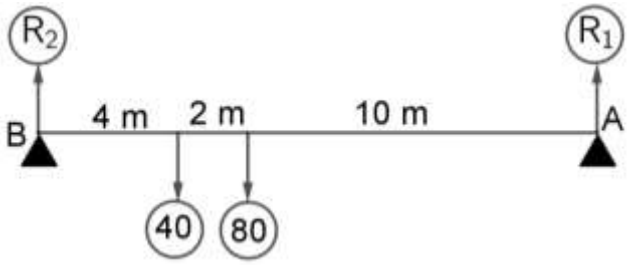
نموذج استرشادى (٢) لامتحان شهادة إتمام الدراسة الثانوية العامة ٢٠٢٥ / ٢٠٢٦ م

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

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

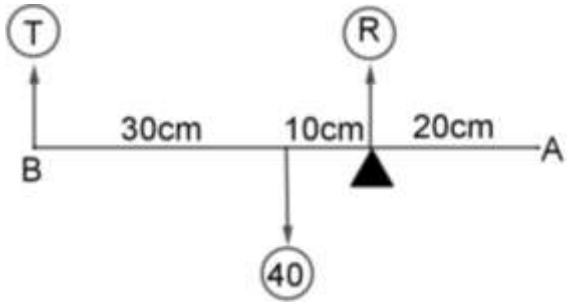
(1)	The forces $\overrightarrow{F_1} = 2\vec{\imath} - 3\vec{\jmath}$, $\overrightarrow{F_2} = 5\vec{\imath} - 2\vec{\jmath}$, $\overrightarrow{F_3} = -3\vec{\imath} + 2\vec{\jmath}$ act at the point A (-3, 5), then the perpendicular distance from the point B (1 , 7) and the line of action of the resultant =……unit length.						
(a)	3	(b)	4	(c)	5	(d)	6

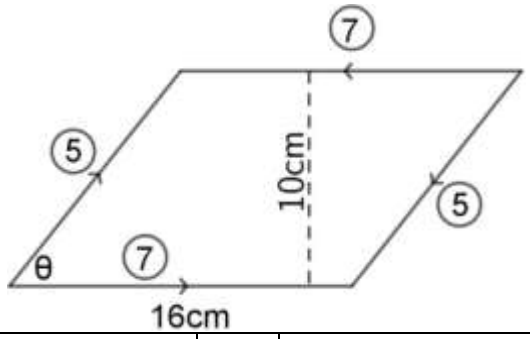
(2)	In the given figure: If the system of forces is equilibrium, then R_1 = ……newton. 						
(a)	20	(b)	40	(c)	60	(d)	80

(3)	If the forces $\overrightarrow{F_1}$, $\overrightarrow{F_2}$, $\overrightarrow{F_3}$ act at the points (0 , 0) , (1 , 0) , (0 , 1) and they are equivalent to a couple where $\overrightarrow{F_1} = 3\hat{\imath} + 4\hat{\jmath}$, $\overrightarrow{F_2} = -\hat{\imath} + \hat{\jmath}$, then the magnitude of the moment of the couple equals …….moment unit.						
(a)	-3	(b)	-2	(c)	2	(d)	3

(4)	A particle moves in a straight line such that the algebraic measure of the velocity V (m/sec) is given as a function in the time t (sec) by the relation V = $\sin\left(\frac{\pi}{6}t\right)$, then the acceleration of motion when t = 2sec equlas ……m/sec^2						
(a)	$\frac{\pi}{12}$	(b)	$\frac{\pi}{6}$	(c)	$\frac{\pi}{2}$	(d)	$\frac{\pi}{3}$

(5)	A body of mass m = (4t + 3)kg moves in a straight line , if its algebraic measure of the displacement is written as a function in time by the relation S = $(\frac{3}{2}t^2 + 4t)$ meters , then the magnitude of the force act on it is …. Newton						
(a)	24t + 3	(b)	24t + 5	(c)	24t + 25	(d)	25t + 24

