نموذج (٩) 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) From the top of a tower of height 64 meters, a body was projected vertically upwards. Such that the algebraic measure of its position vector with respect to the top of the tower is given by the relation: $r = 80\ t - k\ t^2$, and the body hit the ground with a velocity of 96 m/sec , then: k =…….

(a)	8	(b)	11	(c)	16	(d)	22

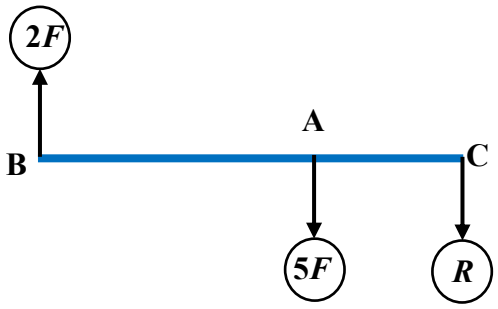
(2) A rested body of mass 3 kg started moving from a fixed point (O) on a straight line under the action of a force $\vec{F}$ where F = 3 r^2 + 9 Newton. The magnitude of the body's velocity when s = 3 is ..... m/sec

(a)	3	(b)	6	(c)	9	(d)	12

(3) A force $\overrightarrow{F}$ of magnitude $10\sqrt{2}$ acts at the point (3, 2) in a direction makes an angle of 45° with the positive direction of the x-axis. The moment of the force $\vec{F}$ about the origin (O) = =……. $\vec{k}$

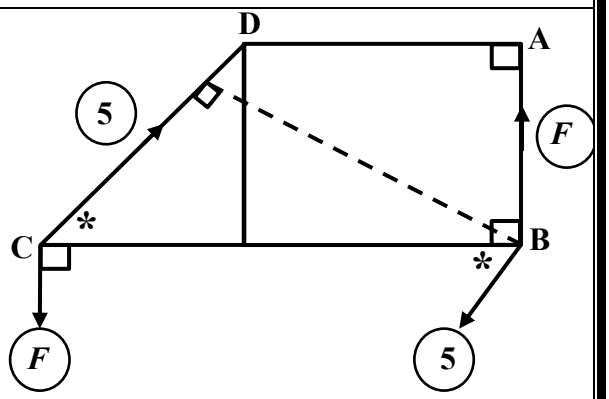
(a)	10	(b)	20	(c)	- 10	(d)	- 20

(4) In the opposite figure:
5 F , 2 F are two parallel and opposite forces acting at points A and B respectively.
Their resultant R acts at point C ,
then: AC : AB = …….



(a)	3 : 2	(b)	2 : 3	(c)	5 : 3	(d)	5 : 2

(5) In the opposite figure:
ABCD is a trapezium
AB = 12 cm , BC = 23 cm , AD = 14 cm
The shown forces acted as in the figure.
If the system is in equilibrium,
then the magnitude of
the force F = ……. Newtons
(Forces are measured in Newtons)

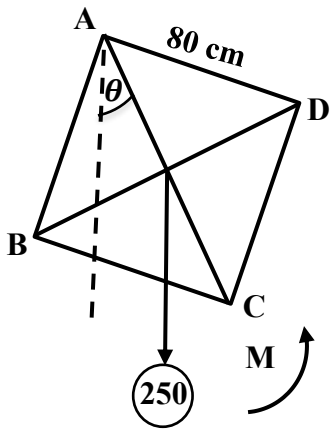


(a)	2	(b)	3	(c)	5	(d)	4

(6)	In a training for one of the military teams, a soldier is trained to descend a rope if the maximum tension in the rope equals $\frac{3}{4}$ the soldier's weight. The minimum acceleration, in terms of (g) (the gravity acceleration) of with which the soldier moves on the rope, is equal to …….						
(a)	$\frac{1}{5}$ g	(b)	$\frac{3}{4}$ g	(c)	$\frac{1}{3}$ g	(d)	$\frac{1}{4}$ g

