

TEST – 4
CHAPTER - 5

Physics (New Scheme)	Inter Part I	GROUP I / II
Time : 20 Min.	OBJECTIVE TYPE	Marks:17

Note:- You have four choices for each objective type question as A,B,C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero in that question.

- 1.1 When a body moves in circle, the angle between its liner velocity v and angular velocity ω is.
(A) 180° (B) 90° (C) 0° (D) 45°
2. SI unit of angular displacement is.
(A) Metre (B) Degree (C) Revolution (D) Radian
3. Moment of inertia is measured in.
(A) kgm^2 (B) kgm^{-2} (C) rad s^{-1} (D) Js
4. The linear velocity of disc moving down an inclined plane is.
(A) $\sqrt{gh}$ (B) $\sqrt{\frac{4}{3}gh}$ (C) $\sqrt{\frac{2}{3}gh}$ (D) $\sqrt{\frac{1}{3}gh}$
5. The speed of a hoop at the bottom of inclined plane can be given by
(A) $V = \sqrt{gh}$ (B) $V = \sqrt{2gh}$ (C) $V = \sqrt{\frac{4gh}{3}}$ (D) $V = \sqrt{\frac{4}{3}gh}$
6. The ratiion between orbital and escape velocities are.
(A) 1 (B) 2 (C) $\sqrt{2}$ (D) $\frac{1}{\sqrt{2}}$
7. The weight of the body at the centre of Earth is.
(A) Maximum (B) Minimum (C) Zero (D) Infinite
8. In angular velocity of particle rotating in a circle is doubled then its moment of inertia.
(A) Remains the same (B) Become half (C) Become doubled (D) Become 4 times.
9. The direction of angular velocity is determined by.
(A) Left hand rule (B) Head to tail rule (C) Right hand rule (D) General rule
10. π radian equal
(A) 60° (B) 90° (C) 180° (D) 360°
11. Which one of the following is not directed along the axis of rotation?
(A) Angular acceleration (B) Angular momentum
(C) Centripetal acceleration (D) angular displacement
12. The unit of angular momentum is.
(A) N-S (B) J-S (C) m-s (D) Kgms^{-1}
13. The diver spins faster when moment of inertia becomes.
(A) Smaller (B) greater (C) Constant (D) Equal
14. The ratio of the momentum of inertial of disc and hoop is.
(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{3}{4}$ (D) $\frac{3}{2}$
15. Angular momentum of rigid body is given by.
(A) $I^2\omega$ (B) $I\omega^2$ (C) $I^2\omega^2$ (D) $I\omega$
16. Moment of inertia of thin rod is given by relation.
(A) $\frac{1}{12}mL^2$ (B) $\frac{2}{5}mR^2$ (C) $12mL^2$ (D) $\frac{5}{7}mR^2$
17. Orbital speed of satellite can be determined by.
(A) $v = \frac{2\pi r}{t}$ (B) $v = \sqrt{\frac{GM}{r}}$ (C) $v = \sqrt{gR}$ (D) $v = \sqrt{\frac{2GM}{R}}$

TEST – 4
CHAPTER NO.5

Physics (New Scheme)	Inter Part I	GROUP I / II
Time : 2:40 hours.	SUBJECTIVE TYPE	Marks:68

SECTION - I

2. Write short answers to any EIGHT (8) questions.

(8x2=16)

- Derive the relation between linear and angular velocity.
- Explain the difference between tangential velocity and angular velocity.
- When mud flies off the tyre of a moving bicycle, in what direction does it fly?
- Explain what is meant by centripetal force and why it must be furnished to an object if the object is to follow a circular path.
- What is meant by moment of inertia? Explain its significance.
- State the direction of the following vectors in simple situation.
i) Angular momentum ii) Angular velocity.
- Why does a diver change his body position before and after diving in the pool?
- Show that orbital angular momentum $L_o = mvr$.
- What is meant by angular momentum? Give its unit.
- Find the rotational kinetic energy of a Disc.
- Differentiate between apparent weight and real weight.
- Describe what should be the minimum velocity for a satellite. To orbit close to the earth around it.

3. Write Short answers to any EIGHT (8) questions.

(8 x 2 =16)

- How is artificial gravity created?
- Why the microwaves are used in satellite communication?
- Why Einstein view of gravitation are preferred than Newton's view of gravitation? Explain briefly.
- Explain how many minimum numbers of geo-stationary satellites are required for global coverage of T.V. transmission.
- Explain why earth's satellite despite of being freely falling object does not reach the earth.
- State the law of conservation of angular momentum.
- Explain what is meant by centripetal force and why it must be furnished to an object if the object is to follow a circular path.
- Show that $1 \text{ radian} = 57.3^\circ$
- State the right-hand rule to find the direction of angular displacement.
- What is meant by centripetal force? Write down its formula.
- What is meant by angular momentum? State the law of conservation of angular momentum.
- A disc and a hoop start moving down from the top of an inclined plane at the same time. Which one will be moving faster on reaching the bottom?

4. Write Short answers to any SIX (6) questions.

(6 x 2 = 12)

- What are Artificial Satellites?
- What will be the effect on moment of inertia of cylinder about its axis if its diameter is doubled?
- Write down applications of communication satellites.
- What are geostationary orbit and geostationary satellites.
- A disc is rolling down on an inclined. Find a relation for the speed of disc at its bottom.
- Define angular momentum and give its dimensions.
- Why banked tracks are needed for turns?
- Define weightlessness and gravity free system.
- Why is the axis of rotation of Earth remains fixed in one direction with respect to the universe around it.

SECTION – II

Note: Attempt any THREE (3) questions:

(3 x 8 = 24)

5. (a) What are Geostationary Satellites? Derive the relation for radius of Geostationary Orbit.
(b) What should be the orbital speed to launch a satellite in a circular orbit 900 km above the surface of the earth.
6. (a) Define rotational Kinetic energy. Also derive an expression for rotational K.E of a disc and a hoop.
(b) A 1000 kg car travelling with a speed of 144 kmh^{-1} around a curve of radius 100 m. find the necessary centripetal force.
7. (a) What is meant by centripetal force? Show by mathematical proof that $a_c = v^2 / r$
(b) A body of moment of inertia $I = 0.80 \text{ kgm}^2$ about a fixed axis rotates with constant angular velocity of 100 rad s^{-1} . Calculate its angular momentum and torque to sustain this motion.
8. (a) What are artificial satellites? Find the expression for velocity and period to put a satellite into the orbit.
(b) The earth rotates on its axis once a day. Suppose by some process the earth contracts so that its radius is only half as large as at present. How fast will it be rotating then? (For sphere $I = \frac{2}{5} M r^2$).
9. (a) Explain rotational kinetic energy. Find rotational kinetic energy of a disc and hoop.
(b) A gramophone record turntable accelerates from rest to an angular velocity of $45.0 \text{ rev min}^{-1}$ in 1.60 s. What is its average angular acceleration?



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