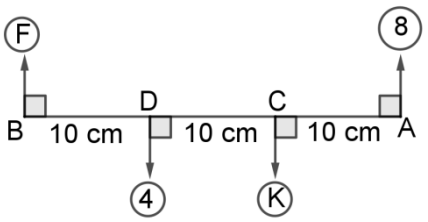
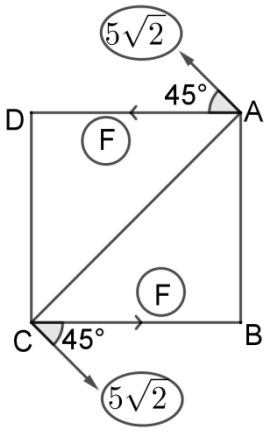
نموذج استرشادى (٣) لامتحان شهادة إتمام الدراسة الثانوية العامة ٢٠٢٥ / ٢٠٢٦ م

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

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

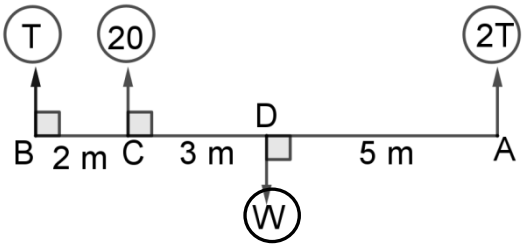
(1)	If the forces $\overrightarrow{F_1} = 5\vec{i} + 4\vec{j}$, $\overrightarrow{F_2} = -2\vec{j}$, $\overrightarrow{F_3} = \left(2\sqrt{2}, \frac{3\pi}{4}\right)$ act at the points $A(3,-1), B(3,4), C(1,0)$ respectively , then the length of perpendicular drawn from the origin point to the line of action of the resultant of these forces = …….. length unit						
(a)	1.2	(b)	1.4	(c)	1.6	(d)	2.6

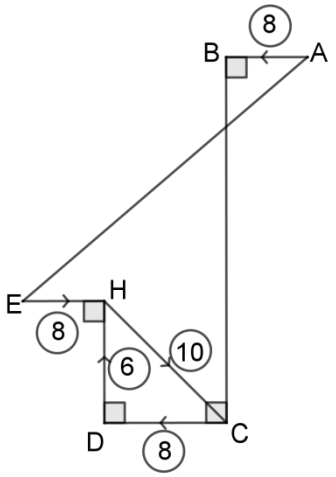
(2)	In the opposite figure: The light rod $\overline{AB}$ is in equilibrium state horizontally and the shown parallel forces measured in Newton , the  						
(a)	k= 4N, F= 6N	(b)	k= 10N ,F= 6N	(c)	k= 6N ,F= 6N	(d)	k= 12N ,F= 8N

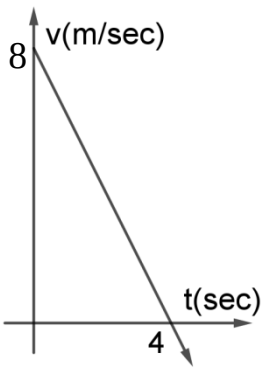
(3)	In the opposite figure: ABCD is square of side length 10 cm , the forces act as shown in the figure, if the couple resulted from the two forces $5\sqrt{2}$, $5\sqrt{2}$ gm .wt. is equivalent to the couple resulted from the two forces F , F , then the magnitude of F = …… gm .wt.  						
(a)	10	(b)	12	(c)	10 $\sqrt{2}$	(d)	15

(4)	A body started to move in a straight line , its velocity v(m /sec) is given as a function of time (t)sec by the relation: $v= 3t^2-2t$, then the acceleration of motion a = ……. m/sec^2 at t = 3 sec.						
(a)	10	(b)	14	(c)	16	(d)	20

(5)	A body of variable mass , its mass m= (4t + 1) kg. moves with constant velocity, it covered 24meter in 3seconds, then the magnitude of the force acted on the body = …… Newton						
(a)	24	(b)	28	(c)	32	(d)	40

