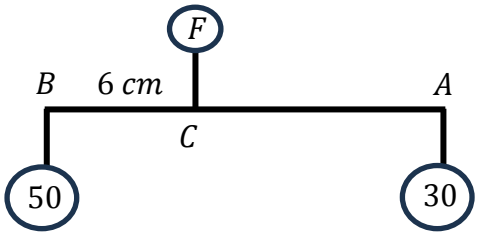
نموذج استرشادى (٤) لامتحان شهادة إتمام الدراسة الثانوية العامة ٢٠٢٥ / ٢٠٢٦ م

المادة : الرياضيات التطبيقية باللغة الإنجليزية (الشعبة العلمية رياضيات) الزمن : ساعتان

أولاً: الأسئلة الموضوعية (الاختيار من متعدد) كل سؤال درجة واحدة

(1)	If the forces $\overrightarrow{F_1} = 2\vec{\imath} + 4\vec{\jmath}$, $\overrightarrow{F_2} = \vec{\imath} - 2\vec{\jmath}$, $\overrightarrow{F_3} = -3\vec{\imath} + 4\vec{\jmath}$ act at the point (3 , 1), then the length of the perpendicular from the point (2 , -3) to the line of action of the resultant of these forces equals ……. Length unit						
(a)	4	(b)	3	(c)	2	(d)	1

(2)	In the opposite figure: If the forces are parallel and equilibrium, then $AC = \ldots\ cm$ 						
(a)	5	(b)	7	(c)	8	(d)	10

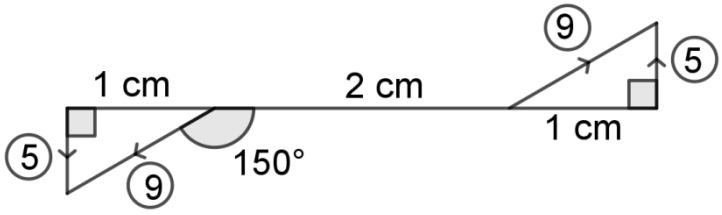
(3)	Two forces of magnitudes 30 , 30 Newton ,the distance between their lines of actions is (l) and the two forces form a couple .If the magnitudes of the two forces became 20 , 20 Newton,then the distance between their lines of actions to form a couple equivalent to the previous couple = ……. l						
(a)	$\frac{1}{2}$	(b)	$\frac{3}{2}$	(c)	$\frac{2}{3}$	(d)	$\frac{1}{3}$

(4)	If a body moves in a straight line from a fixed point on this line, and the algebraic measure of its velocity vector is given by the relation: $v = (3t^4)$ m/esc ,then the algebraic measure of the acceleration of this body after t seconds from the beginning of the motion equals ……. m/sec^2						
(a)	$12\frac{v}{t}$	(b)	$4\frac{v}{t}$	(c)	$4v^2$	(d)	$12\frac{v}{t^2}$

(5)	If a body of mass $m = (t + 2)$ kg moves with a constant velocity $36\ km/hr$ in a straight line under the action of a force F (Newton) that acts in the direction of the motion, then the value of $F = \ldots\ Newton$						
(a)	20	(b)	13	(c)	10	(d)	5

(6)	$\overline{AB}$ is a uniform wooden beam of length 6 $meters$ and weight 60 $kg.wt$, it rests on two supports: one of them at a distance 1 $meter$ from the end A and the other at a distance 2 $meters$ from the end B .If the beam equilibrated horizontally , then the reaction of the support closer to the end A equals ..... $Kg.wt$						
(a)	15	(b)	20	(c)	25	(d)	30

(7)	In the opposite figure: The two forces (5 , 5) Newton form a couple and the two forces (9 , 9) Newton form a couple. If the forces are coplanar, then the magnitude of the resultant couple equals ..... $Newton.cm$						
(a)	29	(b)	27	(c)	20	(d)	11

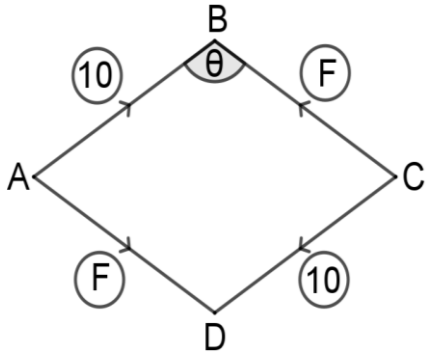


(8)	If a body moves from rest in a straight line from a fixed point on it, and the algebraic measure of its acceleration is given by the relation: $a = (6t^2 - 2)m/sec^2$,then the displacement covered by this body during the time interval $[0 , 4]$ equals ..... m.						
(a)	114	(b)	113	(c)	112	(d)	111

(9)	Two bodies of masses 5 gm, 3 gm tied from the two ends of a string that passes over a small smooth pulley. If the system moves from rest when the two bodies was on the same horizontal plane, then the vertical distance between the two bodies after one second from the beginning of the motion equals ..... cm						
(a)	122.5	(b)	120	(c)	24.5	(d)	245

(10)	If a variable force measured in $Newton$ acts on a body such that: $F = S^2 - 2S$ where S is the displacement in meter then the work done by this force during the interval from $S = 1\ meter$ to $S = 7\ meter$ equals ..... $Joule$						
(a)	35	(b)	65	(c)	66	(d)	33

