $g = 20ms^{-2}$
  - $g = 25ms^{-2}$
  - $g = 15ms^{-2}$
  - $g = 30ms^{-2}$
- Two discs of same moment of inertia rotating about their regular axis passing through centre and perpendicular to the plane of disc with angular velocities  $w_1$  and  $w_2$  And they are brought into contact face to face coinciding the axis of rotation the expression for loss off energy is
  - $\frac{1}{4}I(W_1 - W_2)$
  - $I(W_1 - W_2)^2$
  - $\frac{1}{8}I(W_1 - W_2)^2$
  - $\frac{1}{2}I(W_1 - W_2)^2$
- $(\mu_0 \epsilon_0)^{-1/2}$  has the dimension of
  - Length
  - Time
  - Velocity
  - Force
- If a particle has negative velocity and negative acceleration its speed
  - increases
  - decreases
  - remains same
  - Zero
- Which of the following physical quantities cannot be represented by a Scalar
  - Mass
  - Length
  - Momentum
  - Magnitude of acceleration
- Force acting on the particle moving with constant speed is
  - always zero
  - need not be zero
  - always non zero
  - cannot be concluded
- 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
  - $\frac{2}{3}K$
  - $\frac{3}{2}K$
  - 3K
  - 6K
- A couple produces
  - pure rotation
  - pure translation
  - rotation and translation
  - no motion

14. 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) 64.5                      b) 1032                      c) 182.5                      d) 730
15. The unit of gravitational constant is  
 a)  $\text{ms}^{-2}$                       b)  $\text{NKg}^{-1}$                       c)  $\text{Nm}^2\text{Kg}^{-2}$                       d)  $\text{Nm}^{-2}$

**PART - II**

**Answer any six of the following question no.24 is Compulsory:      6×2=12**

16. Define unit of Length in SI System.  
 17. Differentiate Centre of mass and Centre of gravity.  
 18. State Newton's universal law of gravitation.  
 19. Define Radian.  
 20. If a Stone of mass 0.25Kg tied to a string executes Uniform circular motion with a speed of  $2\text{ms}^{-1}$  of radius 3m. Calculate the tensional force acting on the stone.  
 21. List out the uses of Dimensions.  
 22. Distinguish between Vector and Scalar quantities.  
 23. State Newton's Second law of motion.  
 24. An iron ball and a feather are both falling from a height of 10m, what are the time taken by the iron ball and feather to reaches the ground? (Let  $g = 10\text{ms}^{-2}$ )

**PART - III**

**Answer any six of the following question No.33 is Compulsory:      6×3=18**

25. How will you measure the diameter of moon using parallax method?  
 26. State Kepler's law of planetary motion.  
 27. Differentiate elastic and inelastic collisions.  
 28. If two objects mass 2Kg and 4Kg are moving with same momentum of  $20\text{Kg ms}^{-1}$  will they have the same speed? Prove your answer mathematically.  
 29. What are all the types of equilibrium.  
 30. State and explain Lami's Theorem.  
 31. Explain the principle of Torque.  
 32. Check whether the following equations are dimensionally correct?  
 i)  $V = u + at$       ii)  $E = mgh$   
 33. Find out the equation for

$$\vec{F} = (4\hat{i} - 3\hat{j} + 5\hat{k}) \text{ N and } \vec{r} = (7\hat{i} + 4\hat{j} - 2\hat{k}) \text{ M Find out the equation for } \hat{r} = \hat{r} \times \hat{F}$$

**PART - IV**

**Answer all the questions:**

**5×5=25**

34. Write a note on triangulation method and radar method to measure larger distances. **(OR)**  
 Differentiate Static friction and Kinetic friction.  
 35. Derive the equation of motion, Range and maximum height reached by the particle thrown at an oblique angle  $\theta$  with respect to the horizontal direction.  
 State and prove law of conservation of linear momentum.  
 36. State and prove work energy theorem. **(OR)**  
 Derive the Kinetic equations of motion for constant acceleration.  
 37. a) State law of conservation of energy.  
 b) Derive the relation between power and velocity. **(OR)**  
 Explain the motion of two blocks connected by a string in vertical motion.  
 38. Explain why a cyclist bends while negotiating a curved road? Arrive at the expression for angle of bending for a given velocity. **(OR)**  
 Explain in detail the various types of errors.

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