Set - A

SAMAGRA SHIKSHA, KERALA

SECOND TERM EVALUATION 2023-24

PHYSICS

Standard: IX

Time : 1½ Hour
Total Score : 40

Instructions

- First 15 minutes is given as cool off time. This time is to be spent for reading and understanding the questions.
- Answer the questions based on instructions.
- Answer the questions according to score and time

Answer any three questions from 1 to 4. (One score each) **(3 x1 = 3)**

1. What is the value of the Gravitational constant G? (1)

   6.67×10^{-10} Nm^2/kg^2 66.7×10^{-11} Nm^2/kg^2

   6.67×10^{-11} Nm^2/kg^2 667×10^{-11} Nm^2/kg^2

2. Identify the relation in the first pair and complete the second. (1)

   Particles of chalk stick on black board : Adhesive force
   Water wets glass plate : .....

3. An object of mass 10 g is falling from a height with constant velocity. The net force experienced by the object will be:

   (100 N, 0 N, 1 N, 0.01 N) (1)

4. The ability to do work is energy. What is its SI unit? (1)

Answer any Seven questions from 5 to 13. (2 score each) **(7 x2 = 14)**

5. The relative density of kerosene is 0.81 and that of ice is 0.9.

   a) What do you mean by relative density? (1)

   b) Will a small piece of ice float on kerosene? Justify. (1)

6. Rewrite the following statements by changing the underlined words if they are wrong.

   a) The area under a velocity-time graph gives the magnitude of acceleration. (1)

   b) The size of the graph decreases as we decrease the scale considered, but the value does not change. (1)

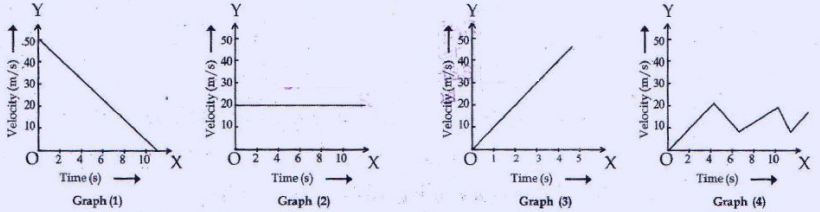
7. State the Newton's law of motion that defines inertia. (2)

8. Fill in the blanks: (2)

Mass of bodies (kg)		Distance	Gravitational
m_1	m_2	d (m)	force (N)
10	20	(a)	8×G
10	10	2	(b) .....

9. A heavy object on a floor is dragged to certain distance. Identify the positive work and negative work in this situation. (2)

10. Observe the following graphs and answer the questions:



a) Identify the graph which indicates the motion of a body without acceleration. (1)

b) Which graph indicates the motion of a freely falling body? (1)

11. Classify the statements according to their inertia. (2)

a) Dust comes out of a hanging mat when beaten with a stick.

b) Athletes take a short run before doing a long jump.

c) A fan continues its rotation for sometime even after it is switched off.

d) Passengers standing in a bus tend to fall backwards when the bus suddenly starts moving forward.

Inertia of rest	Inertia of motion

12. Identify the energy transformation in the following equipments when they are operated.

a) Electric bulb b) Electric motor (2)

13. At the time of catching a cricket ball, the fielder moves his hands backwards along with the ball.

a) What is the scientific fact behind this? (1)

b) Write down another situation in daily life making use of the same fact. (1)

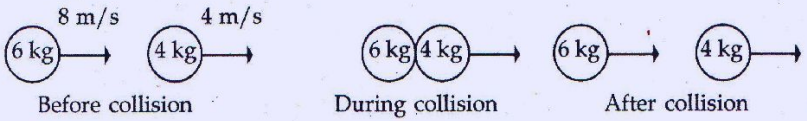
Answer any five questions from 14 to 19. (3 score each) **(5 x3 = 15)**

14. Equal quantities of honey, water and kerosene are allowed to flow down along a slanted glass plate.

    a) Which liquid has the least speed? (1)

    b) Name the liquid property responsibile for this. Define this property. (2)

15. The following figure shows the motion of two bodies along a straight line. Their masses and velocities are indicated.



