وزارة التربية والتعليم
مديرية التربية والتعليم بمحافظة .....

امتحان تجريبى شهادة إتمام الدراسة الثانوية العامة

المـــادة : الاستاتيكا

التاريخ : / / ٢٠١

زمن الإجابة : ساعتان

نموذج ثانوية عامة

١

عدد أوراق الإجابة (٨) ورقات بخلاف الغلاف
وعلى الطالب مسؤلية المراجعة والتأكد من ذلك قبل تسليم الكراسة

الأسئلة من ..... إلى	الدرجة	توقيع	
		المقدر	المراجع

مجموع الدرجات

رقم المراقبة

مجموع الدرجات بالحروف : _____

إمضاءات المراجعين : _____

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اسم الطالب (رباعيًا) / _____

المـــدرســـــة : _____ الإدارة : _____

رقـم الجلـــوس : _____ المحافظة : _____

١- _____

٢- _____

توقيع الملاحظين بصحة البيانات ،
ومطابقة عدد أوراق كراسة الإجابة
عند استلامها من الطالب .

(١) The force $\vec{F} = 3\hat{i} - 5\hat{j}$ acts at point A (-1 , 1) then the moment of the force $\vec{F}$ about the origin point is equal to:

a $-2\hat{k}$ b $2\hat{k}$ c $8\hat{k}$ d $-8\hat{k}$

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(٢) The center of gravity of two physical bodies of masses 3 newtons and 6 newtons and the distance between them is 15 cm is at distance ..... cm from the 3 newtons body

a 5 b 10 c 7.5 d 9

(٣) AB is a light fine rod of length 2 L connected in a vertical plane at its two ends A, B by two strings inclined at 30, 60 to the horizontal respectively, two weights of 2, 8 newtons are suspended on the rod distant $\frac{1}{5}$ L , $\frac{6}{5}$ L from A.

Find in the position of equilibrium, and tension magnitude in the two strings and the measure of the angle of inclination of the rod to the horizontal.

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(٤) The angle of friction is:

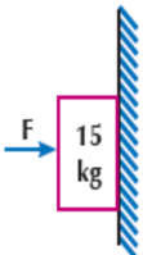
a The angle included between the normal reaction and the resultant reaction in the case of limiting friction.

b The ratio between the force of limiting friction and the normal reaction.

c The ratio between the coefficients of static and kinetic friction.

d The angle included between the force of the limiting fraction and the resultant reaction.

(٥) The magnitude of the least horizontal force $\overline{F}$ needed to equilibrate a body of mass 15 kg.wt on a rough vertical plane the coefficient of the static friction between it and the body is equal to $\frac{1}{5}$ is equal to..... kg.wt.



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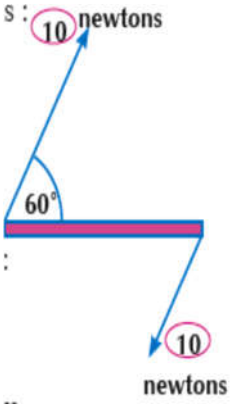
(٦) The algebraic measure of the moment of the opposite couple is equal to:

a 800 newtons . cm

b -800 newtons .cm

c $400\sqrt{3}$ newtons . cm

d $-400\sqrt{3}$ newtons.cm



(٧) ABC is a uniform lamina in the form of an equilateral triangle of side length $30\sqrt{3}$ cm and weight 50 kg.wt. The lamina is suspended by a horizontal pin from a hole close to vertex A to be vertically in equilibrium. A couple perpendicular to the surface of the lamina acts on the lamina to be in equilibrium in a position $\overline{AB}$ is horizontal. Find the moment of the couple acting and the reaction of the pin.

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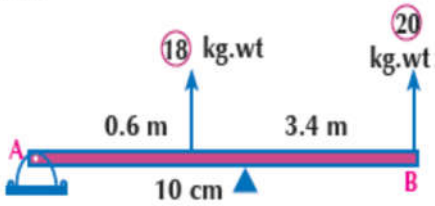
(٨) If the two forces $\vec{F}_1 = A\hat{i} + 5\hat{j}$, $\vec{F}_2 = 3\hat{i} - B\hat{j}$ form a couple, then A + B = ...