(6)	In the opposite figure: $\overline{AB}$ is a uniform rod of length 60 cm. and of weight 40 kg. wt., if the rod rests horizontally on a support at a distance 20 cm. from A and suspended from the end B by a light string, then R – T = …..kg. wt. 						
(a)	40	(b)	30	(c)	20	(d)	10

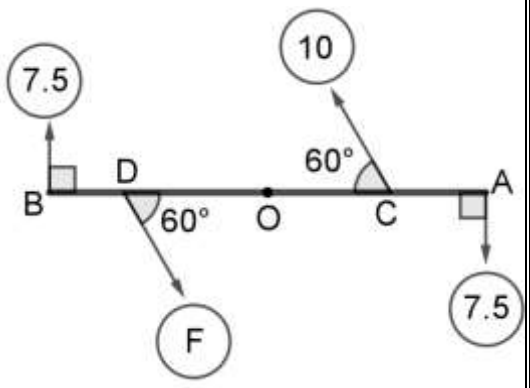
(7)	The opposite figure shows a lamina in the form of a parallelogram and two couples acted on it, if the algebraic measure of the moment of the resultant couple is equal to 30 newton. cm , then θ =…..° 						
(a)	30	(b)	45	(c)	60	(d)	90

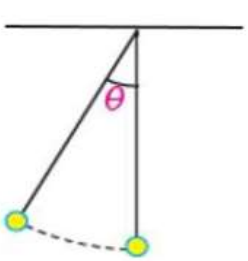
(8)	A particle moves in a straight line such that the algebraic measure of its velocity is given as a function of time by the relation V = $6t^2$ - 24 where V is measured in (m/sec), then the magnitude of the displacement of the particle during the interval t∈ [1 ,4] is……m.						
(a)	54	(b)	190	(c)	290	(d)	298

(9)	A man of mass 80 kg sitting on a chair of mass 18 kg inside a lift of mass 420 kg moving vertically upwards with acceleration a m/sec^2 , if the pressure of the chair and the man together on the ground of the lift was 105 kg.wt , then the tension in the wire carrying the lift was……. Kg.wt						
(a)	555	(b)	545	(c)	455	(d)	444

(10)	A helicopter of mass M tons and the force of its engine is 3 ton.wt. moves vertically downward against a resistance 750 kg.wt., if the work done by the resultant force to cover a distance 100 m is 25000 kg.wt .m., then M = ...tons						
(a)	3	(b)	4	(c)	5	(d)	6

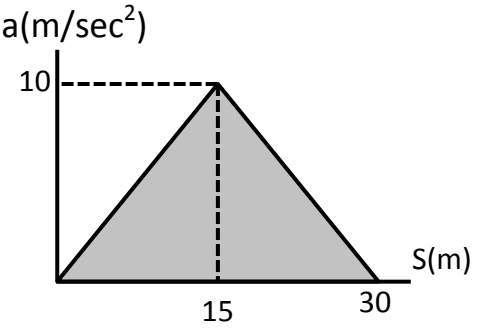
Second: Multiple choice questions" two marks for each item".

(11)	In the opposite figure: If $\overline{AB}$ is a light horizontal rod of negligible weight and its length is 30 cm., O is the midpoint of $\overline{AB}$, the forces shown in the figure measured in Newton, then the length of $\overline{CD}$ in case of equilibrium equals……cm.  						
(a)	10	(b)	15	(c)	$10\sqrt{3}$	(d)	$15\sqrt{3}$

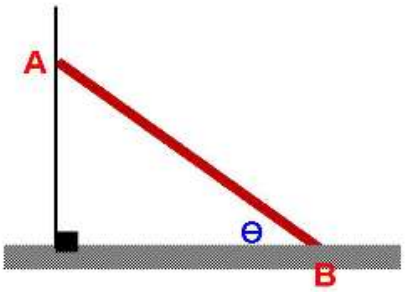
(12)	A simple pendulum the length of its string is L length unit and the mass of its sphere is m mass unit when the pendulum starts its motion the string oscillated forming an angle of measure θ with the vertical. then the change of the potential energy during this displacement equals..... energy unit.  						
(a)	mgL(1- cos θ)	(b)	mgL(1- sin θ)	(c)	mgLcos θ	(d)	mgLsin θ

