نموذج استرشادي تدريبي لشهادة إتمام الدراسة ث - ع
المادة: الاستاتيكا باللغة الإنجليزية
التاريخ: 2021
زمن الإجابة: ساعتان

<table>
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<th>الأسلحة</th>
<th>المقدمة</th>
<th>المراجع</th>
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<tbody>
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<tr>
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</tr>
</tbody>
</table>

إجمالي الدرجات: ______

الذكاءات التي تم إكمالها:

رقم المراقبة: ______

وزارة التربية والتعليم
نموذج استرشادي تدريبي لشهادة إتمام الدراسة ث - ع
المادة: الاستاتيكا باللغة الإنجليزية
التاريخ: 2021
زمن الإجابة: ساعتان

اسم الطالب (рабطاً): ______
المرسالة: ______
رقم الالتباس: ______

توضيح: الملاحظات بصحبة البيانات:
معتبارة عند أوراق إجابة الإجابة
عند استلامها من الطالب.
تعليمات هامة:
عزيزي الطالب:
1. أقرأ التعليمات جيداً سواء في مقدمة كرامة الامتحان أو في مقدمة الأسئلة ، وفي ضوءها أجيب عن الأسئلة .
2. أقرأ السؤال بعناية، وفكر فيه جيداً قبل البدء في إجابته.
3. عند إجابتك للأسئلة المقالية، أجب فيما لا يزيد عن المساحة المحددة لكل سؤال.

مثال :

4. عند إجابتك عن أسئلة الاختيار من متعدد إن وجدت:
ظل الدارة ذات الرمز الدال على الإجابة الصحيحة تظليلًا كاملة لكل سؤال.
مثال: الإجابة الصحيحة (جـ) مثلاً

- في حالة إذا أجبت إجابة خاطئة، ثم قمت بالتشويك وأجبت إجابة صحيحة تحسب الإجابة صحيحة.
- وفي حالة ما إذا أجبت إجابة صحيحة، ثم قمت بالتشويك وأجبت إجابة خاطئة تحسب الإجابة خاطئة.
- في حالة التفتيش على أكثر من رمز، تعتبر الإجابة خاطئة.

ملحوظة:
لا تكوير الإجابة عن الأسئلة الموضوعية (الاختيار من متعدد) ،
فلن تقدم إلا الإجابة الأولى فقط.
5- إذا أجبت عن سؤال من الأسئلة المقالية بإجابتين ، فسيتم تقدير الإجابة الأولى فقط ، فشطب أنت الإجابة التي لا ترغب فيها.

6- يسمح باستخدام الآلة الحاسبة.
7- عدد أسئلة كرامة الامتحان (18) سؤال.
8- عدد صفحت كرامة الامتحان (22) صفحة.
9- تأكد من ترقيم الأسئلة ، ومن عدد صفحت كرامة الامتحان ، فهي مسؤوليتكم.
10- زمن الاختبار سعات.  
11- الدرجة الكلية للاختبار (30) درجة
1. If the force \( \vec{F} = (2, -3, 4) \) acts at the point \((1,1,1)\), then the component of the moment of \( \vec{F} \) about x-axis equals ………

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>-5</td>
</tr>
<tr>
<td>b</td>
<td>-2</td>
</tr>
<tr>
<td>c</td>
<td>2</td>
</tr>
<tr>
<td>d</td>
<td>7</td>
</tr>
</tbody>
</table>

-5  
-2  
2  
7  

If the force \( \vec{F} = (2, -3, 4) \) acts at the point \((1,1,1)\), then the component of the moment of \( \vec{F} \) about x-axis equals ………

-5  
-2  
2  
7  

إذا كانت القوة \( \vec{F} = (2, -3, 4) \) تؤثر في النقطة \((1,1,1)\) فـ فإن مركبة عزم \( \vec{F} \) حول محور تساوي ………

-5  
-2  
2  
7  

...
In the following figure:

AD is a rod of negligible weight, forces of magnitudes 3, \( f \), 5 and \( k \) act at the points A, B, C and D respectively as in the given directions. If the forces equivalent to a couple the algebraic measure of its moment is 36 N.cm, find the value of each of \( f \) and \( k \).
Three forces are represented completely by the sides of an equilateral triangle ABC in the same cyclic order with scale 1 cm for each 2 gm.wt. If the side length of the triangle is 30 cm, then the norm of the moment of the couple equals \( \ldots \ldots \) gm.wt.cm.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>(900\sqrt{3})</td>
<td>(\sqrt{3}/900)</td>
</tr>
<tr>
<td>b</td>
<td>(1800\sqrt{3})</td>
<td>(\sqrt{3}/1800)</td>
</tr>
<tr>
<td>c</td>
<td>(450\sqrt{3})</td>
<td>(\sqrt{3}/450)</td>
</tr>
<tr>
<td>d</td>
<td>900</td>
<td>900</td>
</tr>
</tbody>
</table>
4. A body of weight 50 newton is placed on a rough inclined plane. A force acts on the body and in the direction of the line of the greatest slope upwards if the body is about to move upwards when the magnitude of the force equals 30 newton and the body is about to move downwards when the magnitude of the force equals 20 newton. Find the measure of the angle of inclination of the plane to the horizontal.
The distance between the center of gravity of the fine lamina of uniform thickness and density in the form of an equilateral triangle of side length 12 cm to one of the vertices of the triangle equals \( \sqrt{3} \) cm.

<table>
<thead>
<tr>
<th>Option</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) ( \frac{6}{\sqrt{3}} )</td>
<td>6</td>
</tr>
<tr>
<td>(b) ( \frac{4}{\sqrt{3}} )</td>
<td>6</td>
</tr>
<tr>
<td>(c) ( \frac{2}{\sqrt{3}} )</td>
<td>6</td>
</tr>
<tr>
<td>(d) ( \frac{1}{\sqrt{3}} )</td>
<td>6</td>
</tr>
</tbody>
</table>

The correct answer is (a) \( \frac{6}{\sqrt{3}} \) cm.
6. ABCD is a rectangle in which AB = 6 cm, BC = 8 cm, E ∈ BC such that BE = 3 cm. Forces of magnitudes 9, 12, 10 and $6\sqrt{5}$ newtons act at directions $\overline{AB}$, $\overline{CB}$, $\overline{AC}$ and $\overline{EA}$ respectively.

**Answer one of the following questions:**

1- Find the sum of the magnitudes of the moments of the forces about M where M is the intersection point of the two diagonals of the rectangle.

2- Find the sum of the magnitudes of the moments of the forces about D.
7. If the points A, B and C are in the same plane of a set of forces such that \( \vec{M}_A = 20 \vec{k}, \vec{M}_B = \vec{0}, \vec{M}_C = -10 \vec{k} \), then ……

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>The set is equilibrium</td>
</tr>
<tr>
<td>(b)</td>
<td>The resultant bisects ( \overrightarrow{AC} )</td>
</tr>
<tr>
<td>(c)</td>
<td>B is in the line of action of the resultant</td>
</tr>
<tr>
<td>(d)</td>
<td>The resultant is parallel to ( \overrightarrow{AC} )</td>
</tr>
</tbody>
</table>

If the forces \( A, B, C \) lie in the same plane of a set of forces such that \( \vec{F}_A = 20 \vec{k}, \vec{F}_B = \vec{0}, \vec{F}_C = -10 \vec{k} \), then ……
8. ABCD is a lamina of a uniform thickness and density of mass 4M in the form of a rectangle in which AB = 8 cm, BC = 12 cm and the point E is the intersection point of the diagonals of the rectangle. If the triangle ABE is separated and the masses M, 2M, M and M are fixed at the vertices A, C, D and E respectively. find the distance between the center of gravity of the set to each of \( \overrightarrow{DC}, \overrightarrow{DA} \).
If a rod is connected by one of its ends to a hang fixed on a vertical wall and \( x, y \) are the two algebraic components of the reaction of the hang where \( x = 5 \) newton, \( y = 12 \) newton, then the magnitude of the reaction of the hang = …… newton

<table>
<thead>
<tr>
<th>Option</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 7</td>
<td>7</td>
</tr>
<tr>
<td>b) 13</td>
<td>13</td>
</tr>
<tr>
<td>c) 17</td>
<td>17</td>
</tr>
<tr>
<td>d) 60</td>
<td>60</td>
</tr>
</tbody>
</table>

If a rod is connected by one of its ends to a hang fixed on a vertical wall and \( x, y \) are the two algebraic components of the reaction of the hang where \( x = 5 \) newton, \( y = 12 \) newton, then the magnitude of the reaction of the hang = …… newton

If a rod is connected by one of its ends to a hang fixed on a vertical wall and \( x, y \) are the two algebraic components of the reaction of the hang where \( x = 5 \) newton, \( y = 12 \) newton, then the magnitude of the reaction of the hang = …… newton
10. The force $\mathbf{F}$ acts at the point $A(-3,2)$. If the moment of the force $\mathbf{F}$ about each of the two points $B(3,1), C(-1,4)$ equals $28 \mathbf{K}$, find $\mathbf{F}$. 

إذا كان عزم $\mathbf{F}$ حول كل من النقطتين $B(3,1), C(-1,4)$ يساوي $28 \mathbf{K}$، اوجد $\mathbf{F}$.
If the force \( \vec{F} = 3\hat{i} - 4\hat{j} \) acts at the point \( A(1,2) \), then the distance between the origin point \( O(0,0) \) and the line of action of the force equals \( \ldots \ldots \) length unit.

\[ 11. \]

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
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<tr>
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<td>( \sqrt{5} )</td>
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<tr>
<td>b</td>
<td>2</td>
</tr>
<tr>
<td>c</td>
<td>5</td>
</tr>
<tr>
<td>d</td>
<td>10</td>
</tr>
</tbody>
</table>

\[ \text{If was } \vec{F} = 3\hat{i} - 4\hat{j}, \text{ then the distance between the origin point } O(0,0) \text{ and the line of action of the force equals } \ldots \ldots \text{ length unit.} \]
12. If the resultant of the two parallel forces $7\vec{e}$, $5\vec{e}$ newton acts at a point $2\frac{1}{3}$ meter apart from the line of action of the smaller force, then the distance between the lines of action of the two forces = ........ meter

<p>| | | | | |</p>
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<tr>
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<td>$\frac{49}{15}$</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>$\frac{28}{5}$</td>
<td></td>
<td>$\frac{28}{5}$</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>$\frac{5}{3}$</td>
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<td>$\frac{5}{3}$</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>4</td>
<td></td>
<td>4</td>
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</tbody>
</table>

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<table>
<thead>
<tr>
<th>Question</th>
<th>Part 1</th>
<th>Part 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>A uniform rod AB of weight 20 newton and length 60 cm rests with its end A at a rough horizontal plane and at one of its points C at a smooth wedge which is 25 cm upon the horizontal plane. If the rod is about to slip as it is inclined at 30° to the horizontal, find the reaction of the wedge and the coefficient of friction between the rod and the plane known that the rod lies in a vertical plane.</td>
<td>اب قضيب منظم وزنه 20 نيوتن وطوله 60 سم، يرتكز بطرفه A على مستوى أفقي خشن، ويرتكز عند إحدى نقاطه C على وتد أقل، يعلو 25 سم عن المستوى الأفقي، وكان القضيب على وشك الانزلاق عندما كانت زاوية ميله على الأفقي 30°. أوجد رد فعل الوردو، وكذلك معامل الاحتكاك بين القضيب والمستوى، علمًا بأن القضيب يقع في مستوى رأسي.</td>
</tr>
</tbody>
</table>

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A uniform rod AB of weight 20 newton and length 60 cm rests with its end A at a rough horizontal plane and at one of its points C at a smooth wedge which is 25 cm upon the horizontal plane. If the rod is about to slip as it is inclined at 30° to the horizontal, find the reaction of the wedge and the coefficient of friction between the rod and the plane known that the rod lies in a vertical plane.
14. If $\mu_s$, $\mu_k$ are the coefficients of static and kinetic friction respectively for two connected bodies, then

<table>
<thead>
<tr>
<th>Option</th>
<th>Condition</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>$\mu_s &lt; \mu_k$</td>
<td>$\mu_s &gt; \mu_k$</td>
</tr>
<tr>
<td>b</td>
<td>$\mu_s &gt; \mu_k$</td>
<td>$\mu_s &lt; \mu_k$</td>
</tr>
<tr>
<td>c</td>
<td>$\mu_s = \mu_k$</td>
<td>$\mu_s = \mu_k$</td>
</tr>
<tr>
<td>d</td>
<td>no relation between them</td>
<td>لا توجد علاقة بينهما</td>
</tr>
</tbody>
</table>

If $\mu_s$, $\mu_k$ are the coefficients of static and kinetic friction respectively for two connected bodies, then

- $\mu_s < \mu_k$
- $\mu_s > \mu_k$
- $\mu_s = \mu_k$
- No relation between them
15. ABCD is a square of side length 10 cm. Forces of magnitudes 60, 60 newton act at $BA$, $DC$ respectively. Find the two forces which are equal in magnitude that act at A and C if their lines of action are parallel to the diagonal $BD$ and they form a couple equivalent to the couple formed by the first two forces.
If \( \mathbf{i}, \mathbf{j}, \mathbf{k} \) are a right system of the unit vectors and the force \( \mathbf{F} = 2\mathbf{i} + 3\mathbf{j} - \mathbf{k} \) acts at point \( A (1, -1, 4) \), then the moment of \( \mathbf{F} \) about point \( B (2, -3, 1) \) is equal to:

(a) \(-11\mathbf{i} + 5\mathbf{j} + 7\mathbf{k}\)

(b) \(-11\mathbf{i} - 5\mathbf{j} + 7\mathbf{k}\)

(c) \(11\mathbf{i} + 5\mathbf{j} - 7\mathbf{k}\)

(d) \(-11\mathbf{i} + 5\mathbf{j} - 7\mathbf{k}\)

(e) \(-11\mathbf{i} - 5\mathbf{j} - 7\mathbf{k}\)

(f) \(11\mathbf{i} - 5\mathbf{j} + 7\mathbf{k}\)
17. If the line of action of the force \( \vec{F} = i + j \) bisects \( \overrightarrow{AB} \) where \( A(3,2) \). If \( D(1, 3) \) is the midpoint of \( \overrightarrow{AB} \), then \( \overrightarrow{M_B} = \ldots \)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>- 3 ( \vec{k} )</td>
<td>i</td>
</tr>
<tr>
<td>b</td>
<td>3 ( \vec{k} )</td>
<td>ii</td>
</tr>
<tr>
<td>c</td>
<td>- 6 ( \vec{k} )</td>
<td>iii</td>
</tr>
<tr>
<td>d</td>
<td>6 ( \vec{k} )</td>
<td>iv</td>
</tr>
</tbody>
</table>

If the line of action of the force \( \vec{F} = i + j \) bisects \( \overrightarrow{AB} \) where \( A(3,2) \). If \( D(1, 3) \) is the midpoint of \( \overrightarrow{AB} \), then \( \overrightarrow{M_B} = \ldots \)

\[ \vec{F} = i + j \]

\[ D(1, 3) \]

\[ \overrightarrow{M_B} \]

\[ \overrightarrow{AB} \]

\[ \text{Where } A(3,2) \]

\[ \text{And } D(1, 3) \]

\[ \text{So } \overrightarrow{M_B} = \ldots \]
18. AB is a uniform rod of length 100 cm and weight 10 newton acting at its midpoint rests horizontally on two supports. one of them at end A and the other is at the point C located at a distant 25 cm from B.

**Answer one of the following questions:**

1- find the magnitude of the weight which should be suspended from end B in order that the tension magnitude at C is five times its magnitude at A.

2- find the magnitude of the weight which should be suspended from end B in order that the rod is about to rotate about C.
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