(٩) If the resultant of three forces act on the rod AB of negligible weight in the figure is 13.6 kg.wt and acting upwards distant 3 meters on the right of A. Find the magnitu direction and point of action of the third force



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(١٠) If $\overrightarrow{F_1} = 3\hat{i} - b\hat{j}$ and $\overrightarrow{F_2} = a\hat{i} - 5\hat{j}$ form a couple, then (a, b) =

a (3, -4) b (3, 5) c (-3, 5) d (-3, -5)

(١١) If the norm of the moment of a couple is 350 newtons. m and the magnitude of one of its two forces is 70 newtons, then the arm length of the moment of the couple is equal to:

a 50 meter b 5 meters c 5 cm. d 24500 cm.

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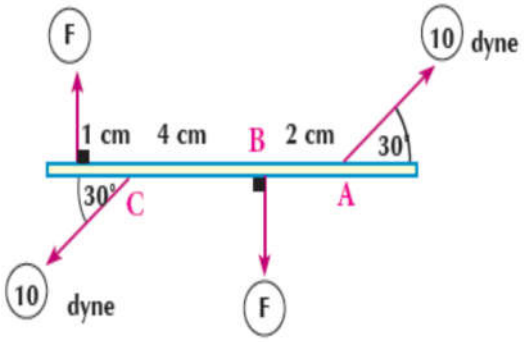
(١٢) **The opposite figure** represents an equilibrium rod under the action of four forces. Find the value of F.



(١٣) ABCDEF is a regular hexagon of side length 15 cm. Forces of magnitudes 40, 50, 30, 40, 50 and 30 newtons act at $\overrightarrow{AB}$, $\overrightarrow{CB}$, $\overrightarrow{CD}$, $\overrightarrow{DE}$, $\overrightarrow{OE}$ and $\overrightarrow{FA}$ respectively. Find the moment of the resultant couple.

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(١٤) The forces $\overrightarrow{F_1} = 2\hat{i} - 4\hat{j}$, $\overrightarrow{F_2} = \hat{i} - 3\hat{j}$, $\overrightarrow{F_3} = -3\hat{i} + 7\hat{j}$ act at point A (-1, 1), B (-2, 3), C (0, 1) respectively. Prove that the system of forces is equivalent to a couple and find the magnitude of its moment

(١٥) If the force $\overrightarrow{F} = \hat{i} + 2\hat{j} - 3\hat{k}$ acts at point A (2, -1, 3) then the moment of $\overrightarrow{F}$ about origin point is equal to:

a $-3\hat{i} + 9\hat{j} + 5\hat{k}$ b $-\hat{i} - 2\hat{j} + \hat{k}$

c $3\hat{i} - 9\hat{j} - 5\hat{k}$ d $2\hat{i} - 5\hat{j} + \hat{k}$

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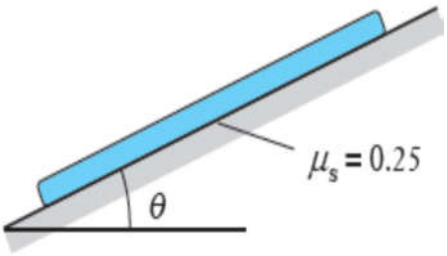
(١٦) If two forces parallel and in the same direction each of a magnitude 5 and 7 newtons act at two points A and B , then the magnitude of their resultant is equal to:

a 12 b 2 c $C\sqrt{74}$ d $\sqrt{24}$

(١٧) **In the opposite figure:**

the body is about to move down wards, then m($\angle\theta$) =



a 14.04° b 14.48°

c 75.52° d 75.87°

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(١٨) A body of weight 13.5 kg.wt is placed on a rough horizontal plane , its coefficient of friction between them is $\frac{2}{3}$, A horizontal force act on it its magnitude 7.5 kg.wt. show whether the body is about to move? Explain your answer.

(١٩) ABCD is a rectangle in which AB = 6 cm and BC = 8 cm forces of magnitudes 4, 5, 3 and 3 newtons act along the directions of $\overrightarrow{AB}$, $\overrightarrow{BE}$, $\overrightarrow{DC}$ and $\overrightarrow{AD}$ where E ∈ $\overline{BC}$, BE = 6cm. Prove that the resultant of these forces passes through point E.

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(٢٠) **The opposite figure** presents a door attached with a hinge at A. If a force $\overrightarrow{F}$ acts on the door which of the following figures in which the force $\overrightarrow{F}$ has the greatest moment about A?