**1st Sec. Physics Revision**

**Part I**

**[1] Write the scientific term:**

1. The force when acts on an object of mass 1kg accelerates it at 1m/s2

2. The tendency of an object to keep its state of rest or state of motion with uniform velocity.

3. The resistance of an object to change its state of rest or motion.

4. Mathematical formula of Newton's first law.

5. The time rate of change in linear momentum.

**[2] Write two factors on which each of the following depends:**

1. The momentum of the moving object.

**[3] Problems:**

**1.** A force of 100N acting on an object of mass 10kg and changed its velocity from 10m/s to 20m/s. Calculate the distance it moved during the change in its velocity.

**2.** A force of 100N acts on a body of mass 10kg to accelerate it 6m/s2 . find the friction force between the body and the surface.

**3.** Find the force causing a car of mass 1200kg to change its velocity by the rate of 2.5m.s-1 every one second.

**4.** A crane pulls a car with a force of 3000 N to accelerate it at 3m/s2. Find the mass and the weight of the car. ( g = 9.8 m/s)

**[4] What is meant by:**

1. Weight of an object = 30N

2. Inertia

3. The momentum of a moving body

**[5] Give reason for:**

1. Passengers in bus fall forwards when it stops suddenly.

2. Although the action and reaction arte equal. It is not a must to result in equilibrium.

**[6] Choose:**

1. If the force acting on a moving object is doubled, while its mass is decreased to half, acceleration of its motion ……………………….

**a. decreases to half b. increases to half c. increases four times**

**[7] Write down the mathematical formula needed to calculate each of the following physical quantities:**

1. Resultant force using acceleration and mass.

**[8] What happens when:**

1. A driver of a fast moving car stops the car suddenly.

**[9] Write the measuring unit of the following:**

1. Momentum

**Part II**

**[1] Write the scientific term:**

1. An acceleration of object that is due to the change in the direction rather than magnitude of the velocity of such object

 **[2] Problems:**

**1.** An object of mass 100 grams moves in a circle of radius 50cm it takes 90 seconds to make 45 revolutions. Calculate:

a. The periodic time

b. The velocity

c. The centripetal acceleration

**2.** A satellite rotates around the Earth in a circular path at a height 900 km away from earth surface. Calculate:

a. The orbital velocity

b. The periodic time

Where: R=6400km, MEarth = 6 x 1024kg, G=6.67 x 10-11 N. m2/kg2

**3.** A body has a mass of 50 kg on Earth where the acceleration due to gravity = 9.8 m/s2. Find:

a. The body weight on Earth

b. The body mass on Moon

**4.** Landsat is an earth imaging satellite that takes pictures of Earth ozone layer and geological features. It orbits Earth at height of 912 km .

Knowing that The gravitational constant = 6.67 x 10-11N.m2/kg2.

Mass of the Earth = 5.97 x 1024 kg, radius of the Earth = 6.38 x 106 m

1. Mention one factor that affects the orbital velocity of the satellite.
2. Mention a physical quantity concerns the satellite has no effect on the orbital velocity of satellite.
3. Calculate the orbital speed of the satellite
4. Calculate the time taken for the satellite to complete one cycle around the Earth.

**[3] What is meant by:**

1. The gravitational field intensity of Earth

**[4] Give reason for:**

1. Huge telescopes roaming in the space and can image the orbs accurately

2. It is dangerous to move at high velocity in curved roads.

3. The orbital velocity of the satellite of a small mass equals the velocity of a big mass.

4. The driver must decrease the velocity in the curved path

5. Newton's third law is the principle of the rocket.

6. Rockets need no fuel at high altitudes.

7. Despite of huge distance between planets, yet the gravitational force between them huge.

8. An object moving in a circle of radius [R] m and covering a distance of [2ЛR] m has zero displacement.

 **[5] Choose the most correct answer from the given answers:**

1. An object moves in a circle, if its velocity is doubled and the radius is halved, the centripetal force is ……………………….

**a. doubled b. increase 4 times c. increase 8 times d. halved**

2. The dimensions of the general gravitational constant is ……………….

**a. MLT-1 b. ML2T-2 c. M-1L3T-2**

3. If an object moves in a circular path, its velocity changes in …………….

**a. magnitude only b. direction only**

**c. magnitude and direction d. no correct answer**

4. The mass of an object is measured on Earth. The mass is 5kg. The object is taken to the Moon. The mass of the object is measured on the Moon. What is the mass of the object on the Moon?...........................

**a. 0kg b. More than 0kg , but less than 5kg**

**c. 5kg d. More than 5kg**

5. A car moved around a circular path of a constant radius at a constant speed. Which of the following statements is true?..........................

