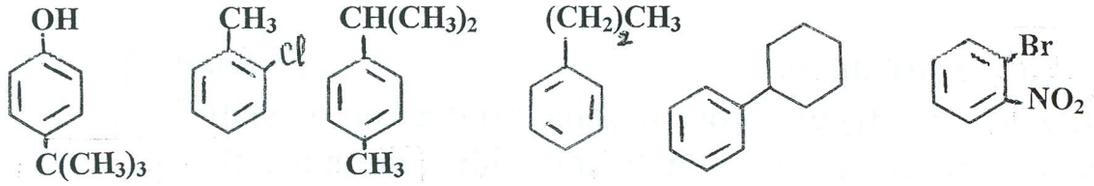
Mansoura University **Faculty of Science** **Chemistry Department** **Subject: Chemistry** **Course(s):** Organic Chemistry 236		**Second Term** **2nd level students** **Date : June 2014** **Time Allowed: 2 hours** **Full Mark: 80 Marks**

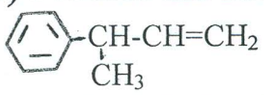
ANSWER ALL QUESTIONS

1. Read carefully the compounds (1)–(6), then answer the questions : **[27 Marks]**

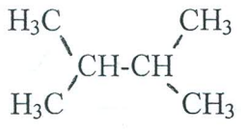


(1) (2) (3) (4) (5) (6)

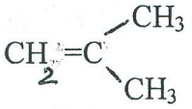
i) Give acceptable names of compounds (1),(2),(4) and (6)
ii) Diagram the synthesis of (4) and (5)
iii) Account for the conversion of (3) to benzene
iv) Show the reaction of (1) with $(CH_3)_2C{=}CH_2/H^+$
v) Predict the products of the reaction of HNO_3/H_2SO_4 on (2) ; Cl_2/Fe on (3) and NBS/hν on (5)
vi) What is the effect of $KMnO_4$/OH, heat on (3) and (4)
vii) The structure of sulfonation product of (6) is .....

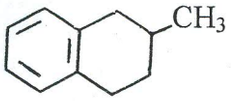
2. i) Predict the favoured product(s) of the reactions of  with each of : **[10 Marks]**

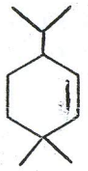
i) H_2SO_4/H_2O ii) Br_2/H_2O
iii) $KMnO_4$, OH,H_2O,cold iv) O_3/CH_2Cl_2;Zn/AcOH
v) NBS / hν

ii) On chlorination of  it was found that the reactivity ratio between 1^o : 3^o H-atoms is 1: 3.25 Calculate the percentage of each isomer **[9 Marks]**

iii) Show the products of the reaction of NBS/hν with the compounds below : **[8 Marks]**







3. i) Write out the structures of : [9 Marks]

i) An alkene C_6H_{12} gives one organic product on ozonalysis

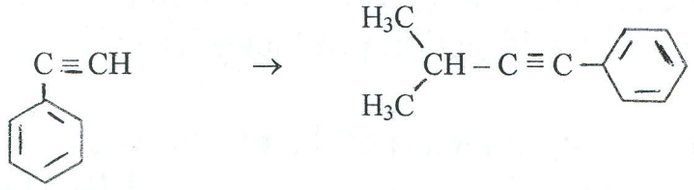
ii) An alkyne C_5H_8 gives no reaction with sodium metal

iii) Two isomeric aromatic hydro carbons of molecular formula C_9H_{12} and on oxidation yield the same product

ii) $CH_3\text{-}CH_2\text{-}CH_3 \xrightarrow{Br_2 / h\nu} \underset{2\%}{CH_3\text{-}CH_2\text{-}CH_2\,Br} + \underset{98\%}{CH_3\text{-}\overset{Br}{\overset{|}{C}}H\text{-}CH_3}$

Calculate the reactivity ratio between 1^o and 2^o H-atoms in this reaction **[8 Marks]**

iii) Diagram these conversions : **[9 Marks]**

i) 

ii) 

