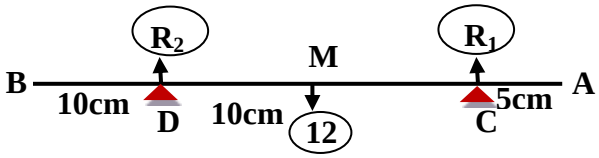
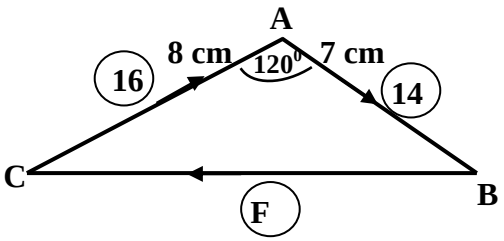
نموذج استرشادى (١) لامتحان شهادة إتمام الدراسة الثانوية العامة ٢٠٢٥ / ٢٠٢٦ م

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

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

(1)	The forces $\overrightarrow{F_1} = 2\vec{i} - 5\vec{j}$, $\overrightarrow{F_2} = 5\vec{i} + \vec{j}$, $\overrightarrow{F_3} = -\vec{i} - 4\vec{j}$ act at the point A(3, 4). Then the length of perpendicular drawn from the point B (5 , 3) to the line of action of the resultant = …… length unit						
(a)	2.2	(b)	2	(c)	1.2	(d)	1

(2)	In the opposite figure $\overline{AB}$ is a uniform rod of length 40 cm and its weight 12 Newton rests in a horizontal position on two supports at C , D where AC = 5 cm and BD = 10 cm. Then the greatest weight can be hanged from the end B such that the rod still equilibrium = …….. Newton. 						
(a)	8	(b)	10	(c)	12	(d)	15

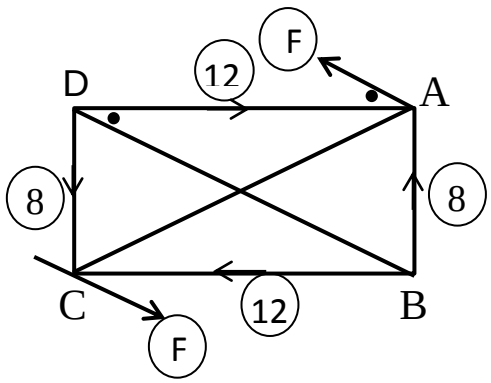
(3)	In the opposite figure : ABC is a triangle in which AC = 8 cm, AB = 7 cm, $m(\angle A) = 120^0$, the shown forces in the figure measured in Newton and form a couple, then the magnitude of F = ……Newton 						
(a)	30	(b)	26	(c)	13	(d)	2

(4)	A body moves in a straight line , its velocity is given as a function in the time (t) by the relation $V = e^{t^2 - 2t}\ cm/sec$, then the acceleration of the body after 2 seconds from the beginning of the motion = …. cm/ sec^2						
(a)	4	(b)	3	(c)	2	(d)	1

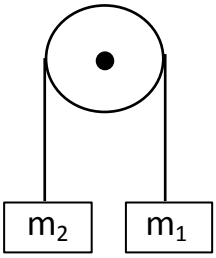
(5)	A body of variable mass moves with uniform velocity in a straight line such that its mass $m=(14t+3)kg$, where t is the time in sec., if the body covered distance 42 meter in 3 seconds, then the magnitude of the acting force on it = …… kg.wt						
(a)	196	(b)	60	(c)	20	(d)	14

(6)	$\overline{AB}$ is a non- uniform rod of length 24 cm , rests horizontally on two supports at C and D , where AC = 5 cm , and BD = 9 cm . If the rod is about to rotate when a weight of magnitude 20 Newton is suspended at B or a weight of magnitude 18 Newton is suspended at A ,then the weight of the rod = …. Newton						
(a)	38	(b)	27	(c)	24	(d)	20

(7)	In the opposite figure ABCD is a rectangle in which AB = 6 cm , BC = 8 cm . The two forces F , F act in directions parallel to $\overleftrightarrow{BD}$. If the forces equivalent a couple the norm of its moment equals 40 .gm.wt.cm., then F = …… gm.wt						
(a)	32	(b)	10	(c)	5	(d)	4.8

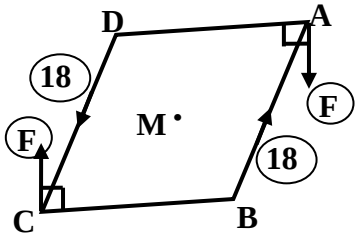


(8)	A body moves in a straight line such that its velocity $V=(16-4t)m/sec$, If x_o = 3 meter, then the displacement within the interval [2 , 6] = ……. meter.						
(a)	16	(b)	6	(c)	1	(d)	zero

(9)	In the opposite figure : If $m_1 : m_2 = 3 : 4$, the mass m_1 is gained an initial velocity V and the displacement after 1 second is the same displacement after 4 seconds, then V = ….. m / sec. 						
(a)	2.45	(b)	3.5	(c)	4.9	(d)	7.35

(10)	A variable force F measured in Newton where $F = (3S^2 - 4)$, S is displacement in meter, if the force F acts on a body, then the work done by this force in the interval from S = 2 m to S = 5 m equals ……. Joule.						
(a)	150	(b)	105	(c)	18	(d)	501

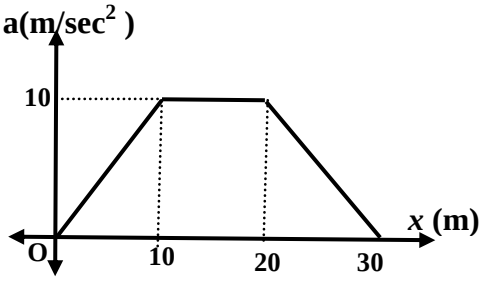
Second: Multiple choice questions" two marks for each item" .