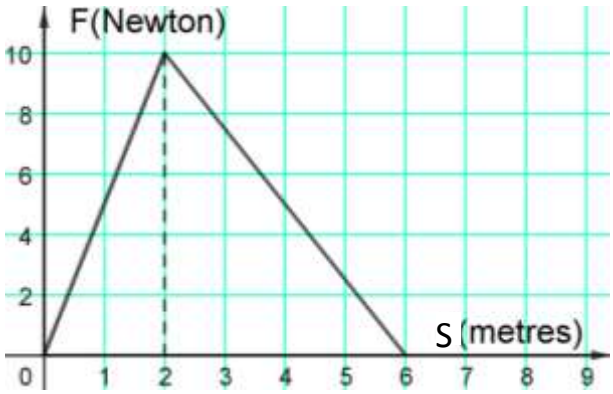
(13)	If the line of action $\vec{F} = \hat{\imath} + \hat{\jmath}$ bisects $\overline{AB}$ at the point D where A = (3 , -1) , D = (1 , 4), then $\overrightarrow{M_B}$ = …..$\hat{k}$						
(a)	7	(b)	-7	(c)	3	(d)	-3.5

(14)	The forces $\overrightarrow{F_1} = l\,\hat{\imath} + m\,\hat{\jmath}$, $\overrightarrow{F_2} = -2\,\hat{\imath} + \hat{\jmath}$ act at the two points A (1,2) and B (2,4) respectively and the sum of moments of the two forces about the origin $= -5\hat{k}$, and the sum of moments of the two forces about the point C $(-2,3) = 3\hat{k}$, then $l + 2m$ =…..						
(a)	3	(b)	-3	(c)	0	(d)	9

(15)	The drawing figure represents the acceleration — displacement curve for a body moved in a straight line with initial velocity 10 m/sec. If the body covered 30 m, then v^2 equals..... 						
(a)	100	(b)	300	(c)	400	(d)	700

(16)	A ball of mass 100 gram fell vertically down on a horizontal ground with velocity of $25\ \mathrm{cm/sec}$. If it rebounded vertically upwards with velocity $15\ \mathrm{cm/sec}$, then the magnitude of the impulse of the ground on the ball equals …… $\mathrm{dyne.sec}$.						
(a)	1000	(b)	1500	(c)	2500	(d)	4000

(17)	In the opposite figure: $\overline{AB}$ is a uniform ladder of weight W kg. wt. rests with its end B on a rough horizontal ground and with its end A on a smooth vertical wall. If the coefficient of static friction between the ladder and the ground is $\frac{1}{4}$ and the ladder is about to slide then $\tan\theta$ =.....  						
(a)	2	(b)	$\frac{\sqrt{3}}{2}$	(c)	$\frac{1}{4}$	(d)	$\frac{1}{2}$

(18)	The opposite figure illustrates (the force – displacement) graph of a body of mass 10 kg. moving in a straight line with initial velocity 3 m./sec., then its kinetic energy becomes.....joules at the end of its displacement.  						
(a)	45	(b)	55	(c)	65	(d)	75

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

(19)	ABCD is a trapezium in which $\overline{AD} // \overline{BC}$, $m(A\hat{B}C) = 90°$, AB = 8 cm, BC = 15 cm, AD = 9 cm. Forces of magnitudes F, 44, 68 gm.wt act along $\overrightarrow{DA}$, $\overrightarrow{DC}$, $\overrightarrow{AC}$ respectively. If the line of action of the resultant of these forces passes through the point B. Find the value of F.

(20)	A body of mass 300 gm. is placed at height 10 m from the surface of the ground, if the body fall vertically, find its kinetic energy in joule when it was at a distance 3 m from the surface of the ground.