O.P.JINDAL SCHOOL,SAVITRI NAGAR

PERIODIC TEST –III (Round-2) **(2024-25)**

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. At what height above the surface of the Earth does the acceleration due to gravity reduces by 32% of its value on the surface of Earth? (Radius of Earth=6400km)

(a)1600km (b)4096km

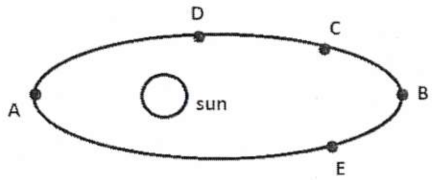
(c) 3200km (d)2304km

Q2. The ratio of the distance of two planets from the sun is 1:2. The ratio of their periods of revolution is

(a)1:4 (b)$1\sqrt{2}$

(c)1:2 (d)$1:2\sqrt{2}$

Q3. The planet mercury is revolving in an elliptical orbit around the sun as shown in the figure. The kinetic energy of mercury will be greatest at



(a)A (b)B

(c)C (d)D

Q4. Find ratio of radius of gyration of a disc and ring of same radii at their tangential axis in plane.

(a) $\sqrt{\frac{5}{6}}$ (b)$\sqrt{\frac{5}{3}}$

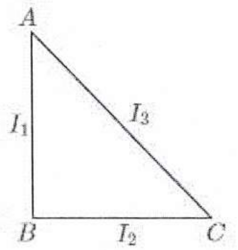
(c)1 (d) $\frac{2}{3}$

Q5. The moment of inertia of a solid sphere about the axis passing through diameter is

(a)$5MR^2/2$ (b)$MR^2/5$

(c) $2MR^2/5$ (d)$3MR^2/5$

Q6. An ABC is a right-angled triangular plate of uniform thickness. The sides are such that AB > BC. As shown in the figure I_1 I_2 and I_3 are moments of inertia about AB, BC and AC respectively. Which of the following relation is correct?



(a)$I_1=I_2=I_3$
(b)$I_2>I_1>I_3$
(c) $I_3>I_2>I_1$
(d) $I_3>I_1>I_2$

SECTION B

Q7. The radius of gyration of a body about an axis at a distance 6 cm from its center of mass is 10 cm. Then find its radius of gyration about a parallel axis through its center of mass.

OR

The moment of inertia of a body is 2.5 kg m^2 .Calculate the torque required to produce an angular acceleration of 18 rad s^{-2} in the body.

Q8. Find the torque of a force 7i - 3j - 5k about the origin which acts on a particle whose position vector $i+j-k$.

OR

(i)Differentiate between translational and rotational motion.
(ii)Write the condition for angular momentum to be conserved about an axis.

Q9. (i)The distance of two planets (neptune and saturn) from sun are 10^{13} and 10^{12} m respectively. Find the ratio of time period of the planets?
(ii)What do you mean by central forces? Give an example

Q10. Write and explain Kepler's first law of planetary motion. Also draw diagram for it.

OR

A body of mass m kg. starts falling from a point 2R above the Earth's surface (where R is the radius of the earth). Prove that its kinetic energy is $\frac{GMm}{6R}$,when it has fallen to a point R above the Earth's surface(where M is the mass of the earth)

SECTION C

Q11. State and prove Kepler's second law of planetary motion.

OR

An artificial satellite circled around the earth at a distance of 3400km. Calculate its orbital velocity and period of revolution. (Take, radius of the earth=6400km and g=9.8ms^{-2})

Q12. The motor of an engine is rotating about its axis with an angular velocity of 100 rpm It comes to rest in 15 s after being switched off. Assuming constant angular deceleration, calculate the number of revolutions made by it before coming to rest

OR

What will be duration of day if earth suddenly shrinks to $\frac{1}{27}^{th}$ of its original volume, mass being unchanged?

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