TvI11P

Tirunelveli District Common Examinations
Common Quarterly Examination - September 2022

# Standard 11

## PHYSICS

Time Allowed: 3.00 Hours Maximum Marks: 70

## PART - A

**I. Choose the best answer:** 15×1=15

1) A planet moving along an elliptical orbit is closet to the sun at a distance $r_1$, and farthest away at a distance of $r_2$. If $V_1$ and $V_2$ are linear speeds at these points respectively. Then the ratio $\frac{V_1}{V_2}$ is _____.

a) $\frac{r_2}{r_1}$ b) $\left(\frac{r_2}{r_1}\right)^2$ c) $\frac{r_1}{r_2}$ d) $\left(\frac{r_1}{r_2}\right)^2$

2) The gravitational force between two masses of 1 kg at a distance 1m is _____.

a) $13.74\times10^{-13}$ N b) $6.67\times10^{-11}$ N
c) $3.274\times10^{-11}$ N d) Zero

3) Which one of the following is having more significant figure?

a) 0.007 $m^2$ b) $2.64\times10^{24}$ kg c) 0.0006032 $m^2$ d) 6.3200 J

4) Which of the following is the largest unit of length?

a) Light year b) Astronomical unit c) Parsec d) Kilometer

5) Velocity of a particle is $\vec{V} = 2\hat{i} + t^2\hat{j} - 9\hat{k}$ then the acceleration of a particle at 0.5s is _____.

a) 1 $ms^{-2}$ b) 2 $ms^{-2}$ c) zero d) $-1$ $ms^{-2}$

6) The angle of projection to have maximum range is _____.

a) 30° b) 45° c) 60° d) 90°

7) Centrifugal force will happen at _____.

a) Inertial frame of reference only
b) Rotational motional frame of reference
c) Accelerated frame of reference
d) Inertial, Non Inertial frame of reference

8) Which one is correct for reference λs and λk?

a) $\lambda s > \lambda k$ b) $\lambda s < \lambda k$ c) $\lambda s = \lambda k$ d) None

9) If linear momentum of particle increases by 0.1% then kinetic energy of the particle increases by _____.

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

10) The workdone in moving a body to distance of 15m with a force of 20N at angle of 60° is _____.

a) 300J b) 15J c) 45J d) 150J

11) Couple produces

a) Rotational motion b) Displacement
c) Both Rotational and Displacement d) No motion

12) A force $(4\hat{i} - 3\hat{j} + 5\hat{k})$N acts on a position vector of $(7\hat{i} + 4\hat{j} - 2\hat{k})$m, then the torque about the origin _____.

a) $\tau = (14\hat{i} - 37\hat{j} - 43\hat{k})$ Nm b) $\tau = (43\hat{i} - 37\hat{j} - 14\hat{k})$ Nm
c) $\tau = (14\hat{i} - 43\hat{j} - 37\hat{k})$ Nm d) $\tau = (43\hat{i} - 14\hat{j} - 37\hat{k})$ Nm

13) If a person moves from Chennai to Trichy, his weight _____.

a) increases b) decreases
c) remains the same d) increases and then decreases

14) Among the following equation which one is having dimension of $[M^0LT^{-1}]$

a) $\frac{\sqrt{hG}}{C^{3/2}}$ b) $\frac{1}{C^2}\left[G\frac{e^2}{4\pi\varepsilon_0}\right]^{1/2}$ c) $\frac{mv^2}{r}$ d) $(\varepsilon_0\lambda_0)^{-1/2}$

15) Inertia of a body is directly proportional to _____.

a) Area b) Mass c) Volume d) Velocity

## PART - B

**II. Answer any six of the following. 6×2=12**

**Question Number 24 is compulsory.**

16) Check the equation V = u+at using dimensional formula.

17) Distinguish between velocity and average velocity.

18) State Newton's second law of motion.

19) Why should we not travel on foot board in a bus?

20) Calculate one electric unit (1 unit) in terms of Joule.

21) Define - Centre of Gravity.

22) Whether Angular momentum of planet will change? Justify your answer.

23) Define - Gravitational field. Write the unit.

24) Calculate Centripetal force of a man of mass 60kg is moving with velocity 50 $ms^{-1}$ in circular path of 10m radius.

## PART - C

**III. Answer any six of the following. 6×3=18**

**Question Number 33 is compulsory.**

25) Write the limitations of Dimensional analysis.

26) Obtain the relation between Linear velocity and Angular velocity.

27) Compare similarity and difference between Centripetal and Centrifugal force.

28) State and explain significance of Newton's third law of motion.

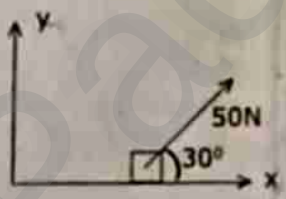
29) Obtain the relation between momentum and Kinetic energy.

30) Compare Rotational and Linear motion. (Any six points)

31) What is Geo-stationary, and Polar satellites? Explain.

32) Explain the term weightlessness using 'lift' motion.

33) Calculate the acceleration of a body of mass 20 kg acted by a force 50N at angle of 30° in x, y direction as shown in figure.




## PART - D

**IV. Answer all questions: 5×5=25**

34) Obtain an expression for escape velocity.

**(OR)**

Explain the types of error.

35) State and explain Triangle law of vector.

**(OR)**

State and prove Law of conservation of linear momentum.

36) Obtain the equation for velocity of a body in elastic collision of one dimensional motion.

**(OR)**

State and explain parallel axis theorem of moment of Inertia.

37) Write with example about the types of equilibrium.

**(OR)**

How does the 'g' varies with (a) altitude (b) depth? Explain.

38) Obtain equation of motion of a body which is
(a) falling down perpendicularly (b) thrown perpendicularly (upwards)

**(OR)**

State and explain work-energy theorem.