Name of the Student: _____

Question No. 1. Encircle the correct option.   **(20)**

(i)   The number of significant figures of 0.0070 x 10^4 are
        (a) Two   (b) Three   (c) Four   (d) Seven

(ii)   Light year is a unit of
        (a) time   (b) distance   (c) velocity   (d) light

(iii)   If X-component of a vector is negative and its Y-Component is positive then vector lies in
        (a) 1st quadrant   (b) 2nd quadrant   (c) 3rd quadrant   (d) 4th quadrant

(iv)   A force of 10 N is applied on the handle of the door at right angle and the distance between the handle and pivot is 0.5 m. The magnitude of torque is;
        (a) 20 N m   (b) 15 N m   (c) 10 N m   (d) 5 N m

(v)   Magnitudes of two rectangular components of a vector are equal when it makes an angle of ------with the X-axis.
        (a) 30° (b) 45° (c) 60° (d) 90°

(vi)   A body will be in complete equilibrium, when
        (a) $\sum F = 0$ (b) $\sum T = 0$ (c) Both (a) & (b)   (d).   None of these

(vii)   When a large force acts for a very short time, then change in momentum is equal to
        (a) Force   (b) Impulse   (c) Work   (d) Torque

(viii) When light body collides elastically with massive body at rest, velocity of light body after collision
        (a) Remains same   (b) Becomes double   (c) reverses   (d) Becomes Zero

(ix)   The acceleration of the rocket increases continuously due to
        (a) increase in its mass   (b) decreases in its mass   (c) increase in force   (d) increase in momentum of ejected gases

(x)   An object of mass 3 Kg placed on the surface of table 2 m high. It is moved on the surface by 4 m the change in P.E with respect to the table is
        (a) Zero   (b) 9.8. J   (c) 19.6 J   (d) 329 J

(xi)   Range of projectile is maximum at an angle of
        (a) 30° (b) 45° (c) 60° (d) 90°

(xii)   The apparent weight of the body differs from true weight due to change of
        (a) velocity   (b) acceleration   (c) both a&b   (d) None of these

(xiii) Where speed of the fluid is high, its pressure will be
        (a) constant   (b) low   (c) high   (d) zero

(xiv)   The artificial gravity to the satellites is provided by the
        (a) spin motion   (b) orbital motion   (c) both a&b   (d) none of these

(xv)   The slope of the velocity time graph gives
        (a) speed   (b) distance covered   (c) acceleration   (d) area

(xvi)   An object will have more weight at
        (a) poles   (b) equator   (c) center of earth   (d) none of these

(xvii) The power of a person weighing 100 N climbing 5 m vertically upward in 10 seconds is
        (a) 5 watt   (b) 50 watt   (c) 100 watt   (d) 250 watt

(xviii) The rotational K.E of body depends upon
        (a) angular velocity   (b) mass of the body   (c) size of the body   (d) all of these

(xix)   The petrol and air are mixed in the carburetor of motorbike due to
        (a) low pressure in it   (b) high pressure in it   (c) its large area   (d) petrol and air cannot be mixed

(xx)   Where the streamlines of fluid are closer to each other, the pressure there
        (a) increases   (b) decreases   (c) remains constant (d) becomes zero

Question No. 2 Write short answers.   **2x6 = 12**
I.   Give the draw backs to use the period of a pendulum as a time standard.
II.   Can the magnitude of a vector have a negative value? Explain.
III.   Prove that power is equal to dot product of force and velocity.
IV.   A person holds a bag of groceries while standing still, talking to a friend. A car is stationary with its engine running. From the stand point of work, how are these tow situations similar?
V.   When mud flies off the tyre of a moving bicycle, in what direction does it fly?
VI.   Two row boats moving parallel in the same direction are pulled towards each other. Explain.

Question No. 3
a.   How artificial gravity is provided to the astronauts in orbiting space station. Also calculate the expression for frequency with which space ship rotates about its axis. **(5)**
b.   Water flows through a hose, whose internal diameter is 1 cm at a speed of 1 m/s. what should be the diameter of the nozzle if the water is to emerge at 21 m/s? **(3)**