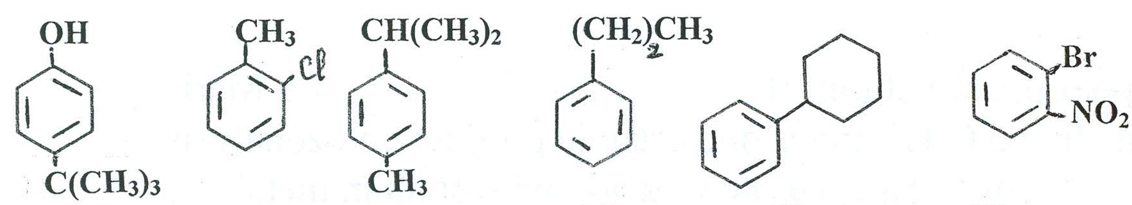
iii) 

المستوى الثاني - مجموعة البيولوجي + الجيولوجي أسس الكيمياء العضوية (ك م ٢٣٦)

Mansoura University **Faculty of Science** **Chemistry Department** **Subject: Chemistry** **Course(s):** Organic Chemistry 236	كلية العلوم جامعة المنصورة	**Second Term** **2nd level students** **Date : June 2014** **Time Allowed: 2 hours** **Full Mark: 80 Marks**

ANSWER ALL QUESTIONS

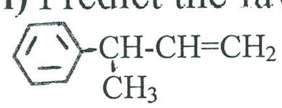
1. Read carefully the compounds (1)–(6), then answer the questions : **[27 Marks]**



(1) (2) (3) (4) (5) (6)

i) Give acceptable names of compounds (1),(2),(4) and (6)
ii) Diagram the synthesis of (4) and (5)
iii) Account for the conversion of (3) to benzene
iv) Show the reaction of (1) with $(CH_3)_2C{=}CH_2/H^+$
v) Predict the products of the reaction of HNO_3/H_2SO_4 on (2) ; Cl_2/Fe on (3) and NBS/hν on (5)
vi) What is the effect of $KMnO_4/\bar{O}H$, heat on (3) and (4)
vii) The structure of sulfonation product of (6) is ....

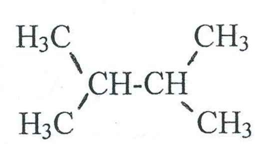
2. i) Predict the favoured product(s) of the reactions of



with each of : **[10 Marks]**

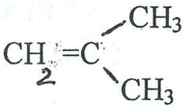
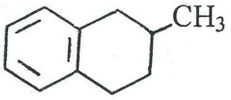
i) H_2SO_4/H_2O
ii) Br_2/H_2O
iii) $KMnO_4$, $\bar{O}H$, H_2O, cold
iv) O_3/CH_2Cl_2;Zn/AcOH
v) NBS / hν

ii) On chlorination of



it was found that the reactivity ratio between 1° : 3° H-atoms is 1: 3.25 Calculate the percentage of each isomer **[9 Marks]**

iii) Show the products of the reaction of NBS/hν with the compounds below : **[8 Marks]**


3. i) Write out the structures of : [9 Marks]

i) An alkene C_6H_{12} gives one organic product on ozonalysis

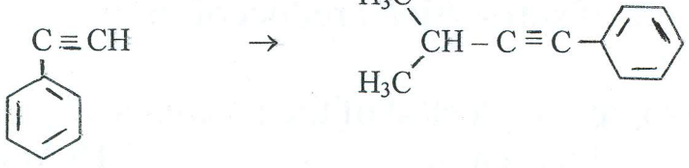
ii) An alkyne C_5H_8 gives no reaction with sodium metal

iii) Two isomeric aromatic hydro carbons of molecular formula C_9H_{12} and on oxidation yield the same product

ii) $CH_3\text{-}CH_2\text{-}CH_3 \xrightarrow{Br_2 / h\nu} \underset{2\%}{CH_3\text{-}CH_2\text{-}CH_2\,Br} + \underset{98\%}{CH_3\text{-}\overset{Br}{\overset{|}{C}}H\text{-}CH_3}$

Calculate the reactivity ratio between 1^o and 2^o H-atoms in this reaction **[8 Marks]**

iii) Diagram these conversions : **[9 Marks]**

i) 

ii) 

iii) 

المستوى الثانى - مجموعة البيولوجى - مقدمة فى علم وظائف الأعضاء ج ٢ ن

Mansoura University
Faculty of Science
Zoology Department

Subject: Functional Morphology (Z 203)
Date: 2/6/2014
Time : 2 hours

Final examination for 2nd level students, programes
Chemistry/Zoology&Chemistry/Botany&Ecology&Microbiology