(7)	A light string passes over a fixed smooth pulley, and carries at its ends it two bodies of masses of 2 m kg and 3 m kg, hanging vertically. If the system starts moving from rest when the two bodies are in the same horizontal plane, then the tension in the string equals …….						
(a)	$\frac{7}{8}mg$	(b)	$\frac{8}{3}mg$	(c)	$\frac{5}{12}mg$	(d)	$\frac{12}{5}mg$

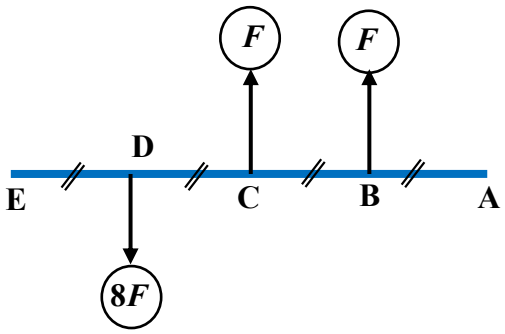
(8)	If $\overrightarrow{F_1}$, $\overrightarrow{F_2}$ and $\overrightarrow{F_3} = 2\hat{\imath} + \hat{\jmath}$ three parallel and equilibrium forces act at the points (0 , 3) , (2 , 5) and (4 , 7) respectively, then $\overrightarrow{F_2}$ = …….						
(a)	$-4\hat{\imath} - 2\hat{\jmath}$	(b)	$4\hat{\imath} + 2\hat{\jmath}$	(c)	$2\hat{\imath} + \hat{\jmath}$	(d)	$-2\hat{\imath} - \hat{\jmath}$

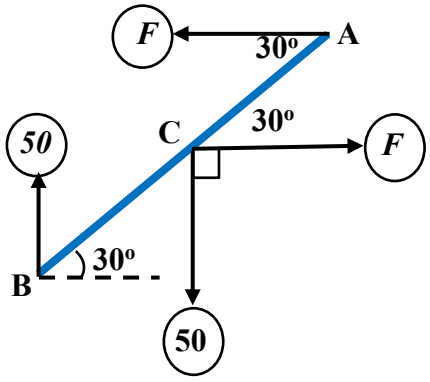
(9)	ABCD is a thin squared lamina of side length 80 cm and weight of 250 gm.wt acts at its geometric center. The lamina is suspended from a nail in a small hole near vertex A such that its plane is vertical and a couple the norm of its moment is$5000\sqrt{2}$ gm.wt.cm acts on its plane. If the body is in equilibrium in a position where $\overline{AC}$ is inclined to the vertical an angle θ, then the value of θ = ……. ° 						
(a)	90	(b)	45	(c)	30	(d)	60

(10)	A body moves in a straight line with an acceleration whose algebraic measure $a = 2\,t + 2$. If the ratio between its velocity after 4 seconds to its initial speed is 7 : 1, then the velocity of the body after 5 seconds from the motion starts equals ..... m/sec						
(a)	13	(b)	12	(c)	36	(d)	39

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

(11)	A force $\vec{F} = 3\hat{i} + 4\hat{j}$ its moment about the point A (1 , 3) equals 10 $\hat{k}$, then the moment of this force about point B (- 2 , 7) = ... $\hat{k}$						
(a)	76	(b)	34	(c)	24	(d)	58

(12)	In the opposite figure: $\overline{AE}$ is a rod of length 4 L the shown forces was acted as the figure, the point of action of the resultant divides $\overline{AE}$ in the ratio ..... 						
(a)	8 : 9 internally	(b)	8 : 9 externally	(c)	7 : 1 internally	(d)	1 : 7 externally

(13)	In the opposite figure: $\overline{AB}$ is a uniform equilibrium rod in which AC = $\frac{1}{2}$ AB Then the magnitude of F = ... gm.wt 						
(a)	$50\sqrt{3}$	(b)	$50\sqrt{2}$	(c)	$\frac{50}{\sqrt{2}}$	(d)	$\frac{50}{\sqrt{3}}$

