

A. A. V. PATEL JUNIOR COLLEGE
EXCELLENCE PROGRAM SYJC (TUTORIAL)

PHYSICS

GRAVITATION

M.M. 25

Question 1 to 5 Carry 1M each

1. State Newton's law of Gravitation.
2. Draw graph showing the variation of gravitational acceleration due to depth and altitude from the earth's surface.
3. Define periodic time of a satellite.
4. Density of the earth is 5478 kg/m^3 . Assuming the earth to be homogeneous sphere. Calculate the value of g on the surface of the earth.
[Given $G = 6.673 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$, $R = 6400 \text{ km}$]
5. Define escape velocity.

Question 6 to 8 Carry 2M each

6. What is geostationary satellite? State its uses.

7. Explain why an astronaut in an orbiting satellite has a feeling of weightlessness?

8. Calculate the escape velocity of a body from the surface of the earth. Given: $G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$
 $R = 6400 \text{ km}$, $g = 9.8 \text{ m/s}^2$.

Question 9 to 11 Carry 3 Marks each.

9. Define critical velocity of a satellite and obtain the expression for it.

10. State the Kepler's law of planetary motion.

11. Two bodies of masses 5 kg and $6 \times 10^{24} \text{ kg}$ are placed with their centres $6.4 \times 10^6 \text{ m}$ apart. Calculate the force of attraction between the two masses and the initial acceleration of the two masses.

Question 12 Carry 5 Marks

12. Discuss the variation of acceleration due to gravity 'g' with depth. Derive the formula.