نموذج استرشادى (٥) لامتحان شهادة إتمام الدراسة الثانوية العامة ٢٠٢٥ / ٢٠٢٦ م

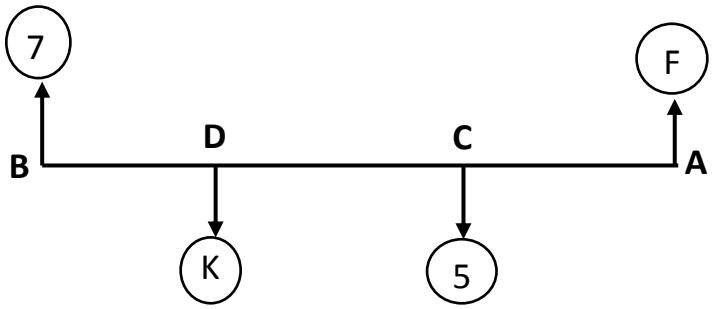
الرياضيات التطبيقية (الشعبة العلمية – رياضيات) الزمن : ساعتان

First: Multiple choice questions" one mark for each item"

(1) If the force $\overrightarrow{F} = 3\vec{\imath} + 4\vec{\jmath}$ acts at the point (2,3) then the length of the perpendicular drawn from the point (-1,3) to the line of action of the force = ……. length units

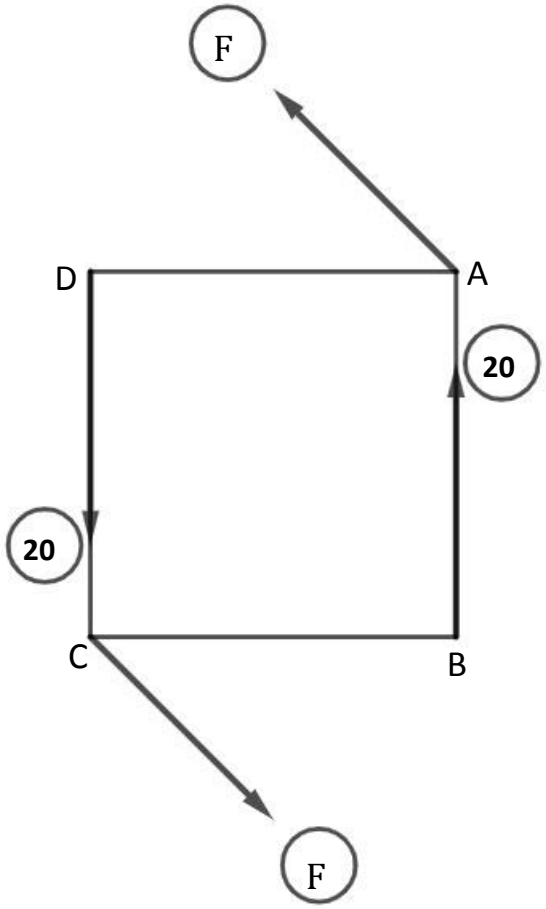
(a) 1.2 (b) 1.8 (c) 2.4 (d) 4.8

(2) In the opposite figure : forces of magnitudes F , 5 , k and 7 Newtons act at the points A,C,D and B respectively , if the forces are parallel and in equilibrium then K-F=…….



(a) 1 (b) 2 (c) 3 (d) 4

(3) In the opposite figure: ABCD is a square of side length 8cm, if the two forces (F, F) form couple equivalent to the couple formed by the two forces (20,20) where the two forces $\overrightarrow{F}$, $\overrightarrow{F}$ are parallel to $\overleftrightarrow{BD}$, then F =…… Newton



(a) $5\sqrt{2}$ (b) $10\sqrt{2}$ (c) $15\sqrt{2}$ (d) $20\sqrt{2}$

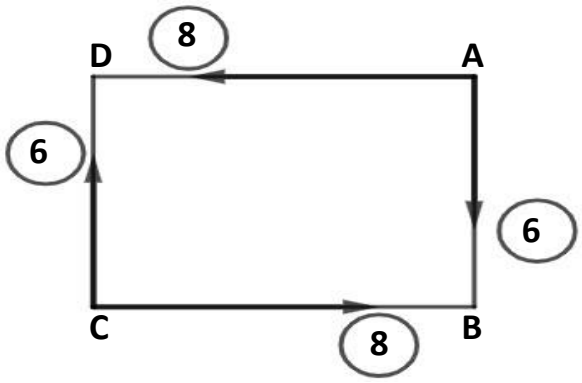
(4) If the velocity vector of a particle $\overrightarrow{v}$(m/s) at any time t(sec) is given by the relation $\overrightarrow{v} = (t^2 - 6t + 5)\overrightarrow{c}$, then the magnitude of the acceleration after 5 seconds from starting the motion =…… m/s^2

(a) 3 (b) 4 (c) 5 (d) 6

(5) If the mass of a body m (kg) at any time t (sec) is given by the relation m =(2t+5) kg moves with uniform velocity 49 m/s, then the magnitude of the force acting on it =……N.

