

O.P. JINDAL SCHOOL, SAVITRI NAGAR
PERIODIC TEST -II (2023-24)

CLASS-XI
SUBJECT-PHYSICS

MAX.MARKS-20
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 3 marks each.

SECTION-A

Q-1) Two bodies of masses m_1 and m_2 have equal kinetic energies. If P_1 and P_2 are their respective momentum, then $P_1:P_2$ is

- (a) $m_1:m_2$ (b) $m_2:m_1$ (c) $\sqrt{m_1}:\sqrt{m_2}$ (d) $m_1^2:m_2^2$

Q-2) The average power of the force when an object of 15 kg under this force produces an acceleration of 3ms^{-2} and initial and the final velocities are 0 and 2ms^{-1} is

- (a) 60Watt (b) 45Watt (c) 90Watt (d) 120Watt

Q-3) If a box is lying on the floor of a wagon with a coefficient of friction 0.2, what is the maximum acceleration of the wagon for which the box would remain stationary? (Let $g = 9.80 \text{ m/s}^2$)

- (a) 1.96 m/s^2 (b) 2 m/s^2 (c) 3.92 m/s^2 (d) 4 m/s^2

Q-4) A car of mass 1000 kg negotiates a banked curve of radius 90m on a frictionless road. If the banking angle is 45° , then safe speed of the car without skidding is

- (a) 20ms^{-1} (b) 30ms^{-1} (c) 5ms^{-1} (d) 10ms^{-1}

Q-5) A body of mass 10 kg, is moving with a velocity of 5 m/s in a circle of radius 5 m, what is the centripetal acceleration of the body?

- (a) 5m/s^2 (b) 25m/s^2 (c) 0.5 m/s^2 (d) 50 m/s^2

Q-6) Which of the following is not a conservative force?

- (a) Gravitational force (b) Frictional force (c) Spring force (d) Normal reaction

SECTION-B

Q-7)(i) If velocity $v=2t^2+t \text{ ms}^{-1}$ and radius of the circular track is 10m, then find centripetal and tangential acceleration at $t=2$ second.

(ii) If potential energy of a system is given by $U=15x-x^3$, then find position and type of equilibrium.

Q-8) A body of mass 1kg is thrown vertically upward with a velocity of 20ms^{-1} . It momentarily comes to rest after attaining a height of 18 m. How much energy is lost due to air friction ($g=10\text{ms}^{-2}$).

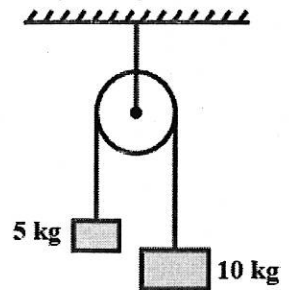
Q-9) The road is banked for a vehicle of mass 200kg and velocity is 10ms^{-1} . If radius of circular track is 20m, then find the magnitude and direction of frictional force, when velocity of vehicle becomes 15ms^{-1} .

Q-10) The conservative force is given by $F_c = 7i+3j$ and initial potential energy is 20J at (1,2) then find final potential energy at (4,3).

SECTION-C

Q-11) Prove that gravitational potential energy of a uniform chain of mass M kg kept on a semi-circular ring of radius R meter is $2MgR/\pi$.

Q-12)(i) Find the work done by tension force and gravitational force on 5kg and 10kg if 5kg moves up and 10kg moves down by 3m respectively.



(ii) Check that $F=3yi+3xj$ is conservative force or not?

OR

If angular displacement is given by $\Theta = t^2+3$ and radius of circular motion is $R=10\text{m}$ then find

(i) ω at $t=2\text{sec}$.

(ii) velocity at $t= 2\text{sec}$

(iii) centripetal acceleration a_c at $t=2 \text{ sec}$