Answer all the following questions

First question: [20 Mark]

a) Define each of the following terms: [5 Mark]

1- Expiratory reserve volume.
2- Heart sound.
3- Vital capacity.
4- Glycogenesis.
5- Thrombus.

b) Put (√) or (X), and correct the false sentences: [8 Mark]

1- Decrease of pH causes a right shift of O_2 dissociation curve.
2- Pepsinogen converts proteins into peptones and proteoses.
3- Blood pressure is a minimum during diastole and maximum during systole.
4- Conversion of one mole of glucose into 2 moles of lactic acid requires the presence of O_2.
5- The atrioventricular node is a natural pacemaker of heart beat.
6- Deficiency symptoms of vitamin B9 includes megaloblastic anemia.
7- Low blood level of Pco_2 causes activation of breathing centers in human brain.
8- Contraction of external intercostal muscle causes transverse expansion of thoracic cavity.

c) Complete the following sentences: [7 Mark]

1- Digestion of fats requires ..... and .....
2- The parietal pleura lines ..... while the visceral pleura covers .....
3- ..... permits the blood flow from right atrium to right ventricle, while ..... permits the blood flow from the left atrium to left ventricle.
4- Number of ATPs produced per complete oxidation of mole pyruvic acid equals.....
5- Gastrin hormone stimulate production of ..... which is necessary for activation of .....
6- Deficiency of vitamin K causes ..... while deficiency of vitamin B_{12} causes .....
7- Phosphorous serves as component of ..... and .....

Second question: [20 Mark]

a) Write short notes on each of the following subjects: [10 Mark]

1- Oxidative deamination.
2- Diaphragm.

b) Compare between each of the following: [10 Mark]

1- Different types of muscles.
2- Anterior and posterior lobes of pituitary gland.

Third question: [20 Mark]

a) Write on three only of these points (the first point should be one of them):

1- Hormones regulated the concentration of both sugar and calcium ion in the blood. [8 Mark]
2- Kidney functions. [6 Mark]
3- Neurotransmitter. [6 Mark]
4- Actin and myosin filaments. [6 Mark]

مع تمنياتنا لكم بالتوفيق

د./ فريد عبد القادر

د./ هناء سراج

المستوى الثانى - كيمياء/بيولوجى - ع ٢٠٣ مقدمة فى علم وظائف الاعضاء

Mansoura University
Faculty of Science
Zoology Department

Subject: Functional Morphology (Z 203)
Date: 2/6/2014
Time : 2 hours

Final examination for 2nd level students, programes
Chemistry/Zoology&Chemistry/Botany&Ecology&Microbiology

Answer all the following questions

First question: [20 Mark]

a) Define each of the following terms: [5 Mark]

1- Expiratory reserve volume.
2- Heart sound.
3- Vital capacity.
4- Glycogenesis.
5- Thrombus.

b) Put (√) or (X), and correct the false sentences: [8 Mark]

1- Decrease of pH causes a right shift of O_2 dissociation curve.
2- Pepsinogen converts proteins into peptones and proteoses.
3- Blood pressure is a minimum during diastole and maximum during systole.
4- Conversion of one mole of glucose into 2 moles of lactic acid requires the presence of O_2.
5- The atrioventricular node is a natural pacemaker of heart beat.
6- Deficiency symptoms of vitamin B9 includes megaloblastic anemia.
7- Low blood level of Pco_2 causes activation of breathing centers in human brain.
8- Contraction of external intercostal muscle causes transverse expansion of thoracic cavity.

c) Complete the following sentences: [7 Mark]

1- Digestion of fats requires ..... and .....
2- The parietal pleura lines ..... while the visceral pleura covers .....
3- ..... permits the blood flow from right atrium to right ventricle, while ..... permits the blood flow from the left atrium to left ventricle.
4- Number of ATPs produced per complete oxidation of mole pyruvic acid equals.....
5- Gastrin hormone stimulate production of ..... which is necessary for activation of .....
6- Deficiency of vitamin K causes ..... while deficiency of vitamin B_{12} causes .....
7- Phosphorous serves as component of ..... and .....