(11)	In the opposite figure ABCD is a uniform lamina in the shape of rhombus in which m ($\angle$ A) = 60°, it is suspended from a small hole near to its center M , two forces 18 , 18 Newton act in $\overrightarrow{BA}$, $\overrightarrow{DC}$ respectively , and the two forces F , F Newton act at A , C perpendicular to $\overline{AD}$, $\overline{BC}$ respectively as shown in the figure . If the lamina is in equilibrium state, then F = …… Newton 						
(a)	6	(b)	$9\sqrt{3}$	(c)	$5\sqrt{3}$	(d)	$6\sqrt{3}$

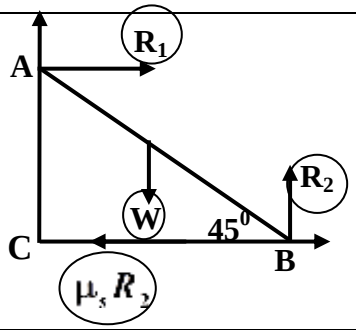
(12)	The force $\vec{F} = 4\vec{i} + 5\vec{j}$ acts on a body to move it from the position A to the position B within 2 sec. If the position vector of the body is given as a function in time t (sec) by the relation $\vec{r} = (2t^2 + 3)\vec{i} + (4t + 1)\vec{j}$,then the change in potential energy of the body , given that the magnitude of the force measured in Newton and the norm of $\vec{r}$ in meter = ……. Joule .						
(a)	8	(b)	–72	(c)	–8	(d)	72

(13)	If the force $\overrightarrow{F}=5\vec{i}-12\vec{j}$ acts at the point A (1 , 3), the two points B, C are in two different sides of the line of action of $\overrightarrow{F}$ such that the length of the perpendicular from B to the line of action of $\overrightarrow{F}$ equal that drawn from C ,then $\overrightarrow{M_B}+\overrightarrow{M_C}=$						
(a)	$2\overrightarrow{M_B}$	(b)	$\mathbf{0}$	(c)	$\frac{1}{2}\overrightarrow{M_B}$	(d)	$\vec{0}$

(14)	If the forces $\overrightarrow{F_1}=2\vec{i}-3\vec{j}$, $\overrightarrow{F_2}=5\vec{i}+\vec{j}$, $\overrightarrow{F_3}=-4\vec{i}+7\vec{j}$ act at the point A(1 , 1) , B(–2 , 2) and C(3 , 1) respectively , then the vector moment of the resultant about the origin point = ... $\vec{k}$						
(a)	8	(b)	16	(c)	–16	(d)	–8

15)	the opposite figure represents (the acceleration –position) graph of a moving particle moves in a straight line starting from the origin point with initial velocity 10 m/sec. then when the particle covered 30 meters in the positive direction V^2 =..... 						
(a)	300	(b)	400	(c)	500	(d)	800

(16)	A sphere mass 500 gm falls down from a height of 2.5 meters on a viscous liquid surface and penetrates it with uniform velocity 0f magnitude $1\frac{3}{4}$ m / sec, then the impulse of the liquid on the sphere = ... kg. m / sec						
(a)	6.5	(b)	1.125	(c)	– 2.625	(d)	– 26.25

(17)	In the opposite figure If the rod $\overline{AB}$ is about to slide , then μ_s= …… 						
(a)	$\frac{1}{2}$	(b)	$\frac{1}{4}$	(c)	$\frac{1}{8}$	(d)	$\frac{1}{3}$

(18)	A force of magnitude F Newton acts on a body of a constant mass , so the body moves in a straight line in the same direction of the force , if $F = \begin{cases} 2S^2+3 & , \quad 0 \le S \le 3 \\ 15-S^2 & , \quad 3 < S \le 6 \end{cases}$ where S is the displacement in meters . Then the change in kinetic energy of the body from S = 0 to S = 6 meters equals …… Joule						
(a)	9	(b)	18	(c)	45	(d)	180

Third: essay questions "two marks for each question".

(19)	ABCD is a square of side length 6 cm , $H \in \overline{BC}$ where BH = 1 cm forces of magnitudes 1 . 2 , 3 , 4 ,F gm.wt act along $\overrightarrow{AB}$, $\overrightarrow{BC}$, $\overrightarrow{CD}$, $\overrightarrow{DA}$, $\overrightarrow{AC}$ respectively . If the line of action of the resultant passes through H , Find the magnitude of F.
(20)	A car descends a slope from rest of length 180 meters and of height 10 meters. It is given that $\frac{3}{4}$ of the potential energy is lost due overcoming the resistance against motion where the resistance remains constant during the motion of the car .Find the velocity of the car at the end of the slope.