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Class: EM - CLASS 10 **Subject:** Science and Technology - Part 1
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1) Multiple Choice Questions **(4)**

(1) Mass is a ..... quantity.

a) scalar
b) both (a) and (b)
c) vector
d) None of these

Answer: Scalar

(2) Value of G is ..... .

a) $6.67 \times 10^{-11}\ Nm^2kg^{-2}$
b) $9.8 \times 10^{-11}\ Nm^2\ kg^2$
c) $6.67 \times 10^{-23}\ Nm^2\ kg^{-2}$
d) $9.8\ m/s^2$

Answer: $6.67 \times 10^{-11}\ Nm^2kg^{-2}$

(3) Newton invented a new branch of mathematics, this is called ..... .

a) topology
b) game theory
c) order theory
d) calculus

Answer: Calculus

(4) The object tries to go towards the centre of the circle because of ..... force.

a) centripetal
b) gravitational
c) centrifugal
d) magnetic

Answer: Centripetal

2) Match the pair **(2)**

(1)

Column "A"	Column "B"
1. Mass	a. Newton
2. Weight	b. Kg
3. Velocity	c. Nm^2kg^{-2}
4. Gravitational force	d. m/s

Answer: 1) - b, 2) - a, 3) - d, 4) - c

(2)

Column "A"	Column "B"
1. Mass	a. m/s^2
2. Weight	b. Kg
	c. Nm^2/Kg^2
	d. N

Answer: 1 - b 2 - d

3) Find the odd one out **(4)**

(1) Acceleration, mass, force, weight

a) Acceleration
b) force,
c) mass
d) weight

Answer: mass

(2) Mass, potential energy, radius, weight

a) Mass
b) radius
c) potential energy
d) weight

Answer: weight

(3) Grams, Newton, Centimeters, Dyne

a) Grams
b) Centimeters
c) Newton
d) Dyne

Answer: Newton is an S.I. unit while others are C.G.S units.

(4) Gravitational Force, centripetal force, gravitational constant, weight of an object.

a) Gravitational Force
b) Gravitational constant
c) Centripetal force
d) Weight of an object

Answer: Gravitational constant value remains same across the universe while remaining vary with space and time.

4) Find co-related terms **(4)**

(1) Object in motion : kinetic energy :: Object in stable position : _____

Answer: Potential energy

(2) Force : dynes :: velocity : _____

Answer: cm/s or cm s^{-1}

(3) Gravitation : Newton :: Planetary motion : _____

Answer: Kepler

(4) Increasing magnitude : Acceleration :: Decreasing magnitude : _____

Answer: Deceleration

5) State true or false **(4)**

(1) Newton gave the three laws of planetary motion.

Answer: False

(2) The Difference of the distances to the two focal points from every point on the curve is constant.

Answer: False

(3) Value of g varies with altitude.

Answer: True

(4) The force of gravity due to the earth acts on each and every object.

Answer: True

6) Distinguish between **(4)**

(1) Distinguish between : Potential Energy and Kinetic Energy

Answer: Potential Energy:

i. Energy possessed by an object due to its position or state is called potential energy.
ii. It depends on the height and gravitational acceleration.
iii. It does not depend on velocity of the object.

iv. It is given by PI = mgh .
v. Potential energy can be positive or negative.

Kinetic Energy:
i. Energy possessed by an object due to its motion is called kinetic energy.
ii. It depends on mass and velocity height or gravitational acceleration.
iii. It depends on the final velocity of the object.
iv. It is given by KE = 1/2 mv^2 .
v. Kinetic energy is always positive.

(2) Distinguish between : Mass and Weight

Answer: Mass:
i. Mass is the amount matter present in an object.
ii. Mass is measured in kilograms as SI unit.
iii. Mass of any object is universally constant and does not change.
iv. Mass is a primary quantity and cannot be formulated for measurement.
v. Mass is measured by a beam balance.

Weight:
i. Weight is the force on an object due to gravitational pull.
ii. Weight is measured in Newton as SI unit.
iii. Wight changes with the change in Gravitational acceleration.
iv. Weight is a secondary quantity and depends on mass and gravitational acceleration, given as W = mg.
v. Weight is measured by a spring balance.

7) Give scientific reasons **(4)**

(1) Inert or noble gases have zero valency.

Answer: i. Inert or noble gases neither lose or gain electrons. They have stable configuration.
ii. Thus, their octet is complete.
iii. Therefore, Inert or noble gases have zero valency

(2) A body weighs more at poles and less at equator.

Answer: i. The weight of an object is defined as the force with which the earth attracts the object. It is given as, W = F = mg
ii. The weight of an object depends on the mass of the object and the value of acceleration due to gravity.
iii. On the surface of the earth, the value of g is highest at the poles and decreases slowly with decreasing latitude becoming lowest at the equator. Hence, a body weighs more at the poles and less at equator.

8) Answer the following **(4)**

(1) What is free fall? When is it possible?

Answer: i. The motion of any object under the influence of the force of gravity alone is called as free fall. Free fall is possible only in the absence of air or vacuum.
ii. When a ball and a feather is thrown from a height, feather falls on the ground first. But in a vacuum both ball and feather will reach the ground together.

(2) Define : (a) escape velocity (b) centripetal force

Answer: (a) **Escape velocity**: Escape velocity is the minimum speed needed for an object to escape from the gravitational influence of a massive body.
(b) **Centripetal force:** A force acts on any object moving along a circle and it is directed towards the centre of the circle. This is called the centripetal force.