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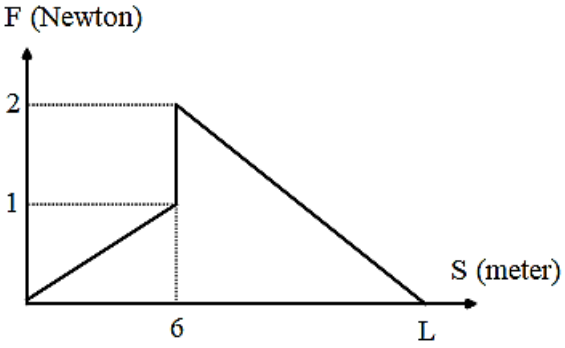
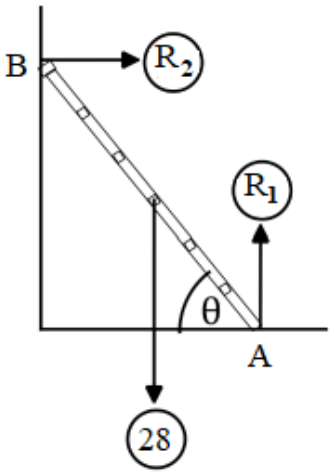
(14) The opposite figure represents the (force - displacement) curve for a body moves in a straight line. If the work done by the force during the displacement from F = 0 to F = L meters equals 13 joule, then L = ……



(a)	6	(b)	12	(c)	16	(d)	20

(15) In the opposite figure:
$\overline{AB}$ is a uniform rod of weight 28 dyne rests with its end A on a rough horizontal ground and its end B on a smooth vertical wall.
If $R_2 = \frac{14}{\sqrt{3}}$ and its angle of inclination to the ground is θ,
then θ = ……



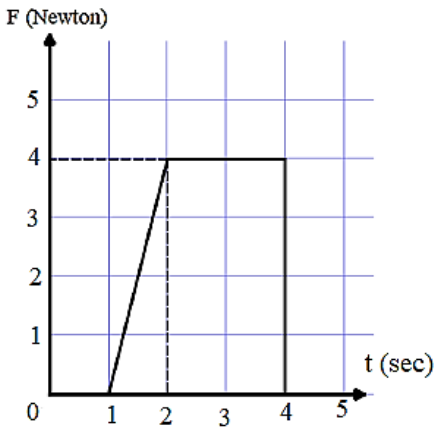
(a)	25	(b)	45	(c)	30	(d)	60

(16) A body of a mass 3 kg is at rest, a force $\vec{F}$ is acted on the body where F = 9 t^2 (in Newtons), then the work done by this force during the first two seconds equals = …… joule

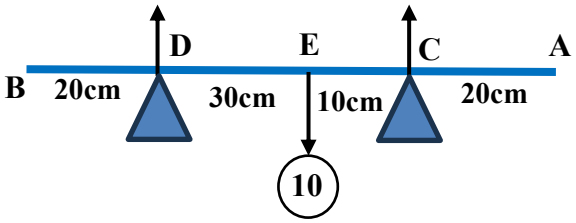
(a)	96	(b)	144	(c)	48	(d)	72

(17) A helicopter with a mass of 2 tons moves vertically upwards against resistances equal to 250 kg.wt, per ton of its mass. If its maximum engine power is 500 horse, then its maximum speed at which it moves vertically upwards = …… km/h

(a)	54	(b)	45	(c)	108	(d)	205

(18)	The opposite figure represents a (force-time) graph for a body of mass m moving in a straight line in a time t, then the change in momentum from t=1 sec to t=4 sec equals ……. Newton.sec 						
(a)	2	(b)	8	(c)	10	(d)	12

ثالثاً: الأسئلة المقالية " كل سؤال درجتان"

(19)	In the opposite figure: $\overline{AB}$ is a uniform light rod of length 80 cm rests on two supports at the points C and D. The shown forces acted on it as the figure.  Find the magnitude of the largest weight that can be suspended at A without disturbing the equilibrium.

(20)	A body of mass m kg is projected with an initial velocity of 10 m/sec. from the bottom of an inclined plane of length 5 meter against a constant resistance of $\frac{9}{49}$ of the weight of the body. Find the velocity of the body when it returns to the same point from which it was projected.