Model Question Paper

Laws of Motion and Gravitation (P) - Part II

10th Standard

Science

Reg.No. : | | | | | | |

I.Answer all the questions.

II.Use blue pen only.

Time : 01:00:00 Hrs

Total Marks : 36

Part-A

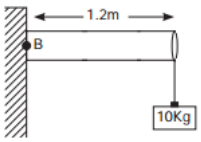
5 x 1 = 5

1) List out the names of the organisations which are not associated with Chandrayaan-I mission from the following:ISOR, BARC, NASA, ESA, WHO, ONGC
2) Two objects of same mass, namely A and B hit a man with a speed of 20 km/hr and 50 km/hr respectively and comes to rest instantaneously. Which object will exert more force on that man? Justify your answer.
3) An object is moving with a velocity of 20 m/s. A force of 10 N is acting in a direction perpendicular to its velocity. What will be the speed of the object after 10 seconds?
4) If the radius of the earth is reduced to half of its present value, with no change in the mass, how will the acceleration due to gravity, be affected?
5) Selvi placed her purse on the passenger's seat of her car when she drove to work. By the time she reached her office, her purse had fallen on the floor in front of the passenger's seat. Why did this happen? Explain.

Part-B

8 x 2 = 16

6) A 10 Kg mass is suspended from a beam 1.2 m long. The beam is fixed to a wall. Find the magnitude and direction (clockwise or anti-clockwise) of the resulting moment at point B.



7) If the force experienced by a body of unit mass is gravitational field strength, find the gravitational field strength on the surface of the earth.
8) If the density of the earth is doubled to that of its original value, the radius remaining the same, what will be the change in acceleration due to gravity?
9) Renu is standing in a dining line 6.38×10^3 km from the centre of the earth. The mass of the earth is 6×10^{24} kg. i) Find the acceleration due to gravity. ii) Will the value change after she finishes her lunch?
10) If an angel visits an asteroid called B 612 which has a radius of 20 m and mass of 104 kg, what will be the acceleration due to gravity in B 612 ?.
11) A man of mass 'm' standing on a plank of mass 'M' which is placed on a smooth horizontal surface, is initially at rest. The man suddenly starts running on the plank with a speed of 'v' m/s with respect to the ground. Find the speed of the plank with respect to the ground.
12) Two balls of masses in ratio 2:1 are dropped from the same height. Neglecting air resistance, find the ratio of i) the time taken for them to reach the ground. ii) the forces acting on them during motion. iii) their velocities when they strike the ground. iv) their acceleration when they strike the ground.
13) An object of mass 1 kg is dropped from a height of 20 m. It hits the ground and rebounds with the same speed. Find the change in momentum.(Take g=10 m/s^2)

Part-C

3 x 5 = 15

14) State Newton's law of gravitation. Write an expression for acceleration due to gravity on the surface of the earth. If the ratio of acceleration due to gravity of two heavenly bodies is 1:4 and the ratio of their radii is 1:3, what will be the ratio of their masses?
15) A bomb of mass 3 kg, initially at rest, explodes into two parts of 2 kg and 1 kg. The 2 kg mass travels with a velocity of 3 m/s. At what velocity will the 1 kg mass travel?
16) Two ice skaters of weight 60 kg and 50 kg are holding the two ends of a rope. The rope is taut. The 60 kg man pulls the rope with 20 N force. What will be the force exerted by the rope on the other person? What will be their respective acceleration?

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