O.P. JINDAL SCHOOL, SAVITRI NAGAR
PERIODIC TEST – I (Round-1) (2025-26)

CLASS-XI **MAX.MARKS-20**
SUBJECT-PHYSICS **MAX.TIME-1HOUR**

General Instruction:-

(i)All questions are compulsory .There are 12 questions in this question paper with internal choice.
(ii) **SECTION –A:** Question numbers 1 to 6 are MCQs , carrying 1 mark each.
(iii) **SECTION –B:** Question numbers 7 to 10 are short answer questions carrying 2 marks each.
(iv) **SECTION –C:** Question numbers 11 and 12 are long questions carrying 3marks each.
(v)There will be internal choices in some of the question of section B and section C.

SECTION A

Q1. The dimensions of universal gravitation constant is
(a)$[M^{-1}L^{3}T^{-2}]$ (b)$[ML^2T^{-1}]$
(c) $[M^{-2}L^3T^{-2}]$ (d) $[M^{-2}L^2T^{-1}]$

Q2. The velocity v of a particle at time t is given by v=at+$\frac{b}{t+c}$, where a, b and c are constants. The dimensions of a , b and c are
(a)$[L]$, $[LT]$ and $[LT^{-2}]$
(b) $[LT^{-2}]$, $[L]$ and $[T]$
(c) $[L^2]$, $[T]$ and $[LT^{-2}]$
(d) $[LT^{-2}]$, $[LT]$ and $[L]$

Q3. If y= Asin $\left(\frac{2\pi}{\lambda}(ct-x)\right)$, where x and y are in metre ,then
(a) the unit of λ will be same as that of x and A
(b) the unit of $(ct-x)$ will be same as that of $\frac{2\pi}{\lambda}$
(c) the unit of λ will be same as that of x but not of A
(d) the unit of c is same as that of $\frac{2\pi}{\lambda}$

Q4. $\frac{h}{2\pi}$ is the dimensions of
(a)Velocity (b)Momentum
(c)Energy (d)Power

Q5. The dimensional formula for universal gas constant R is
(a) $[ML^2T^{-2}mol^{-1}K^{-1}]$ (b) $[ML^3T^{-1}mol^{-2}K^{-2}]$
(c) $[M^3LT^{-1}mol^{-1}K^{-1}]$ (d) $[M^3LT^{-2}mol^{-1}K^{-2}]$

Q6. Which of the following pairs does not have same dimensions?

(a)impulse and momentum (b)moment of inertia and torque

(c)angular momentum and Planck's constant (d)work and torque

SECTION B

Q7. The frequency 'f ' of vibration of a stretched string depends upon its length l, its mass per unit length 'm' and the tension T in the string. Obtain dimensionally an expression for frequency f.

OR

Check the correctness of the relation $\tau = I\alpha$, where τ is the torque acting on a body, I is the moment of inertia and α is angular acceleration.

Q8. Find the dimension of $\frac{a}{b}$ in the equation of $F = a\sqrt{x} + bt^2$, where F is the force , x is distance and t is time.

Q9. Find the value of 100 J on a system which has 20 cm, 250 g and half minute as fundamental units of length, mass and time.

OR

Calculate the dimensions of force taking velocity (v), density (ρ) and frequency (f) as basic quantities.

Q10. Write 2 limitations of dimensional analysis.

SECTION C

Q11. (i) Differentiate between Fundamental and derived physical quantities .

(ii)Write the dimensional formula of following physical quantities:

(a)Resistance

(b)Boltzmann's constant

OR

Derive an expression for centripetal force "F" acting on a particle to moves mass "m" moving with a velocity "v" in a circle of radius "r".

Q12. Check the following equation is dimensionally correct:

(i) $S = ut + \frac{1}{2}at^2$, where S is displacement , u is velocity , a is acceleration and t is time.

(ii) $v = \sqrt{\frac{2GM}{R}}$, where v is velocity , G is universal gravitation constant , M is mass and R is radius.

OR

Find the dimensions of a × b in the relation : $P = \frac{b - x^2}{at}$, P is pressure , x is distance and t is time .

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