(6)	In the opposite figure: $\overline{AB}$ is uniform rod of length 10 meter and its weight (W) Kg. wt. is hanged up from its ends by two vertically light strings. If a force of magnitude 20 kg wt. acts vertically upward at C to make the rod in equilibrium state horizontally and the tension at A is twice the tension at B , then the weight of the rod = ……. Kg.wt. 						
(a)	36	(b)	56	(c)	65	(d)	63

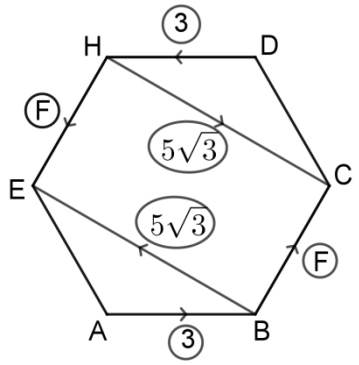
(7)	In the opposite figure: AB= HE= 2 cm , DH= 3 cm , BC= 9 cm, AE= 10 cm , the forces act as shown in the figure (measured in Newton) , then the magnitude of the moment of the resultant couple = …… Newton .cm 						
(a)	64	(b)	72	(c)	48	(d)	24

(8)	If the opposite figure represents (velocity – time) curve of a particle started its motion from a fixed point in a straight line , then the position of the particle after 3 second from starting its motion equals …….. meter 						
(a)	10	(b)	15	(c)	18	(d)	20

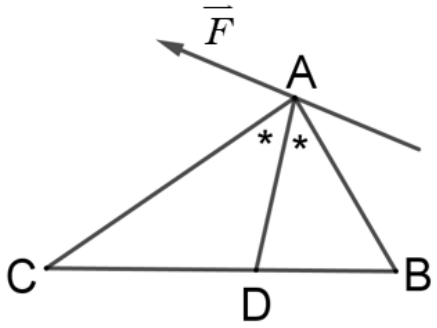
(9)	A body of weight m kg placed on a pressure balance fixed on the ground of a lift, If the reading of the balance was 90 kg.wt. when the left ascends with uniform acceleration $2a$ m/sec^2 and the reading was 60 kg.wt. when the lift descends with uniform acceleration a m/sec^2 ,then ……..		
(a)	m= 70 kg , a = 1.4 m/sec^2	(b)	m= 60 kg , a = 2.45 m/sec^2
(c)	m= 63 kg , a = 2.1 m/sec^2	(d)	m= 80 kg , a = 0.6125 m/sec^2

(10)	A variable force F (measured by dyne) acts on a body where F is given as a function of the displacement (s) cm by the relation : $F = (1 + \tan^2 s)\, e^{\tan s}$, then the work done by the force in the interval from s= 0 to s = $\frac{\pi}{4}$ equals……. erg						
(a)	2e	(b)	e+1	(c)	2e-1	(d)	e-1

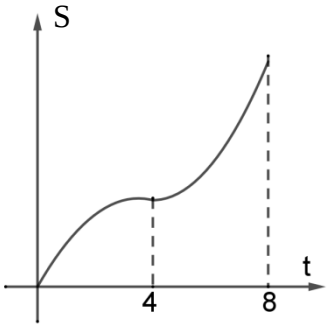
Second: Multiple choice questions" two marks for each item" .

(11)	In the opposite figure: ABCDHE is regular hexagon , the forces act as shown in the figure (measured in Newton) ,if the forces are In equlibrium state , then F =……. newton 						
(a)	1	(b)	2	(c)	3	(d)	4