Second question: [20 Mark]

a) Write short notes on each of the following subjects: [10 Mark]

1- Oxidative deamination.
2- Diaphragm.

b) Compare between each of the following: [10 Mark]

1- Different types of muscles.
2- Anterior and posterior lobes of pituitary gland.

Third question: [20 Mark]

a) Write on three only of these points (the first point should be one of them):

1- Hormones regulated the concentration of both sugar and calcium ion in the blood. [8 Mark]
2- Kidney functions. [6 Mark]
3- Neurotransmitter. [6 Mark]
4- Actin and myosin filaments. [6 Mark]

مع تمنياتنا لكم بالتوفيق

د./ فريد عبد القادر

د./ هناء سراج

المستوى الثانى - شعبة البيولوجى - ميكروبيولوجيا عامة (ب ٢٠٤)

Mansoura University
Faculty of Science
Botany Department
El-Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Subject: Botany | Final Examination in Botany for Second level Students, May 2014 | Date: 9/6/2014

Course: General Microbiology | Program: Microbiology, Chemistry and Zoology, Chemistry and Botany and Environmental Sciences. | Time allowed: 2 hours

Code: B 204 | Question Mark: 15 | Full Mark: 60

Answer the Following Questions:

Q1: A- Complete the missing word or words: (5 Mark)

1. The science of organisms that are invisible to the naked eye is termed as .....
2. Microorganisms that use energy from the oxidation or reduction of chemical compounds are known as.....
3. The main carbon source of the photoautotrophic microorganisms is.....
4. Microorganisms that harm their hosts are known as.....
5. The organic component of soil, formed by the decomposition of organic material by soil microorganisms is known as.....

B- Chose the most correct answer: (7.5 Mark)

1- All the following diseases are caused by bacteria except:
a. Typhoid fever b. Pneumonia c. Anthrax d. Small box

2- All the following organisms are heterotrophs except:
a. *Saccharomyces* b. *Rhizopus* c. *Bacillus* d. *Chlamydomonas*

3- Nitrogen is essential macronutrient for microbes to buildup:
a. Fatty acids b. Nucleic acids c. ADP d. b+ c

4- All the following microorganisms are prokaryotic except:
a. *Penicillium* b. *Oscillatoria* c. *Rhizopium* d. *Clostridium*

5- Nutrient uptake through phagocytosis is a common biological process of:
a. Bacteria b. Fungi c. Microalgae d. Protozoa

C- Answer the following: (7.5 Mark)

1. Outline the major importance of microorganisms to the environment.
2. Mention only four methods of food preservation against microbes.
3. Discuss the importance of sulphur as essential macronutrient for microorganisms.

فضلا اقلب الورقة

Q2: A- Answer the following questions: (14 mark)

1- Discuss using labeled diagram the complete steps of binary fission in bacteria.
2- Explain in details the relation of bacteria to free oxygen and its effects on their growth.
3- How many phases are in the growth curve of unicellular microorganisms? Discuss the major events in these phases.

B- Compare and contrast between: (6 mark)

1- Psychrotrophs and psychrophiles.
2- Neutrophiles and acidophiles.
3- Batch cultures and continuous cultures.

Q3: a- Define each of the following: (6 mark)

1- Antisepsis. 2- Biocides. 3- Thermal death point.

b- Rational (give the reasons): (7 mark)

1- It is not good for patients to abuse antibiotics.
2- Mothers should not use microwave baby bottles.

c- Compare between each of the following: (7 mark)

a- Autoclaving and pasteurization.
b- Ionizing and non-ionizing radiation.

Examiners:

Prof. Dr. Anwar T. Mankarious Dr. Ghada S. Abou-ElWafa

المستوى الثاني - مجموعة البيولوجي - ميكروبيولوجيا عامة (ب ٢٠٤)

Mansoura University
Faculty of Science
Botany Department
El-Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Subject: Botany | **Final Examination in Botany for Second level Students, May 2014** | **Date: 9/6/2014**

Course: General Microbiology | **Program:** Microbiology, Chemistry and Zoology, Chemistry and Botany and Environmental Sciences. | **Time allowed: 2 hours**

Code: B 204 | **Question Mark: 15** | **Full Mark: 60**

Answer the Following Questions:

Q1: A- Complete the missing word or words: (5 Mark)

1. The science of organisms that are invisible to the naked eye is termed as ....
2. Microorganisms that use energy from the oxidation or reduction of chemical compounds are known as..........
3. The main carbon source of the photoautotrophic microorganisms is.........
4. Microorganisms that harm their hosts are known as........
5. The organic component of soil, formed by the decomposition of organic material by soil microorganisms is known as..........

