

Model Question Paper
Gravitation and Space Science

11th Standard

Physics

Reg.No. :

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Answer all the Questions

Time : 01:00:00 Hrs

Total Marks : 40

Part A

4 x 1 = 4

- 1) If the distance between two masses is doubled, the gravitational attraction between them
(a) is reduced to half (b) is reduced to a quarter (c) is double (d) becomes four-time
- 2) The acceleration due to gravity at a height $(1/20)$ th the radius of the earth above the Earth's surface is 9ms^{-2} . Its value at a point at an equal distance below the surface of the earth is
(a) 0 (b) 9ms^{-2} (c) 9.8ms^{-2} (d) 9.5ms^{-2}
- 3) The weight of a body at Earth's surface is W. At a depth halfway to the center of the Earth, it will be
(a) W (b) $W/2$ (c) $W/4$ (d) $W/8$
- 4) Force due to gravity is least at a latitude of
(a) 0° (b) 45° (c) 60° (d) 90°

Part B

7 x 2 = 14

- 5) Why is the gravitational force of attraction between the two bodies of ordinary masses not noticeable in everyday life?
- 6) State the universal law of gravitation.
- 7) Define gravitational constant. give its value, unit and dimensional formula.
- 8) What are the factors affecting the 'g' value?
- 9) Why a man can jump higher on the Moon than on the Earth?
- 10) The acceleration due to gravity varies with
(i) altitude and
(ii) depth.

Prove.

- 11) Discuss the variation of g with latitude due to the rotation of the Earth.

Part C

4 x 3 = 12

- 12) Two spheres of masses 10 kg and 20 kg are 5 m apart. Calculate the force of attraction between the masses.
- 13) What will be the acceleration due to gravity on the surface of the moon, if its radius is $\frac{1}{4}$ th the radius of the Earth and its mass is $\frac{1}{80}$ th the mass of the earth? (Take g as 9.8ms^{-2})
- 14) The acceleration due to gravity at the moon is 1.67ms^{-2} . The mass of the earth is about 81 times more massive than the moon. What is the ratio of the radius of the Earth to that of the moon?

- 15) 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?

Part D

2 x 5 = 10

- 16) Calculate the speed with which a body has to be projected vertically from the Earth's surface, so that it escapes the Earth's gravitational influence. ($R = 6.4 \times 10^3 \text{ km}$; $g = 9.8 \text{ m s}^{-2}$).
- 17) Jupiter has a mass 318 times that of the Earth and its radius is 11.2 times the radius of the Earth. Calculate the escape speed of a body from Jupiter's surface. (Given : escape speed on Earth is 11.2 km s^{-1})