    a) Find the total momentum of the bodies before collision. (1)

    b) How much is the total momentum after collision. (1)

    c) State the law which helped you to arrive at the above conclusion. (1)

16. The mass of lander module of Chandrayan-3 is 1752 kg including rover.

    a) Find its weight on the surface of the earth in the unit newton (Assume g = 10 m/s^2) (1)

    b) What will be its weight after landing on the moon? (2)

    (Assume that the value of g on the Moon = 1.6 m/s^2)

17. Consider the following situations.

    • Stretched bow • An aeroplane flying at certain height • A wound spring

    a) Which of the above possess both potential energy and kinetic energy? (1)

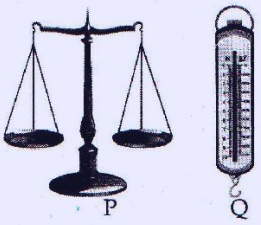
    b) Write down the type of mechanical energy possessed by the other two bodies. (2)

18. A boy of mass 40 kg is riding along a circular path on a bicycle of mass 10 kg. The radius of the circular path is 30 m.

    a) What will be the centripetal force experienced if the boy rides the bicycle with a speed of 6 m/s? (2)

    b) Suggest any two means to reduce the centripetal force in such situations. (1)

19. Observe the following figures.



    a) Which of these instruments is used to measure mass? (1)

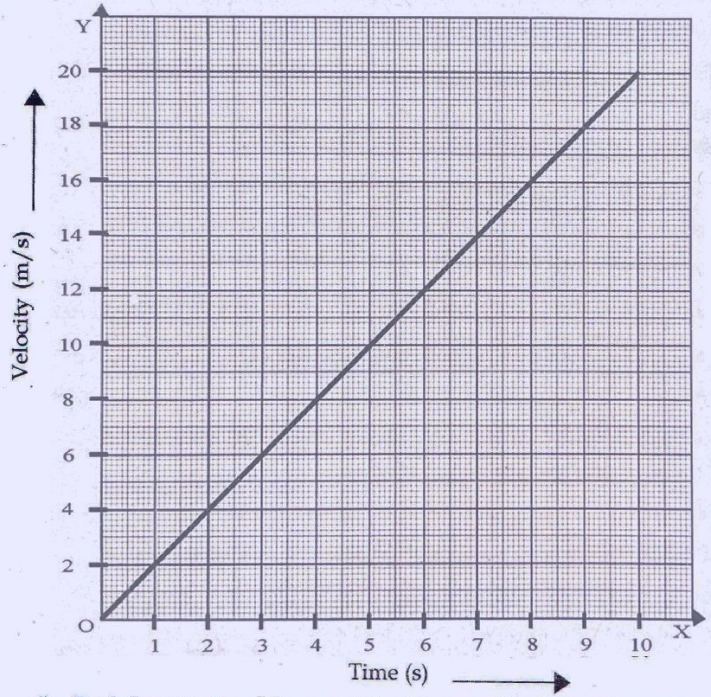
    b) An object of mass 5 kg is hung on the instrument Q. When this arrangement is taken to the poles, the reading of the instrument increases. Explain the reason. (2)

Answer any two questions from 20 to 22. (4 score each) **(2 x 4 = 8)**

20. A body of mass m kg is allowed to fall down freely from a certain height.
    a) What is its weight during the free fall? Why? (2)
    b) Derive the equation for the acceleration of this body in terms of mass of the Earth (M), radius of the Earth (R) and Gravitational constant (G). (2)

21. The mass of a toy car is 200 g. The spring in it is wound tight and the car is released on to a floor. The car moves with a velocity of 0.25 m/s
    a) What is the energy transformation when the car is in motion? (1)
    b) Calculate the kinetic energy attained by the car. (2)
    c) Calculate the work done during the motion of the car. (1)

22. The following graph represents the motion of a car of mass 800 kg with uniform acceleration. Analyse the graph and answer the questions.



    a) Find the velocity of the car at the 3rd second and the 9th second. (1)
    b) Calculate the momentum of the car at these instants. (1)
    c) Find the rate of change of momentum of the car. (1)
    d) What is the magnitude of force acting on the car? (1)