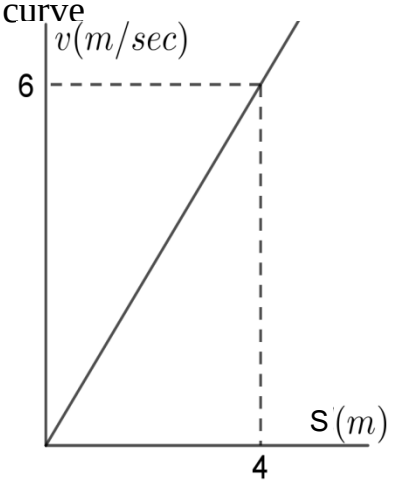
ثانيا : الأسئلة الموضوعية (الاختيار من متعدد) "كل سؤال درجتان"

(11)	In the opposite figure: $ABCD$ is a rhombus, if the two forces $(10\ ,10)$ $Newton$ forms a couple, then the magnitude of the force F such that the set of forces is equilibrium state equals …… $Newton$ 							
(a)	20	(b)	$20\ sin\theta$	(c)	10	(d)	$20\ cos\theta$

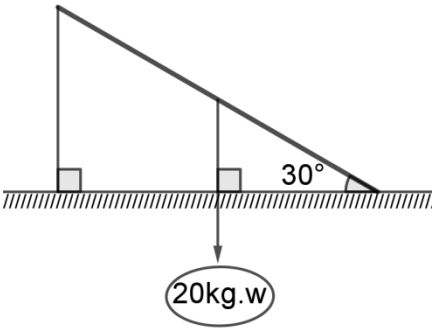
(12)	A crane lifts a box with a conservative force $\vec{F}\ =\ 50\,\vec{\imath} + 60\,\vec{\jmath}$ and its displacement vector is given by the relation: $\vec{S}\ =\ 4\,\vec{\imath} + 3\,\vec{\jmath}$ .If the magnitude of the force is measured in $Newton$ and the magnitude of the displacement is measured in $meter$, then the change in the kinetic energy of the body equals ……. $Joule$						
(a)	390	(b)	380	(c)	90	(d)	20

(13)	If $\vec{F}\ =\ 3\,\vec{\imath} + 5\,\vec{\jmath}$ acts at the point $A(\ 2\ ,1\ )$ and the line of action of this force is parallel to $\overline{CB}$ such that $C(\ 0\ ,1\ )$,then the magnitude of the moment of this force about the point B equals ……. $moment\ unit$						
(a)	6	(b)	7	(c)	8	(d)	10

(14)	If the forces $\overrightarrow{F_1}\ =\ 3\vec{\imath} + a\,\vec{\jmath}$, $\overrightarrow{F_2}\ =\ b\vec{\imath} + 2\,\vec{\jmath}$, $\overrightarrow{F_3}\ =\ 4\,\vec{\imath} + 2a\,\vec{\jmath}$ act at the points $(\ 1\ ,2\ ),(\ 3\ ,3\ ),(\ 3\ ,1\ )$ respectively, If the resultant of the forces passes through the point $(\ 2\ ,2\ )$,then $b\ -\ a\ =$ ……						
(a)	6	(b)	7	(c)	9	(d)	4

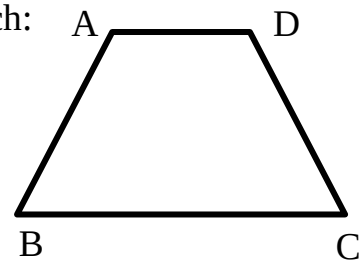
(15)	If the opposite figure represents the (velocity – displacement) curve for a body moves in a straight line, then the acceleration of the body when the displacement became $4\ meters$ equals ……. m/sec^2 						
(a)	9	(b)	24	(c)	12	(d)	50

(16)	If a constant force acts on a body of mass 5 kg moves in a straight line to change its velocity from 36 km/hr to $72km/hr$ in a time $\frac{1}{5}$ sec , then the magnitude of this force equals …….. $Newton$						
(a)	175	(b)	250	(c)	125	(d)	50

(17)	In the opposite figure : A uniform ladder of weight 20 kg, wt rests with one of its ends on a smooth vertical wall and with its other end on a rough horizontal ground. If the ladder is about to slide when it inclined to the horizontal at an angle of measure 30°,then the static friction force = ……. kg, wt 						
(a)	10	(b)	20	(c)	$10\sqrt{3}$	(d)	$20\sqrt{3}$

(18)	A force of magnitude 90 $Newton$ acts on a body of mass 20 kg moves in a straight line to change its velocity from 12 m/sec to 15 m/sec in the same direction ,then the distance covered by the body = …… m$eter$						
(a)	9	(b)	15	(c)	12	(d)	8

ثالثا: الأسئلة المقالية: كل سؤال درجتان:

(19)	In the opposite figure : $ABCD$ is an isosceles trapezium in which: $AB = DC = 5\ cm$, $BC = 15\ cm$, $AD = 9\ cm$, $\overline{AD}\ //\ \overline{BC}$. The forces of magnitudes 5 , 9 , 3 , 4 $Newton$ act on the directions $\overrightarrow{AB}$, $\overrightarrow{CB}$, $\overrightarrow{DC}$, $\overrightarrow{DA}$ respectively. Find the sum of the moments of the forces about the point D. 

(20)	A body of mass 20 kg is projected with velocity 7 m/sec upwards an inclined smooth plane that inclined to the horizontal at an angle of measure 30° . Find the potential energy of the body after 2 sec from the beginning of the motion.