

O. P. JINDAL SCHOOL, SAVITRI NAGAR
PERIODIC TEST I (2023)

Class : XI
Subject: Physics

MM: 20
Time:1 Hrs.

General Instructions:-

- (i) All questions are compulsory. There are 12 questions in this question paper with internal choices.
(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 3 marks each.
(v) Use of calculator is not permitted. However, you may use log tables, if necessary.

SECTION-A

- Q.1. Force F is given by $F = at + bt^2$, where a, b are constants and t is time. What are the dimensions of a and b ?
- (a) MLT^{-1} and MLT^0 (b) MLT^{-3} and ML^2T^{-4}
(c) MLT^{-4} and MLT^1 (d) MLT^{-3} and MLT^{-4}
- Q.2. $ML^2T^{-3}A^{-1}$ is the dimensional formula of
- (a) electric power (b) charge
(c) electric potential (d) resistance
- Q3. The numerical ratio of displacement to distance for a moving object is
- (a) always less than 1 (b) always equal to 1
(c) always more than 1 (d) equal to or less than 1
- Q4. The slope of tangent of velocity-time graph at any time gives
- (a) final acceleration (b) initial acceleration
(c) instantaneous acceleration (d) average acceleration
- Q.5. If Position of a particle is given by $x = (4t^2 - 8t)$, then which of the following is true?
- (a) Acceleration is zero at $t = 0$ (b) Velocity is zero at $t = 0$
(c) Velocity is zero at $t = 1s$ (d) Velocity and acceleration will never be zero
- Q.6. If the value of work done is $10^{10} \text{ g-cm}^2 \text{ s}^{-2}$, then its value in SI units will be
- (a) $10 \text{ kg-m}^2 \text{ s}^{-2}$ (b) $10^2 \text{ kg-m}^2 \text{ s}^{-2}$
(c) $10^4 \text{ kg-m}^2 \text{ s}^{-2}$ (d) $10^3 \text{ kg-m}^2 \text{ s}^{-2}$

SECTION-B

- Q.7. Draw the Velocity-time graph for the following conditions:
- i) An object moving with increasing acceleration.
ii) An object moving with uniform negative acceleration with positive initial velocity.

Q.8. If the value of universal gravitational constant in SI is $6.6 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$, using dimensional method find its value in CGS System?

OR

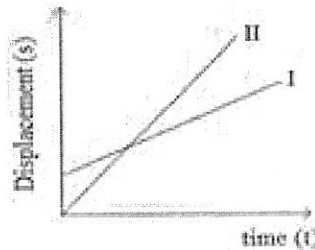
Convert SI unit of work into CGS unit of work using dimensional method.

Q.9. The centripetal force (F) acting on a particle moving uniformly on circular path, depends on the mass (m) of the particle, its velocity (v) and radius (r) of the circle. Derive the expression for centripetal force using dimensional analysis method.

Q.10. If Force (F), velocity (V) and acceleration (A) are taken as the fundamental units instead of mass, length and time, express pressure in terms of F, V and A.

SECTION-C

Q.11.(i) Figure shows displacement – time curves I and II. What conclusions (write 2 points) do you draw from these graphs?



(ii) Displacement of a particle is given by the expression $x = 3t^2 + 7t - 9$, where x is in meter and t is in seconds. What is acceleration?

OR

Sameer went on his bike from Delhi to Gurgaon at a speed of 60 km/hr and came back at a speed of 40 km/hr. What is his average speed and average velocity for entire journey.

Q.12.(i) Derive $s = ut + \frac{1}{2} at^2$ from velocity time graph.

(ii) Draw displacement time graph for uniformly accelerated motion. What is its shape?

OR

(i) Show that area under v-t graph gives displacement covered.

(ii) A balloon is ascending at the rate of 4.9 m/s. A packet is dropped from the balloon when situated at a height of 245 m. How long does it take the packet to reach the ground? What is its final velocity?