

Model Question Paper 3
Gravitation and Space Science 3

11th Standard

Physics

Reg.No. :

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Answer all the Questions

Time : 01:00:00 Hrs

Total Marks : 50

Part A

2 x 1 = 2

- 1) Which of the following objects do not belong to the solar system?
(a) Comets (b) Nebulae (c) Asteroids (d) Planets
- 2) According to Kepler's law, the radius vector sweeps out equal areas in equal intervals of time. The law is a consequence of the conservation of
(a) angular momentum (b) linear momentum (c) energy (d) all the above

Part B

8 x 2 = 16

- 3) Mention the special features of Newton's universal gravitation law.
- 4) What is acceleration due to gravity?
- 5) The radius of the earth is 6.38×10^6 m. Its acceleration due to gravity is 9.8 m/s^2 . Calculate the mass of the earth.
- 6) How does acceleration due to gravity vary with altitude and depth?
- 7) How does acceleration due to gravity vary with latitude?
- 8) What is meant by action at a distance?
- 9) Define gravitational potential difference.
- 10) What is escape speed?

Part C

4 x 3 = 12

- 11) If the diameter of the Earth becomes two times its present value and its mass remains unchanged, then how would the weight of an object on the surface of the Earth be affected?
- 12) Assuming the Earth to be a sphere of uniform density, how much would a body weigh, one-fourth down to the centre of the Earth, if it weighed 205 N on the surface?
- 13) What is the value of acceleration due to gravity at an altitude of 500 km? The radius of the Earth is 6400 km.
- 14) What should be the angular velocity of the Earth, so that bodies lying on equator may appear weightless? How many times this angular velocity is faster than the present angular velocity? (Given: $g = 9.8 \text{ m s}^{-2}$; $R = 6400 \text{ km}$)

Part D

4 x 5 = 20

- 15) State Kepler's laws of planetary motion.
- 16) What are asteroids?