FRESHMAN UNIVERSITY

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DO WHAT YOU CAN FOR OTHERS

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I, Write true if the statement is correct and false if the statement is incorrect(5pts)

1, For an isolated system mechanical energy is conserved.

2, The number 0.0040120 has five significant figures.

3, If the distance between two objects becomes doubled the gravitational force between them also doubled.

4, Static friction arises when the object is in motion on the surface.

5, If the acceleration of an object is zero, then that object cannot be moving.

II, Choose the best answer from the given alternatives(10pts.)

1, Which of the following is a physical quantity that can be described by dynamics but not by kinematics?

A. Velocity B.Acceleration

C.Force D.Speed

2, Let vector A= 2i +j+2k .what is a unit vector along vector A?

A, $\frac{-2i+j+2k}{3}$ B, $\frac{3i+2j+2k}{3}$ C, $\frac{2i+j+2k}{3}$ D, $\frac{2i+j+2k}{3}$

3, Which of the following is contact force?

A, Gravitational force B, Magnetic force

C, Electrostatic force D, Frictional force

4, A car which starts from rest increases its velocity to 60m/s in 10 seconds. What is the acceleration of the car during this time?

A, $1m/s^2$ B, $6m/s^2$ C, $4m/s^2$ D, $2m/s^2$

5, Which force is the weakest force among the fundamental force in nature?

A. Electromagnetic B.Gravitational

C.Strong nuclear D.Weak nuclear

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6. Which one of the following is/ are the SI unit of basic physical quantity

A. Kelvin B. kg. /s2 C. m/s2 D. N.m

7. What is another name for Newton's first law?

A. Law of infinite motion

B. Law of inertia

C. Law of friction

D. Kepler's law

8. One object exerts a force of magnitude F1 on another object and experiences a force of magnitude F_2 in return. What is true for F_1 and F_2?

A. $F_1 > F_2$ C. $F_1 < F_2$

B. $F_1 = F_2$ D. None

9. If a ball is thrown vertically upward with an initial velocity of 10m/s, how it rises up?

(take g = 10m/s2)

A, 100m B. 10m C, 1m D, 5m

10. Which of the following cannot be the resultant of the two forces F1=50N and F2=120N?

A,170N B,70N C, 130N D, 5ON

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III, ANSWER THE FOLLOWING QUESTIONS BRIEFLY (7pts)

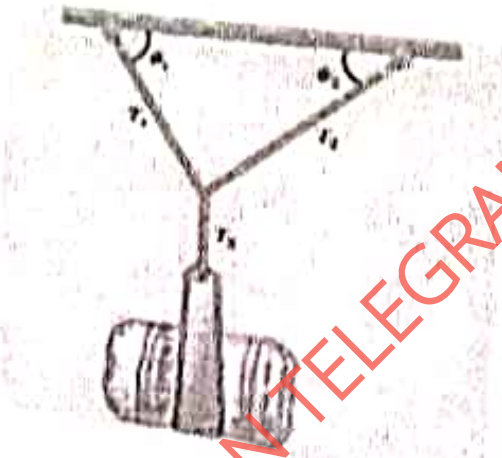
1. Write down the three essential conditions when the work to be performed. (1.5pts.)
2. State Keeper's laws of planetary motion. (3pts.)
3. Drive the expression of work kinetic energy theorem. (2.5pts.)

IV, WORK OUT BY SHOWING YOUR STEPS CLEARLY (8pts)

1. A bag of sand of weight 500N hangs from three ropes as shown in the figure below. Two of the ropes makes angles of $\theta_1 = 37^\circ$ and $\theta_2 = 53^\circ$ with the horizontal. If the system is in equilibrium find the tensions T_1, T_2 and T_3 inside the ropes **(3pts.)**

GIVEN

$\cos 37^\circ = \sin 53^\circ = 0.8$ $\quad$ $\sin 37^\circ = \cos 53^\circ = 0.6$



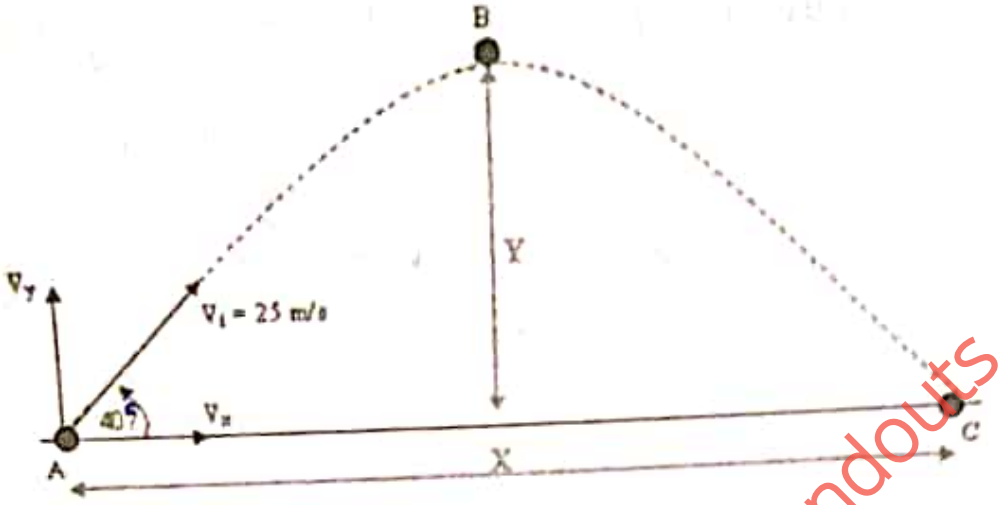
2. A football is kicked with an initial velocity of 25 m/s at an angle of 40-degrees with the horizontal. Determine the total time of flight, the Range, and the peak height of the football. **(3pts.)**

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$\cos 40^\circ = 0.77$

$\sin 40^\circ = 0.64$

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3. A particle is in motion and is accelerating. The functional form of the velocity is

$v(t) = 20t - 5t^2$ m/s

a. Find the acceleration as the function of time **(0.5 pt.)**

b. Find the instantaneous velocity at t = 1, 2, 3, and 5 s. **(0.5 pt.)**

c. Find the instantaneous acceleration at t = 1, 2, 3, and 5 s. **(1 pt.)**

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