B- Chose the most correct answer: (7.5 Mark)

1- All the following diseases are caused by bacteria except:

a. Typhoid fever b. Pneumonia c. Anthrax d. Small box

2- All the following organisms are heterotrophs except:

a. *Saccharomyces* b. *Rhizopus* c. *Bacillus* d. *Chlamydomonas*

3- Nitrogen is essential macronutrient for microbes to buildup:

a. Fatty acids b. Nucleic acids c. ADP d. b + c

4- All the following microorganisms are prokaryotic except:

a. *Penicillium* b. *Oscillatoria* c. *Rhizopium* d. *Clostridium*

5- Nutrient uptake through phagocytosis is a common biological process of:

a. Bacteria b. Fungi c. Microalgae d. Protozoa

C- Answer the following: (7.5 Mark)

1. Outline the major importance of microorganisms to the environment.
2. Mention only four methods of food preservation against microbes.
3. Discuss the importance of sulphur as essential macronutrient for microorganisms.

فضلا اقلب الورقة ←

Q2: A- Answer the following questions: (14 mark)

1- Discuss using labeled diagram the complete steps of binary fission in bacteria.
2- Explain in details the relation of bacteria to free oxygen and its effects on their growth.
3- How many phases are in the growth curve of unicellular microorganisms? Discuss the major events in these phases.

B- Compare and contrast between: (6 mark)

1- Psychrotrophs and psychrophiles.
2- Neutrophiles and acidophiles.
3- Batch cultures and continuous cultures.

Q3: a- Define each of the following: (6 mark)

1- Antisepsis. 2- Biocides. 3- Thermal death point.

b- Rational (give the reasons): (7 mark)

1- It is not good for patients to abuse antibiotics.
2- Mothers should not use microwave baby bottles.

c- Compare between each of the following: (7 mark)

a- Autoclaving and pasteurization.
b- Ionizing and non-ionizing radiation.

Examiners:

Prof. Dr. Fatma F. Megahed Dr. Huda M. Soliman

مجموعة البيولوجي - ٢ ب الفسيولوجيا النمو والتطور

Mansoura University
Faculty of Science
Botany Department
El-Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
Second Term: May 2014

Students: 2nd Level : Chemistry/Botany& Microbiology & Ecological Sciences &Chemistry/Zoology
Time: 2 hours.
Full mark: 60

Course: : Cytogenetics and physiology of growth and development (B 203)
Date: 05/6/2014
Question mark: 20

Answer The Following Questions:

Q1: A- Fill in the spaces using suitable words or phrases: (10 marks)

1- Cytokinesis is the division of the .....

2- The ends of the chromosomes are called .....

3- In cell cycle, the interphase stage divided into three parts :....., ... and .....

4- Polytene chromosomes are special types of .....

5- According to the positions of centromere , the chromosomes are classified into ....., ..., ... and .....

B- Compare between each two of the following and explain an example for every case : (10 marks)

1- Euploidy and Aneuploidy
2- Autopolyploidy and Allopolyploidy

Q2: A- Answer the following using instructions between brackets : (10 marks)

1- Cry of the cat disease (Discuss)

2- Dicentric bridge and acentric chromosome. (Draw)

3- Unbalanced gene dosage leads to developmental abnormalties (Discuss & Draw)

B- 1-Define the following: (2 marks)

a- Micropyle b- Viviparous

2- Classify seeds according to seed covering. (2 marks)

3- Differentiate between epigeal and hypogeal germination [position of cotyledons – embryonic stem elongation- type of seeds which it occur in] (3 marks)

4- Match the phase from column A with the event occur in it from column B (3 marks)

A Phase - Stage	B Event
1- Post germination phase	a- Zygote formation
2- Cell differentiation	b- Radicle elongation
3- Maturation drying	c- Formation of LEA proteins

P.T.O من فضلك اقلب الصفحة

Mansoura University
Faculty of Science
Botany Department
El-Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
Second Term: May 2014

Q3: A- Define each of the following: (10 marks)

1- Differentiation

2- Phases of growth

3- Pollination

4- Annual plants

5- Growth curve

B- Answer the following questions: (10 marks)

a- Define seed dormancy and write on how to treat physical and mechanical dormancies?

b- From what you have studied, (1) write what you know about plant growth promoters and (2) give an account on one of them.

c- Write on what happens when a chilling-resistant plant is exposed to cold stress.

d- Differentiate between constitutive and inducible resistance mechanisms in plants.

e- What is the role of secondary metabolism as a response of plants to biotic stress?

