End Sem(I) UG.

PHYSICS (GE-01)

2021

Time: 3hours

Full Marks: 75

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Answer from both the groups as directed.

GROUP-A

(Very-short answer Type questions) $10 \times 1 = 10$

1. (a) If $\vec{a} \cdot \vec{b} = |\vec{a} \times \vec{b}|$. What is the angle between vectors $\vec{a}$ and $\vec{b}$?

(b) What is the order and degree of the given differential equation -

$$2\left(\frac{d^2y}{dx^2}\right)^2 + 3\frac{d^3y}{dx^3} + 2y = 0$$

(c) What is relation between work done by a force and Kinetic energy?

(d) What is unit and dimension of gravitational constant?

(e) What is conservation of angular momentum?

(f) What is weightlessness?

(g) Write down differential equation of SHM (Simple Harmonic Motion).

(h) What is HOOKE's law in Elasticity?

(i) What is limit of POISSON's ratio?

(j) What is Kepler's third law of planetary motion?

2. State and prove the conservation of momentum. — 05

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GROUP-B

Answer any four questions $15 \times 4 = 60$

3. Write down the general form of second order homogeneous differential equation with constant coefficients and give its solution.

4. What is Newton's Law of gravitation? Obtain expression for the orbital velocity and time period of a satellite moving in circular orbit.

5. What is simple harmonic motion? Show that the total energy of a particle executing SHM remains constant.

6. What are elastic constants? Establish relation between the elastic constants.

7. Obtain expression for the following-
   (i) Work done in stretching a wire.
   (ii) Work done in twisting a wire.
   (iii) Twisting couple on a cylinder.

8. What are postulates of special Theory of relativity? Obtain expression for the Length contraction and Time dilation.