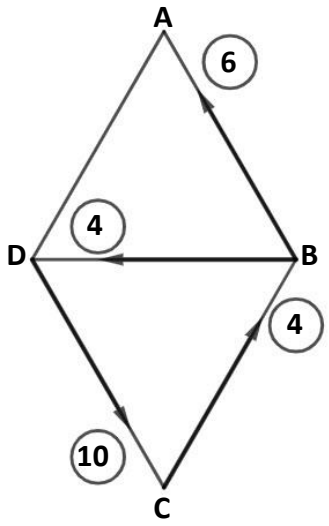
(a) 28 (b) 49 (c)70 (d) 98

(6) In the opposite figure: ABCD is a rectangle in which AB=3cm , if the forces are in equilibrium, then AD=…….cm



(a) 3 (b) 4 (c) 5 (d) 6

(7) In the opposite figure: ABCD is a rhombus of side length 4cm where BD=AB , if the system of the forces(measured in Newton) form couple then the magnitude of its moment=…… Newton.cm



(a) $10\sqrt{3}$ (b) $15\sqrt{3}$ (c) $20\sqrt{3}$ (d) $25\sqrt{3}$

(8) A particle moves in a straight line where its velocity vector $\overrightarrow{v}$(m/s) at any time t(sec) is given by the relation $\overrightarrow{v} = (3t^2 + 2t)\overrightarrow{c}$, then the algebraic measure of its displacement during the time interval $[3,6]$ = …… meters

(a) -216 (b) -87 (c) 87 (d) 216

(9) If a man of weight 70 kg.wt stands on the floor of a lift moving vertically up with acceleration 1.4 m/s^2 , then the pressure of the man on the floor of the lift =…….kg.wt

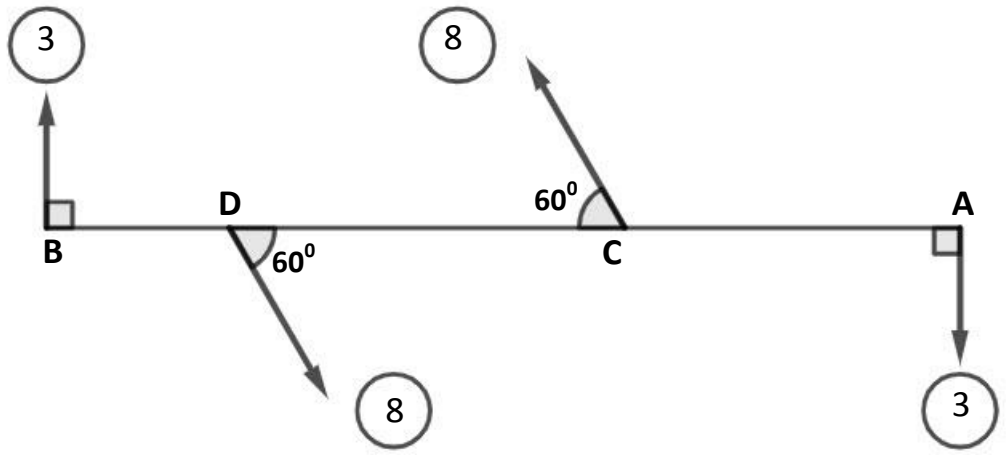
(a) 70 (b) 80 (c) 686 (d) 784

(10) A body moves in a straight line under the effect of a force $\overrightarrow{F}$ where its magnitude at any position "x" by the relation $F= 3x^2 - 2x$. If the force acts in the same direction of motion, then the work done by the force from the position x = 2 to the position x = 5 equals …….. work units

(a) 57 (b) 73 (c) 96 (d) 104

Second : Multiple choice questions" two marks for each item"

(11) The opposite figure : $\overline{AB}$ is a rod of negligible weight, its length 100cm, the drawn forces (measured by the same unit) act in the rod . If the rod is in equilibrium under the effect of these forces , then CD=……cm



(a) $10\sqrt{3}$ (b) $15\sqrt{3}$ (c) $20\sqrt{3}$ (d) $25\sqrt{3}$

(12) If the force $\overrightarrow{F} = 3\vec{\imath} - 4\vec{\jmath}$ (Newton) acted on a body so it moved from the point A(1,3) to the point B(7,3) , then the change in the potential energy of the body = …… work units