Examiners: Prof . Magda Soliman, Dr. Linda Samaan, Dr. Ashraf Abdel Montaleb, Dr. Amany Kazamel, Dr. Heba Abdel-Aziz, Dr. Bardees Mickky

Mansoura University
Faculty of Science
Botany Department
El-Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
Second Term: May 2014

Students: 2nd Level : Chemistry/Botany& Microbiology & Ecological Sciences &Chemistry/Zoology
Course: : Cytogenetics and physiology of growth and development (B 203)
Time: 2 hours.
Date: 05/6/2014
Full mark: 60
Question mark: 20

Answer The Following Questions:

Q1: A- Fill in the spaces using suitable words or phrases: (10 marks)

1- Cytokinesis is the division of the .....

2- The ends of the chromosomes are called .....

3- In cell cycle, the interphase stage divided into three parts :....., ... and .....

4- Polytene chromosomes are special types of .....

5- According to the positions of centromere , the chromosomes are classified into ....., ..., ... and .....

B- Compare between each two of the following and explain an example for every case : (10 marks)

1- Euploidy and Aneuploidy
2- Autopolyploidy and Allopolyploidy

Q2: A- Answer the following using instructions between brackets : (10 marks)

1- Cry of the cat disease (Discuss)

2- Dicentric bridge and acentric chromosome. (Draw)

3- Unbalanced gene dosage leads to developmental abnormalties (Discuss & Draw)

B- 1-Define the following: (2 marks)

a- Micropyle b- Viviparous

2- Classify seeds according to seed covering. (2 marks)

3- Differentiate between epigeal and hypogeal germination [position of cotyledons – embryonic stem elongation- type of seeds which it occur in] (3 marks)

4- Match the phase from column A with the event occur in it from column B (3 marks)

A Phase - Stage	B Event
1- Post germination phase	a- Zygote formation
2- Cell differentiation	b- Radicle elongation
3- Maturation drying	c- Formation of LEA proteins

P.T.O من فضلك اقلب الصفحة

Mansoura University
Faculty of Science
Botany Department
El-Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
Second Term: May 2014

Q3: A- Define each of the following: (10 marks)

1- Differentiation

2- Phases of growth

3- Pollination

4- Annual plants

5- Growth curve

B- Answer the following questions: (10 marks)

a- Define seed dormancy and write on how to treat physical and mechanical dormancies?

b- From what you have studied, (1) write what you know about plant growth promoters and (2) give an account on one of them.

c- Write on what happens when a chilling-resistant plant is exposed to cold stress.

d- Differentiate between constitutive and inducible resistance mechanisms in plants.

e- What is the role of secondary metabolism as a response of plants to biotic stress?

Examiners: Prof . Magda Soliman, Dr. Linda Samaan, Dr. Ashraf Abdel Montaleb, Dr. Amany Kazamel, Dr. Heba Abdel-Aziz, Dr. Bardees Mickky

المستوى الثاني - كيمياء - حيوان حيا
كيمياء حيوان - مجموعة البيولوجي - رياضيات بحتة (ر ٢٠١)

الفرقة: الثانيـــــــــــــة الشعب: كيمياء- كيمياء حيوية -كيمياء/ نبات - كيمياء/حيوان-علوم بيئة-جيولوجيا المادة: ر ٢٠١- رياضيات بحتة	كلية العلوم – قسم الرياضيات	دور مايو ٢٠١٤ الزمن: ساعتـــــان التاريخ: ٢٠١٤/٦/١٢

أجب على الأسئلة الآتية:

[1]أ. اختبر وجود النهايات المتكررة و النهاية العامة للدالة $f(x,y)=\frac{2xy}{x^2+y^2}$، وذلك عندما $(x,y)\to(0,0)$. [١٠ درجات]

ب. حل مسألة الشرط الابتدائي : $y'=\frac{x+y-4}{x+y+4}$, $y(2)=0$ [١٠ درجات]

---

[2]أ. إذا كانت $z=\sec^{-1}\left(\frac{x^5+y^5}{x-y}\right)$ ، فاثبت أن : $x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}=4\cot z$ [١٠ درجات]

ب. إذا كانت $z=f(x+3y)+g(x-3y)$ ، حيث f, g دوال قابلة للاشتقاق مرتين على الأقل

فاثبت أن : $z_{yy}=9\,z_{xx}$. [١٠ درجات]

---

[3]أ. اوجد الحل العام للمعادلة التفاضلية : $(\cos 2y-3x^2y^2)dx+(\cos 2y-2x\sin 2y-2x^3y)dy=0$ ، ثم استنتج الحل الخاص الذي يحقق الشرط : $y(3)=0$. [١٠ درجات]

ب. احسب قيمة التكامل : $I=\int_0^4\int_{x/2}^{2}\cos(y^2)dy\,dx$ [١٠ درجات]

---

[٤]أ. اوجد الحل العام للمعادلة التفاضلية : $(2xy^5-y)dx+2x\,dy=0$ [١٠ درجات]

ب. اثبت أن قيمة التكامل الخطي: $\int_{(1,1)}^{(2,4)}(2x+4xy)dx+(2x^2+y)dy$

لا تعتمد على المسار الواصل بين النقطتين $(1,1)$ ، $(2,4)$ ، ثم احسب قيمته على الخط الواصل بين النقطتين.

[١٠ درجات]

مع التمنيات بالتوفيق

المستوى الثاني - كيمياء - جيولوجيا - مجموعة البرامج (ر ١٠١) رياضيات بحتة
كيمياء صوى

الفرقة: الثانيـــــــــــــة الشعب: كيمياء- كيمياء حيوية -كيمياء/ نبات - كيمياء/حيوان-علوم بيئة-جيولوجيا المادة: ر ٢٠١- رياضيات بحتة	كلية العلوم – قسم الرياضيات	دور مايو ٢٠١٤ الزمن: ساعتـــــان التاريخ: ٢٠١٤/٦/١٢

أجب على الأسئلة الآتية:

[1]أ. اختبر وجود النهايات المتكررة و النهاية العامة للدالة $f(x,y)=\frac{2xy}{x^2+y^2}$، وذلك عندما $(x,y)\to(0,0)$.

[١٠ درجات]

ب. حل مسألة الشرط الابتدائي : $y'=\frac{x+y-4}{x+y+4}$, $y(2)=0$ [١٠ درجات]

---

[2]أ. إذا كانت $z=\sec^{-1}\left(\frac{x^5+y^5}{x-y}\right)$ ، فاثبت أن : $x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}=4\cot z$ [١٠ درجات]

ب. إذا كانت $z=f(x+3y)+g(x-3y)$ ، حيث f, g دوال قابلة للاشتقاق مرتين على الأقل

فاثبت أن : $z_{yy}=9\,z_{xx}$. [١٠ درجات]

---

[3]أ. اوجد الحل العام للمعادلة التفاضلية : $(\cos 2y-3x^2y^2)dx+(\cos 2y-2x\sin 2y-2x^3y)dy=0$ ، ثم

استنتج الحل الخاص الذي يحقق الشرط : $y(3)=0$. [١٠ درجات]

ب. احسب قيمة التكامل : $I=\int_0^4\int_{x/2}^{2}\cos(y^2)\,dy\,dx$ [١٠ درجات]

---

[٤]أ. اوجد الحل العام للمعادلة التفاضلية : $(2xy^5-y)dx+2x\,dy=0$ [١٠ درجات]

ب. اثبت أن قيمة التكامل الخطي: $\int_{(1,1)}^{(2,4)}(2x+4xy)dx+(2x^2+y)dy$

لا تعتمد على المسار الواصل بين النقطتين $(1,1)$ ، $(2,4)$ ، ثم احسب قيمته على الخط الواصل بين النقطتين.

[١٠ درجات]

مع التمنيات بالتوفيق