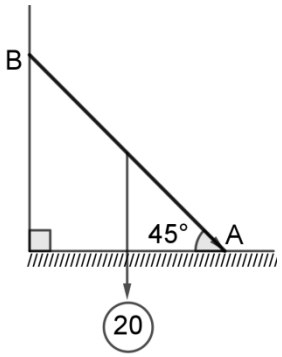
(12)	The force $\vec{F} = 5\vec{i} + 4\vec{j}$ acted on the body to move it from the initial position A to the position B in 2 seconds , and its position vector is given by the relation $\vec{r} = (t^2 - 3)\vec{i} + (3t + 1)\vec{j}$, (where the magnitude of $\vec{F}$ measured newton and the magnitude of $\vec{r}$ in meter , t in second), then the change of the potential energy of the body = ……. Joule .						
(a)	-33	(b)	-32	(c)	-44	(d)	-48

(13)	In the opposite figure: If $\vec{F}$ acts in the plane of ΔABC , $\overrightarrow{AD}$ bisects $\angle BAC$, AB = 6 cm , AC = 9 cm , M_B = 8 Newton.cm ,and M_D = 10 Newton.cm , then M_C = ……. Newton.cm 						
(a)	10	(b)	11	(c)	12	(d)	13

(14)	If the forces $\overrightarrow{F_1} = 3\vec{i} - 2\vec{j}$, $\overrightarrow{F_2} = \vec{i} + 5\vec{j}$, $\overrightarrow{F_3} = -2\vec{i} + \vec{j}$ act at the points A (2, 4) , B (3 ,2) , C (2, 0) respectively , then the equation of the line of action of the resultant of these forces is ……						
(a)	4x - 2y +1= 0	(b)	4x + 2y =1	(c)	2x - 4y =1	(d)	X - 2y =1

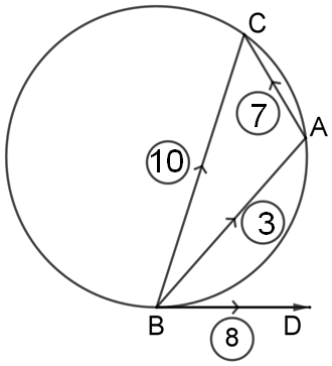
(15)	If the opposite figure represents the (displacement – time) curve of a particle moves in a straight line within the time interval $]0, 8[$, then the motion is ……. 
(a)	always acceleration
(b)	always deceleration
(c)	acceleration in $]0, 4[$ and deceleration in $]4, 8[$
(d)	acceleration in $]4, 8[$ and deceleration in $]0, 4[$

(16)	If a constant force of magnitude 14 kg.wt. acts on a body of mass m kg for $\frac{1}{4}$ second to change its velocity from 3 m/sec to 36 km/hr in the same direction of the force , then the mass of the body m = …… kg.						
(a)	3.5	(b)	4.7	(c)	4.9	(d)	5.2

(17)	In the opposite figure: A ladder of length 4 meters and its weight 20 kg.wt. rests with one of its ends on a rough horizontal ground and the other end against a smooth vertical wall. If the ladder makes an angle of 45^0 with the horizontal, and the coefficient of static friction between the ladder and the ground is $\frac{3}{5}$, then the maximum distance can a boy of weight 40 kg.wt ascends the ladder without disturbing equilibrium is …… meter. 						
(a)	2	(b)	2.4	(c)	2.6	(d)	2.8

(18)	A force F Newton acted upon a body of mass(2π) kg to move it in a straight line in the direction of the force, where $F = \sqrt{9-(s-3)^2}$,$0 \leq s \leq 6$, where s is the displacement in meter . if its kinetic energy at the end of the displacement = (8.5 π) joule, then its initial velocity = …… m/ sec						
(a)	2	(b)	2.4	(c)	3	(d)	3.8

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

(19)	In the opposite figure: A circle of radius length 10 cm , $\overrightarrow{BD}$ is a tangent at B , AB = 15 cm , AC = 8 cm ,the forces act as shown in the figure(measured in Newton) . Find the sum of moments of these forces about the point A .	
(20)	In the opposite figure: A ball of mass 2 kg is projected upwards on a smooth inclined plane with velocity 3 m/sec from the point A at the bottom of the smooth inclined plane $\overline{AB}$ and comes to rest at the point B, If 3AC = 2BC , Find the kinetic energy at C.