**a. The car velocity is constant b. The car acceleration is constant**

**c. The car velocity is directed towards the center**

**d. The car velocity acceleration is directed towards the center.**

6. When the velocity of an object moving in a circular path is doubled, the force needed to keep such object in track will …………………….

**a. be the same b. increase 4 time c. decrease to quarter**

7. m3.kg-1.s-2 is the measuring unit of …………………….

**a. mechanical energy b. friction force c. gravitational constant**

**[6] Write down the mathematical formula needed to calculate each of the following physical quantities:**

1. Gravitational field intensity at a point near to a certain planet.

2. The orbital velocity of the satellite and its orbital radius.

3. The acceleration due to gravity at orbit around the earth and the universal gravitational constant

**[7] What happens when:**

1. The driver of a heavy fast moving car does not slow down round dangerous turns.

2. A motorbick racer leans or swing his body right and left while driving .

**[8] Compare between:**

1. Linear acceleration and centripetal acceleration from the point of view of mathematical relation.

**[9] Write the suitable physical quantities for the following units:**

1. N2.m2/kg

**[10] Graphs:**

1. An object moves in a circular path where the following table relate centripetal acceleration and reciprocal of its radius:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ac (m/s2) | 40 | 80 | 120 | 160 | 200 | 240 | 280 |
| 1/r (m-1) | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |

1. Draw the graph between (ac) on the Y-axis and (1/r) on the X-axis.
2. From the graph find the tangential velocity of the object.

**[11] Prove that:** 1. The orbital velocity of a satellite : v = $\sqrt{G\frac{M}{r}}$

**[12] What is the function of :** 1. Remote sensing satellite

**[13] Explain , when does each of the following physical quantities are equal numerically:**The weight of an object on Earth and Earth field intensity.

**[14] Give one example for:**1. Centripetal force 2. Satellites

**Part III**

**[1] Write the scientific term:**

1. Work done by a force of 1N to move an object through a displacement of 1m in the direction of work.

2. The stored energy due to the position of the object.

**[2] Write two factors on which each of the following depends:**

1. Potential energy

**[3] Problems:**

**1.** A force of 100 N acts on an object to displace it through 2.5m. Find the work done by this force in the following cases:

a. If the force acts in the same direction of the object motion.

b. If the force direction makes an angle 600 to the direction of the object motion.

c. If the force acts perpendicular to the direction of the object motion.

**2.** A force of 150 N acts on an object, the object moves a displacement 40m. Calculate:

a. The work done by the force when the force and the displacements are the same.

b. the work done when the force makes an angle 300 with the displacement.

c. The work done when the force is perpendicular to the displacement.

**3.** A simple pendulum of mass 4kg bounces in a vertical plane round an equilibrium position called zero position. The maximum level it reaches is 2.5 m from the horizontal level. Find the velocity when it reaches the zero position. (where: g= 9.8 m/s2.

**4.** A force of 200N acts on a static object of mass 50kg. Calculate the work done by the force during time 5s.

**5.** Find the force causing a work of 2 x 103 joules to raise a car in oil station by vertical distance 2.5m.

 **[4] Give reason for:**

1. When an object is projected upward, its kinetic energy decreases while its potential energy increases.

2. The drum [tub] of automatic washing machine spins at great speed at the drying stage of washing.

3. The work done by the gravitational force on a car raised up in oil station is negative.

 **[5] Choose:**

1. The mechanical energy of a free falling object of mass (m) and velocity (v) at half its maximum height …………………..

**a. 1/2 mv2 b. 2mv2 c. mv2 d. 1/4 mv2**

2. The potential energy of an object of a mass 2kg lies at height 5m above the Earth surface = ………………… J (g=9.8m/s2)

**a. 9.8 b. 2.5 c. 10 d. 98**

3. If the velocity of the moving body is doubled, then the kinetic energy of the same body ………………………….

**a. increases 4 times b. doubled c. halved**

**[6] Write down the mathematical formula needed to calculate each of the following physical quantities:**

1. The velocity of a moving car and its kinetic energy.

 **[7] Compare between:** 1. Joule and Newton in terms of equivalent unit

**[8] Write the suitable physical quantities for the following units:** kg.m2/s2

**[9] Prove that:** 1. The kinetic energy of moving object = 1/2 mv2

**[10] Mention:**

1. The statement of the law of conservation of mechanical energy and write the mathematical formula.

**[11] Graphs:**

1. Draw the following relation such that the potential energy of 20kg mass on (Y) and the vertical distance on (X) :

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| PE (Joule) | 200 | 1000 | 2000 | 4000 | 5000 |
| H (m) | 1 | 5 | 10 | 20 | 25 |

1. Name the slope of the given relation.
2. Find the gravitational field intensity of Earth

**[12] What is meant by:** 1. The potential energy of a body = 100 Joule