(a) -24 (b) -18 (c) 18 (d) 24

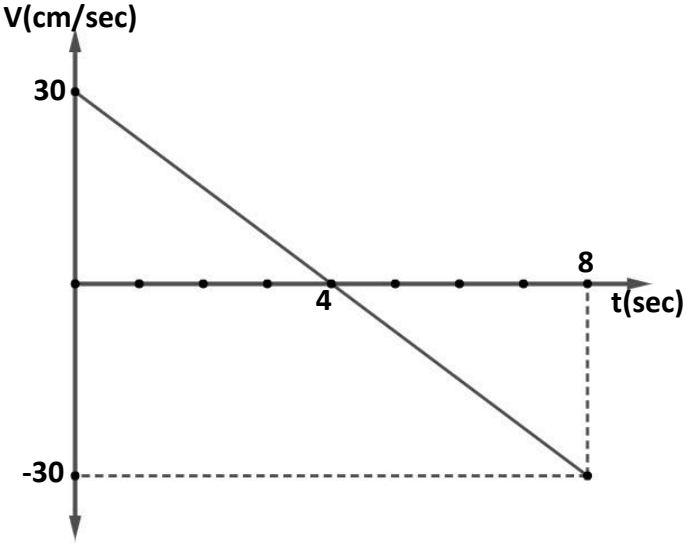
(13) ABCD is a rectangle, the line of action of the force $\overrightarrow{F}$ passing through the center of the rectangle, if the moment vector of the force $\overrightarrow{F}$ about the point A = $-6\vec{k}$, then the moment vector of the force about the point C =…….$\vec{k}$

(a) -6 (b) -3 (c) 3 (d) 6

(14) If the forces $\overrightarrow{F_1} = 3\vec{\imath} + 4\vec{\jmath}$, $\overrightarrow{F_2} = \vec{\imath} - 2\vec{\jmath}$, $\overrightarrow{F_3} = -3\vec{\imath} + 4\vec{\jmath}$ act at the point A(2,3) then the moment vector of the resultant of the forces about the point B(1,1)=…….. $\vec{k}$

(a) -13 (b) -4 (c) 4 (d) 13

(15) If the opposite figure represents (velocity-time) graph for a body moves in a straight line, then its displacement after 8 seconds from starting the motion =……. cm



(a) -120 (b) 0 (c) 60 (d) 120

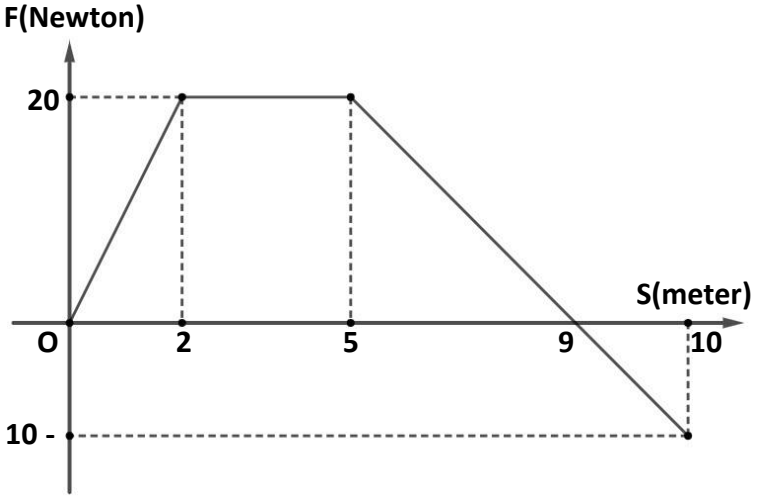
(16) A body of mass 10 kg rests on a horizontal smooth plane, if a horizontal force of magnitude 40 Newton acted on it , the body moved in its direction, then the magnitude of the velocity of the body after 5 seconds from starting its motion = ……m/s

(a) 10 (b) 20 (c) 30 (d) 40

(17) In the opposite figure: a uniform ladder its weight (w) rests with its upper end on a smooth vertical wall and its lower end on a rough horizontal ground , if the ladder is about to slide when it inclined angle of measure 45^0 to horizontal , then the coefficient of static friction between the ladder and the ground =……

(a) $\frac{\sqrt{2}}{2}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\sqrt{2}$

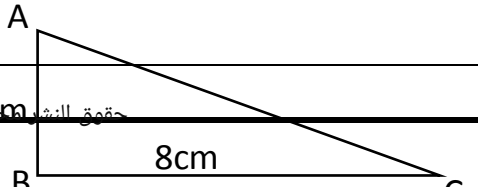
(18) The opposite figure represents the (force- displacement) graph for a body moving in a straight line ,if the force measured in Newton and the displacement in meter , then the change in kinetic energy of the body when the magnitude of the displacement =10 meters equals.....joule



(a) 110 (b) 115 (c) 120 (d) 125

Third: essay questions “two marks for each question”.

(19) In the opposite figure: ABC is right angled triangle at B in which AB=3cm , BC=8cm , force F(Newton) acts in the plane of the triangle such that $\overrightarrow{M_A} = \vec{0}$, $\overrightarrow{M_C} = -\overrightarrow{M_B} = 60\vec{k}$, Find $\left\|\overrightarrow{F}\right\|$.



(20) A body is placed at the top of an inclined smooth plane of height 10 meter, find the velocity of the body when it reached the bottom of the plane