قسم علم الحيوان
كلية العلوم/ جامعة أسيوط
امتحان دور مايو 2008

المادة: مكافحة الحشرات و سموم المبيدات (402 ش)
الفرقة : الرابعة علوم حشرات
الزمن: ثلاث ساعات

الجزء الأول: مكافحة الحشرات

أجب عن ثلاث أسئلة فقط مما يأتى:

(1)- عرف فقط معنى المكافحة الحيوية في الحشرات موضحا معني التطفل و الافتراس و الصعوبات التي تواجه التوسع في استخدامها في مكافحة الآفات. (45 درجة)

(2)-أ- منظمات النمو في الحشرات مبيدات ذات تخصص نوعي. و ضح ذلك مع إعطاء أمثلة. (15 درجة)

ب- اشرح بإيجاز الفرق بين مكافحة الحشرة بالمبيد و مكافحتها بالتعقيم. (15 درجة)

ج- بين الصعوبات التي تواجه استخدام المكافحة المتكاملة في مكافحة الحشرات. (15 درجة)

(3)- تكلم بإيجاز عن المكافحة السلوكية للحشرات باستخدام الكيميائيات موضحاً استخدام فورمونات الجنس في مكافحة الآفات. (45 درجة)

(4)- أ- بين مدي الحاجة الماسة للاهتمام بمبيدات البيض في مكافحة الآفات و العوامل التي تؤثر علي كفاءة مبيدات البيض في المكافحة. (22.5 درجة)

ب- تعتبر مانعات التغذية أحد الإتجاهات الحديثة قي مكافحة الآفات. و ضح ذلك مع إعطاء نبذه تاريخية عن مانعات التغذية و تعريفها! (22.5 درجة)

(أسئلة هذا الجزء في صفحتين)

الجزء الثاني: سموم المبيدات (تسعون درجة)

Answer the following questions:

1- Write on TWO points ONLY of the following: (30 Marks)

a- Insect resistance and factors involved in resistance to insecticides. (15 Marks)

b- Benzophenyl ureas and their mode of action. (15 Marks).

c- Explain the differences between organophosphates and carbamates as insecticides? (15 Marks)

2- Discuss TWO points ONLY of the following: (30 Marks)

a- The role of cytochrome P_{450} in pesticide metabolism. (15 Marks)

b- Two examples of lethal metabolism of pesticides. (15 Marks)

c- *Bacillus thuringiensis*, and avermectins as biological insecticides. (15 Marks).

3- Answer the following question: (30 Marks)

1- Factors influencing the effect of pesticides ingestion on human are:

a)

b)

c)

2- First aid for pesticide poisoning in eye are:

a)

b)

c)

3- Narcotics are characterized by:

a)

b).

c) ,

4- All pesticides must be labeled with a word denoting the acute oral LD_{50} range:

a- The range of acute oral LD_{50} for the label *Danger - Poison* is from.....-.....mg/kg.

b-. The range of acute oral LD_{50} for the label *Warning* is from.....-.....mg/kg.

c-. The range of acute oral LD_{50} for the label *Caution* is from.....-.....mg/kg.

5- Mention three oxidation reactions involving mono-oxygenases:

a)

b)

c)

Define the following:

6- The scientific definition of poison.

7- