قسم الرياضيات		Department of Mathematics
كلية العلوم		Faculty of Science

م امتحان نهائي الفصل الدراسي الأول 2016/2017م
التاريخ 2017/1/4

اسم المقرر : تكامل + هندسة تحليلية	الفرقة : المستوى الاول	الزمن : ساعتان
الدرجة الكلية : 50	رقم المقرر ورمزه : 105ر	

أجب عن الاسئلة الاتية :

السؤال الاول :

1- أوجد التكاملات الاتية

(i) $\int \dfrac{cos^3 x}{sin^6 x}\, dx$

(ii) $\int \dfrac{\sqrt{1-x}}{\sqrt{2x+3}}\, dx$

(iii) $\int \dfrac{\sec x \tan x}{sec^2 x - 2\sec x + 10}\, dx$

(v) $\int \dfrac{x^4 + 1}{x^3 - x}\, dx$

(iv) $\int sec^3 x\, dx$

(iiv) $\int \dfrac{\sqrt{\tan x}}{\sin x \cos x}\, dx$

2- كون قانون الاختزال المتتالى للتكامل $I_n = \int (sin^{-1} x)^n\, dx$ ومن ثم اوجد قيمة التكامل $\int (sin^{-1} x)^3 dx$

السؤال الثانى :

1- (a) أوجد قيمة التكامل الاتى

$$\int_0^{\frac{\pi}{4}} \ln(1 + \tan x)\, dx$$

b- أوجد مساحة المنطقة المحدودة بالقطع الناقص

$$\frac{x^2}{16} + \frac{y^2}{9} = 1$$

2- (a) أوجد حجم المخروط القائم الذى نصف قطر قاعدتة 4 وارتفاعة 10 .

b- أحسب التكامل $\int_{-2}^{0} e^{-x^2}\, dx$ اذا كانت $h = 0.2$ وذلك باستخدام طريقة سمبسون.

السؤال الثالث:

1- أدرس القطع $\quad x^2 + 4y^2 + 2x - 8y + 1 = 0$

2- أوجد مركز ونصف قطر الدائرة $\quad r^2 + 3r\cos\theta + 3r\sin\theta = 16 \quad$ ثم وضح ذلك بالرسم .
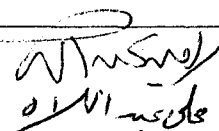
السؤال الرابع:

1- أوجد معادلة المماس ومعادلة العمودى وطول ما تحت المماس وطول ما تحت العمودى للقطع المكافى ثم طبق ذلك على القطع $y^2 = 16x$ عند النقطة $(1,4)$.

2- أوجد معادلة الخط المستقيم العمودى على $4x + 3y = 12$ والذى يبعد عن النقطة $(1,2)$ مسافة 2 ثم وضح ذلك بالرسم.

مع تمنياتى بالتوفيق

د/ راوية عبدالرحمن حسين

د/ على عبداللاة على

museums, libraries, and universities in the capital. Finally, the capital city can serve as a centre of trade, industry and commerce, so it is often the financial centre of the country.

2) The Japanese automobile industry uses robots in many stages of its production process. In fact, one large Japanese auto factory uses robots in all of its production stages. Some Japanese universities are developing medical robots to detect certain kinds of cancer. Another automobile factory in Japan uses them to paint cars as they come off the assembly line. Furthermore, most Japanese factories use robots to weld the parts of the finished car together.

3. Circle the letter of the correct answer.   (16 marks)

1-"Excuse me._____?" 'No, but _____ a little Spanish.'
a. Are you speaking / I'm speaking
b. Do you speak French/ I speak
c. Are you speaking / I speak

2- '_____?' 'Four or five times a year.'
a. Are you often travelling abroad
b. Do you often travel
c. Is you often travelling abroad

3- Water _____ at 100 degree Centigrade.
a. is boiling
b. is boil
c. boils

4- Can I turn off the TV? You _____it.
a. don't watch
b. didn't watched
c. aren't watching

5- When you were a child,_____ away from home?
a. have you ever run
b. did you ever run
c. do you ever run

6- Carlos is the only one of those students who _____ lived up to the potential described in the yearbook.

أولا : الجبر (أجب عن خمسة اسئلة فقط ممياتي كل سؤال 5 درجات)

(1) باستخدام الاستنتاج الرياضي أثبت أن

$$\sum_{r=1}^{n}(r^2+r)=\frac{1}{3}n(n+1)(n+2)$$

(2) أجمع المتسلسلة الاتية الي **n** حدا

$$6.1^2+7.2^2+8.3^2+\ldots\ldots$$

(3) حلل الكسر الاتي الي كسورة الجزئيه

$$\frac{2x^2+3x+4}{(x-1)(x^2+1)}$$

(4) أوجد الحدود الاربعة الاولي في مفكوك المتسلسلة $(8+3x)^{\frac{1}{3}}$ ثم أوجد قيم x التي تجعل المفكوك صحيحا .

(5) ادرس تقارب وتباعد المتسلسلات الاتيه :

$$(i)\sum_{n=1}^{\infty}\frac{3n}{1-.2n+3n^2}. \quad (ii)\sum_{n=1}^{\infty}\frac{(-1)^{n+1}x^n}{n^2}.$$

(6) باستخدام المصفوفات أوجد حل النظام الاتي

$$2x+4y+z=1$$
$$-x+y+z=1$$
$$x+y+2z=1$$

من فضلك انظر خلف الورقة

First Semester Exam - December 2016
Students: First Year
Course: English Language (1)
Time Allowed: Two Hours
Total Score: 50 Marks
Date: 29-12-2016

General Instructions:
- The exam booklet consists of 6 pages.
- Do not write your name inside the exam booklet.
- Do not give more than one answer to each question.
- Do not use pencil or red pen.

Answer the following questions.

1. Choose the best topic sentence for each group of supporting sentences. Write its letter on the line provided.   (5 marks)

1) _____. I usually go skiing every weekend in the winter even though it is expensive. I love the feeling of flying down a mountain. The views are beautiful from the top of a mountain and along the trails. Even the danger of falling and getting hurt can't keep me away from the slopes on a winter day.
a) Skiing is expensive.
b) Skiing is my favourite sport.
c) Skiing is dangerous.

2) _____. First of all, we need money to repair old roads and build new roads. We also need more to pay teachers' salaries and to pay for services such as trash collection. Finally, more tax money is needed to give financial help to the poor citizens of the city. It is clear that the city will have serious problems if taxes are not raised soon.
a) We should raise city taxes.
b) City taxes are too high.
c) City taxes pay for new roads.

2. There is one irrelevant sentence in each paragraph that follows. Find that sentence and cross it out.   (5 marks)

1) The capital city of a country is usually a very important city. The government offices are located in the capital city and political leaders usually live there nearby. There are many different types of governments in the world. The capital may also be the centre of culture. There are often

أولا : الجبر (أجب عن خمسة اسئلة فقط ممماياتي كل سؤال 5 درجات)

(1) باستخدام الاستنتاج الرياضي أثبت أن

$$\sum_{r=1}^{n}(r^2 + r) = \frac{1}{3}n(n+1)(n+2)$$

(2) أجمع المتسلسلة الاتية الي n حدا

$$6.1^2 + 7.2^2 + 8.3^2 + \ldots\ldots$$

(3) حلل الكسر الاتي الي كسورة الجزئيه

$$\frac{2x^2 + 3x + 4}{(x-1)(x^2+1)}$$

(4) أوجد الحدود الاربعة الأولي في مفكوك المتسلسلة $(8+3x)^{\frac{1}{3}}$ ثم أوجد قيم x التي تجعل المفكوك صحيحا .

(5) ادرس تقارب وتباعد المتسلسلات الاتيه :

$$(i) \sum_{n=1}^{\infty} \frac{3n}{1 - .2n + 3n^2}. \quad (ii) \sum_{n=1}^{\infty} \frac{(-1)^{n+1} x^n}{n^2}.$$

(6) باستخدام المصفوفات أوجد حل النظام الاتي

$$2x + 4y + z = 1$$
$$-x + y + z = 1$$
$$x + y + 2z = 1$$

من فضلك انظر خلف الورقة

museums, libraries, and universities in the capital. Finally, the capital city can serve as a centre of trade, industry and commerce, so it is often the financial centre of the country.

2) The Japanese automobile industry uses robots in many stages of its production process. In fact, one large Japanese auto factory uses robots in all of its production stages. Some Japanese universities are developing medical robots to detect certain kinds of cancer. Another automobile factory in Japan uses them to paint cars as they come off the assembly line. Furthermore, most Japanese factories use robots to weld the parts of the finished car together.

3. <u>Circle the letter of the correct answer.</u>   (16 marks)

1-"Excuse me._____?" 'No, but _____ a little Spanish.'
a. Are you speaking / I'm speaking
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2- '_____?' 'Four or five times a year.'
a. Are you often travelling abroad
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5- When you were a child,_____ away from home?
a. have you ever run
b. did you ever run
c. do you ever run

6- Carlos is the only one of those students who _____ lived up to the potential described in the yearbook.

Answer the following questions.

1. Read the following passage and answer the questions that follow.

(10 marks)

"Click!" That's the sound of safety. That's the sound of survival. That's the sound of a seat belt locking in place. Seat belts save lives and that's a fact. That's why I don't drive anywhere until mine is on tight. Choosing to wear your seat belt is a simple as choosing between life and death. Which one do you choose?

Think about it. When you're driving in a car, you may be going 60 MPH or faster. That car is zipping down the road. Then somebody ahead of you locks up his or her brakes. Your driver doesn't have time to stop. The car that you are in crashes. Your car was going 60 miles per hour. Now it has suddenly stopped. Your body, however, is still going 60 MPH. What's going to stop your body? Will it be the windshield or your seat belt? Every time that you get into a car you make that choice. I choose the seat belt.

Some people think that seat belts are uncool. They think that seat belts cramp their style, or that seat belts are uncomfortable. To them I say, what's more uncomfortable? Wearing a seat belt or flying through a car windshield? What' more uncool? Being safely anchored to a car, or skidding across the road in your jean shorts? Wearing a seat belt is both cooler and more comfortable than the **alternatives**. Let's just take a closer look at your choices. If you are not wearing your seat belt, you can hop around the car and slide in and out of your seat easily. That sounds like a lot of fun. But, you are also more likely to die or suffer serious injuries.

If you are wearing a seat belt, you have to stay in your seat. That's no fun. But, you are much more likely to walk away unharmed from a car accident. Hmmm... A small pleasure for a serious pain. That's a tough choice. I think that I'll avoid the serious pain. How about giving money away? Do you like to give your money away? Probably not. And when you don't wear your seat belt, you are begging to give your money away. That's because kids are required to wear seat belts in every state in America. If you're riding in a car, and you don't have

جامعة اسيوط (يناير 2017) المادة : التفكير العلمى

كلية العلوم رقم المادة : 14 م ج الزمن : ساعتان

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سؤال اجبارى : (20 درجة)

الانسان يصطنع منهجا يتيح له الاتصال المباشر بالواقع ، عن طريق الجمع بين العقل والتجربة ، إلا فى مرحلة متأخرة من تاريخه . فلا بد إذن أن عقبات أساسية حالت دون تحقيق هذا الاتصال المباشر بين الإنسان والعالم عن طريق العلم .فما هى هذه العقبات التى أخرت ظهور العلم ، والتى لاتزال تشوه صورة المعرفة العلمية حتى يومنا هذا عند فئات كثيرة من البشر ؟

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اجب عن سؤالين فقط

السؤال الاول : (15 درجة)

التفكير العلمى هو ذلك النوع من التفكير المنظم .. الذى يمكن ان نستخدمة فى شئون حياتنا اليومية .. أو فى النشاط الذى نبذله حين نمارس أعمالنا المهنية المعتادة .. أو فى علاقاتنا مع الناس.. كلم بالتفصيل عن سمات التفكير العلمى .

السؤال الثانى: (15 درجة)

ليس العلم ظاهرة منعزلة ، تنمو بقدرتها الذاتية وتسير بقوة دفعها الخاصة وتخضع لمنطقها الداخلى البحت ، بل أن تفاعل العلم مع المجتمع حقيقة لا ينكرها أحد . تكلم بالتفصيل عن الابعاد الاجتماعية للعلم المعاصر.

السؤال الثالث : (15 درجة)

وضح المعالم الكبرى فى طريق العلم حتى اصبح أفضل نموذج للدقة والانضباط فى استخدام العقل البشرى .

تمنياتى لكم بالتوفيق

أ.د./محمد زيدان

a seat belt on, the police can give you or your driver a ticket. Then you will have to give money to the city. I'd rather keep my money, but you can spend yours how you want.

Wearing a seat belt does not make you **invincible**. You can still get hurt or killed while wearing your seat belt. But wearing them has proven to be safer than driving without them. You are much less likely to be killed in a car wreck if you are wearing a seat belt. You are much less likely to get seriously injured if you are wearing one. So why not take the safer way? Why not go the way that has been proven to result in fewer deaths? You do want to live, don't you?

1. Which title best expresses the main idea of this text?
a. *Car Accidents: Ways That We Can Prevent Them*
b. *Slow Down: Save Lives By Driving Slower*
c. *Seat Belts: Wear Them to Survive Any Wreck*
d. *Why Not? Improve Your Odds with Seat Belts*

2. Which best expresses the author's main purpose in writing this text?
a. To inform readers about seat belt laws
b. To persuade readers to wear seat belts
c. To entertain readers with stories and jokes about seat belts
d. To describe what car accidents are like without seat belts

3. Which best describes the text structure in the fourth paragraph?
a. Compare and contrast   b. Chronological order
c. Sequential order   d. Problem and solution

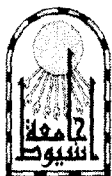**4. Which best defines the word _alternatives_ as it is used in the third paragraph?**
a. Being safe   b. Being unsafe
c. Other choices   d. Driving fast

5. Which best expresses the main idea of the fifth paragraph?
a. Seat belts are a waste of money.
b. People don't like to give money away.
c. Not wearing a seat belt may cost you.
d. Seat belt laws save lives.

6. Which best defines the word _invincible_ as it is used in the last paragraph?
a. Uncool   b. Difficult or impossible to see
c. Glow-in-the-dark   d. Unable to be harmed

First Semester Exam - December 2016
Students: First Year
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Time Allowed: Two Hours
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Date: 29-12-2016

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Answer the following questions.

1. Choose the best topic sentence for each group of supporting sentences. Write its letter on the line provided.   (5 marks)

1) _____. I usually go skiing every weekend in the winter even though it is expensive. I love the feeling of flying down a mountain. The views are beautiful from the top of a mountain and along the trails. Even the danger of falling and getting hurt can't keep me away from the slopes on a winter day.
a) Skiing is expensive.
b) Skiing is my favourite sport.
c) Skiing is dangerous.

2) _____. First of all, we need money to repair old roads and build new roads. We also need more to pay teachers' salaries and to pay for services such as trash collection. Finally, more tax money is needed to give financial help to the poor citizens of the city. It is clear that the city will have serious problems if taxes are not raised soon.
a) We should raise city taxes.
b) City taxes are too high.
c) City taxes pay for new roads.

2. There is one irrelevant sentence in each paragraph that follows. Find that sentence and cross it out.   (5 marks)

1) The capital city of a country is usually a very important city. The government offices are located in the capital city and political leaders usually live there nearby. There are many different types of governments in the world. The capital may also be the centre of culture. There are often

4. Decide whether the following sentences are true or false. If true write (T) and if false write (F). **(18 marks)**

1. Morphemes are divided into free and bound.

2. *Party* is used as a noun and a verb in English.

3. UNISCO is done through initialism.

4. Classroom is considered a compound word.

5. "*A*" is an affix in English meaning *before*.

6. Inflectional and derivational morphemes have the same behavior.

7. *Brunch* is a symbol of blending.

8. Allomorphs are the different realizations of the same morpheme.

9. Clipping in English is importing words from other languages.

Best Wishes .... Dr. Marwa M. Abdelmotaleb

a seat belt on, the police can give you or your driver a ticket. Then you will have to give money to the city. I'd rather keep my money, but you can spend yours how you want.

Wearing a seat belt does not make you **invincible**. You can still get hurt or killed while wearing your seat belt. But wearing them has proven to be safer than driving without them. You are much less likely to be killed in a car wreck if you are wearing a seat belt. You are much less likely to get seriously injured if you are wearing one. So why not take the safer way? Why not go the way that has been proven to result in fewer deaths? You do want to live, don't you?

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a. *Car Accidents: Ways That We Can Prevent Them*
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c. *Seat Belts: Wear Them to Survive Any Wreck*
d. *Why Not? Improve Your Odds with Seat Belts*

2. Which best expresses the author's main purpose in writing this text?
a. To inform readers about seat belt laws
b. To persuade readers to wear seat belts
c. To entertain readers with stories and jokes about seat belts
d. To describe what car accidents are like without seat belts

3. Which best describes the text structure in the fourth paragraph?
a. Compare and contrast   b. Chronological order
c. Sequential order   d. Problem and solution

4. Which best defines the word _alternatives_ as it is used in the third paragraph?
a. Being safe   b. Being unsafe
c. Other choices   d. Driving fast

5. Which best expresses the main idea of the fifth paragraph?
a. Seat belts are a waste of money.
b. People don't like to give money away.
c. Not wearing a seat belt may cost you.
d. Seat belt laws save lives.

6. Which best defines the word _invincible_ as it is used in the last paragraph?
a. Uncool   b. Difficult or impossible to see
c. Glow-in-the-dark   d. Unable to be harmed

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2. There is one irrelevant sentence in each paragraph that follows. Find that sentence and cross it out.   (5 marks)

1) The capital city of a country is usually a very important city. The government offices are located in the capital city and political leaders usually live there nearby. There are many different types of governments in the world. The capital may also be the centre of culture. There are often

5. Read the following passage. Then answer the questions below. (14 marks)

Icebergs are among nature's most spectacular creations, and yet most people have never seen one. A vague air of mystery envelops them. They come into being somewhere-in faraway, frigid waters, amid thunderous noise and splashing turbulence, which in most cases no one hears or sees. They exist only a short time and then slowly waste away just unnoticed.

Objects of sheerest beauty, they have been called. Appearing in an endless variety of shapes they may be dazzlingly white, or they may be glassy blue, green, or purple, tinted faintly or in darker hues. They are graceful, stately, inspiring-in calm, sunlit seas.

But they are also called frightening and dangerous, and that they are-in the night, in the fog, and in storms. Even in clear weather one is wise to stay a safe distance away from them. Most of their bulk is hidden below the water, so their underwater parts may extend out far beyond the visible top. Also, they may roll over unexpectedly, churning the waters around them.

Icebergs are parts of glaciers that break off, drift into the water, float about awhile, and finally melt. Icebergs afloat today are made of snowflakes that have fallen over long ages of time. They embody snows that drifted down hundreds, or many thousands, or in some cases maybe a million years ago. The snows fell in polar regions and on cold mountains, where they melted only a little or not at all, and so collected to great depths over the years and centuries.

As each year's snow accumulation lay on the surface, evaporation and melting caused the snowflakes slowly to lose their feathery points and become tiny grains of ice. When new snow fell on top of the old, it too turned to icy grains. So blankets of snow and ice grains mounted layer upon layer and were of such great thickness that the weight of the upper layers compressed the lower ones. With time and pressure from above, the many small ice grains joined and changed to larger crystals, and eventually the deeper crystals merged into a solid mass of ice.

1. Which of the following is the best title for the passage?
(A) The Melting of Icebergs
(B) The Nature and Origin of Icebergs
(C) The Size and Shape of Icebergs
(D) The Dangers of Icebergs

ثانيا: التفاضل (أجب عن خمسة اسئلة فقط مما ياتي كل سؤال 5 درجات)

(1) اذا كانت , $f(x) = \sqrt{x+1}$, $g(x) = x^2$

فاوجد $(f \circ g)(x)$ ثم أوجد المجال والمدي لها .

(2) أوجد النهايات الاتيه

$(i)\ Lim_{x \to \frac{\pi}{2}} \dfrac{\cot x}{\frac{\pi}{2} - x}$ $(ii)\ Lim_{x \to 9} \dfrac{\sqrt{x} - 3}{x - 9}$

(3) ابحث اتصال الدالة الاتيه عند x= -1

$$f(x) = \begin{cases} x^2 & , & -1 \prec x \leq 1 \\ x+1 & , & x \leq -1 \end{cases}$$

(4) أوجد $\dfrac{dy}{dx}$ لكل من

$(i) y = (x^2 + \sin x)^{\tan^{-1} x}$

$(ii) y = 5^{(\sinh x - e^{\cosh^{-1} x})}$

(5) أوجد $\dfrac{dy}{dx}$ اذا كانت

$y \sin^{-1} x + \tan(x+y) + \ln(x^2 y + 1) + \sqrt{3 + x^2} = 1$

(6) اذاكانت $y = \dfrac{\cos^{-1} x}{\sqrt{1 - x^2}}$ فاثبت أن $(1 - x^2)y' = xy - 1$ ثم استخدم نظرية ليبنز في اثبات ان

$y^{(n+1)}(0) = n^2 y^{(n-1)}(0)$

انتهت الاسئلة مع تمنياتنا بالنجاح والتوفيق

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سؤال اجبارى : (20 درجة)

الانسان يصطنع منهجا يتيح له الاتصال المباشر بالواقع ، عن طريق الجمع بين العقل والتجربة ، إلا فى مرحلة متأخرة من تاريخه . فلا بد إذن أن عقبات أساسية حالت دون تحقيق هذا الاتصال المباشر بين الإنسان والعالم عن طريق العلم .فما هى هذه العقبات التى أخرت ظهور العلم ، والتى لاتزال تشوه صورة المعرفة العلمية حتى يومنا هذا عند فئات كثيرة من البشر ؟

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اجب عن سؤالين فقط

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التفكير العلمى هو ذلك النوع من التفكير المنظم .. الذى يمكن ان نستخدمة فى شئون حياتنا اليومية .. أو فى النشاط الذى نبذله حين نمارس أعمالنا المهنية المعتادة .. أو فى علاقاتنا مع الناس.. كلم بالتفصيل عن سمات التفكير العلمى .

السؤال الثانى: (15 درجة)

ليس العلم ظاهرة منعزلة ، تنمو بقدرتها الذاتية وتسير بقوة دفعها الخاصة وتخضع لمنطقها الداخلى البحت ، بل أن تفاعل العلم مع المجتمع حقيقة لا ينكرها أحد . تكلم بالتفصيل عن الابعاد الاجتماعية للعلم المعاصر.

_____

السؤال الثالث : (15 درجة)

وضح المعالم الكبرى فى طريق العلم حتى اصبح أفضل نموذج للدقة والانضباط فى استخدام العقل البشرى .

تمنياتى لكم بالتوفيق

أ.د./محمد زيدان

7. Which statement would the author most likely agree with?

a. Being safe is more important than being cool.

b. Moving freely around a car is worth the risks.

c. Seat belts will keep you safe in any car accident.

d. You should be most concerned with your comfort.

8. Which argument is not made by the author?

a. Not wearing a seat belt can be expensive.

b. Penalties for not wearing a seat belt should increase.

c. Seat belts keep you from flying through the windshield.

d. Wearing a seat belt is cooler than suffering an injury.

9. Which statement would the author most likely disagree with?

a. Seat belts save lives.

b. Every state in America has seat belt laws.

c. You shouldn't drive anywhere until you are wearing your seat belt.

d. Seat belts increase your chances of being injured in a car wreck.

10. Which best explains why the author starts his essay with the word *click*?

a. He is trying to scare readers.

b. He is trying to get the reader's attention.

c. He is trying to remind readers how seat belts sound when clasped.

d. He is trying to describe what it's like to ride in a car.

2. Write the antonym of the following words by adding the proper prefix. **(10 marks)**

1. Capable   2. To obey   3. To understand   4. Logical   5. Regular

6. Movable   7. Approval   8. Legal   9. Resistance   10. Legitimate

3. Define (4 only) of the following: **(12 marks)**

1. Science 2. Bird of prey 3. Reptiles 4. Technology 5. Amphibians 6. Insect

a. has
b. have
c. had

7- One of my best friends _____ an extra on *Seinfeld* this week.
a. are
b. is
c. has

8- Not only the students but also their instructor _____ been called to the principal's office.
a. have
b. has
c. is

9- Most of the milk _____ gone bad. Six gallons of milk _____ still in the refrigerator.
a. have/is
b. has/are
c. have/are

10- _____ either my father or my brothers made a down-payment on the house?
a. Has
b. Have
c. Does

11- A few of the students _____ doing so well they can skip the next course.
a. is
b. are
c. did

12- My brother _____ a fight with his neighbour last week.
a. has had
b. has
c. had

13- I've got a very interesting job, and I _____ lots of famous people.
a. met

Answer the following questions.

1. Read the following passage and answer the questions that follow.

(10 marks)

"Click!" That's the sound of safety. That's the sound of survival. That's the sound of a seat belt locking in place. Seat belts save lives and that's a fact. That's why I don't drive anywhere until mine is on tight. Choosing to wear your seat belt is a simple as choosing between life and death. Which one do you choose?

Think about it. When you're driving in a car, you may be going 60 MPH or faster. That car is zipping down the road. Then somebody ahead of you locks up his or her brakes. Your driver doesn't have time to stop. The car that you are in crashes. Your car was going 60 miles per hour. Now it has suddenly stopped. Your body, however, is still going 60 MPH. What's going to stop your body? Will it be the windshield or your seat belt? Every time that you get into a car you make that choice. I choose the seat belt.

Some people think that seat belts are uncool. They think that seat belts cramp their style, or that seat belts are uncomfortable. To them I say, what's more uncomfortable? Wearing a seat belt or flying through a car windshield? What' more uncool? Being safely anchored to a car, or skidding across the road in your jean shorts? Wearing a seat belt is both cooler and more comfortable than the **alternatives**. Let's just take a closer look at your choices. If you are not wearing your seat belt, you can hop around the car and slide in and out of your seat easily. That sounds like a lot of fun. But, you are also more likely to die or suffer serious injuries.

If you are wearing a seat belt, you have to stay in your seat. That's no fun. But, you are much more likely to walk away unharmed from a car accident. Hmmm... A small pleasure for a serious pain. That's a tough choice. I think that I'll avoid the serious pain. How about giving money away? Do you like to give your money away? Probably not. And when you don't wear your seat belt, you are begging to give your money away. That's because kids are required to wear seat belts in every state in America. If you're riding in a car, and you don't have

أولا : الجبر (أجب عن خمسة اسئلة فقط مماياتي كل سؤال 5 درجات)

(1) باستخدام الاستنتاج الرياضي أثبت أن

$$\sum_{r=1}^{n}(r^2+r)=\frac{1}{3}n(n+1)(n+2)$$

(2) أجمع المتسلسلة الاتية الي n حدا

$$6.1^2+7.2^2+8.3^2+\ldots\ldots\ldots$$

(3) حلل الكسر الاتي الي كسورة الجزئيه

$$\frac{2x^2+3x+4}{(x-1)(x^2+1)}$$

(4) أوجد الحدود الاربعة الأولي في مفكوك المتسلسلة $(8+3x)^{\frac{1}{3}}$ ثم أوجد قيم x التي تجعل المفكوك صحيحا .

(5) ادرس تقارب وتباعد المتسلسلات الاتيه :

$$(i)\sum_{n=1}^{\infty}\frac{3n}{1-.2n+3n^2}. \quad (ii)\sum_{n=1}^{\infty}\frac{(-1)^{n+1}x^n}{n^2}.$$

(6) باستخدام المصفوفات أوجد حل النظام الاتي

$$2x+4y+z=1$$
$$-x+y+z=1$$
$$x+y+2z=1$$

من فضلك انظر خلف الورقة

أجب عن الاسئلة الاتية :

السؤال الاول :

1- أوجد التكاملات الاتية

(i) $\int \dfrac{cos^3 x}{sin^6 x}\, dx$

(ii) $\int \dfrac{\sqrt{1-x}}{\sqrt{2x+3}}\, dx$

(iii) $\int \dfrac{\sec x \, \tan x}{\sec^2 x - 2\sec x + 10}\, dx$

(v) $\int \dfrac{x^4 + 1}{x^3 - x}\, dx$

(iv) $\int \sec^3 x \, dx$

(iiv) $\int \dfrac{\sqrt{\tan x}}{\sin x \, \cos x}\, dx$

2- كون قانون الاختزال المتتالى للتكامل $I_n = \int (sin^{-1} x)^n \, dx$ ومن ثم اوجد قيمة التكامل $\int (sin^{-1} x)^3 dx$

السؤال الثانى :

1- (a) أوجد قيمة التكامل الاتى

$$\int_0^{\frac{\pi}{4}} \ln(1 + \tan x)\, dx$$

(b) أوجد مساحة المنطقة المحدودة بالقطع الناقص

$$\frac{x^2}{16} + \frac{y^2}{9} = 1$$

2- (a) أوجد حجم المخروط القائم الذى نصف قطر قاعدتة 4 وارتفاعة 10 .

(b) أحسب التكامل $\int_{-2}^{0} e^{-x^2}\, dx$ اذا كانت $h = 0.2$ وذلك باستخدام طريقة سمبسون.

السؤال الثالث:

1- أدرس القطع $x^2 + 4y^2 + 2x - 8y + 1 = 0$

2- أوجد مركز ونصف قطر الدائرة $r^2 + 3r\cos\theta + 3r\sin\theta = 16$ ثم وضح ذلك بالرسم .

السؤال الرابع:

1- أوجد معادلة المماس ومعادلة العمودى وطول ما تحت المماس وطول ما تحت العمودى للقطع المكافى ثم طبق ذلك على القطع $y^2 = 16x$ عند النقطة (1,4).

2- أوجد معادلة الخط المستقيم العمودى على $3y + 4x = 12$ والذى يبعد عن النقطة (1,2) مسافة 2 ثم وضح ذلك بالرسم.

مع تمنياتى بالتوفيق د/ راوية عبدالرحمن حسين

ثانيا: التفاضل (أجب عن خمسة اسئلة فقط مما ياتي كل سؤال 5 درجات)

(1) اذا كانت

$$f (x) = \sqrt{x + 1} \qquad , \qquad g(x) = x^2$$

فاوجد $(f \circ g)(x)$ ثم أوجد المجال والمدي لها .

(2) أوجد النهايات الاتيه

$$(i)\ Lim_{x \to \frac{\pi}{2}}\ \frac{\cot\ x}{\frac{\pi}{2} - x} \qquad (ii)\ Lim_{x \to 9}\ \frac{\sqrt{x} - 3}{x - 9}$$

(3) ابحث اتصال الدالة الاتيه عند x= -1

$$f (x) = \begin{cases} x^2 & , & -1 \prec x \leq 1 \\ x + 1 & , & x \leq -1 \end{cases}$$

(4) أوجد $\dfrac{dy}{dx}$ لكل من

$$(i)y = (x^2 + \sin x)^{\tan^{-1} x} \qquad\qquad (ii)y = 5^{(\sinh x - e^{\cosh^{-1} x})}$$

(5) أوجد $\dfrac{dy}{dx}$ اذا كانت

$$y \sin^{-1} x + \tan(x + y) + \ln(x^2 y + 1) + \sqrt{3 + x^2} = 1$$

(6) اذاكانت $y = \dfrac{\cos^{-1} x}{\sqrt{1 - x^2}}$ فاثبت ان $(1 - x^2)y' = xy - 1$ ثم استخدم نظرية ليبنز في اثبات ان

$$y^{(n+1)}(0) = n^2 y^{(n-1)}(0)$$

انتهت الاسئلة مع تمنياتنا بالنجاح والتوفيق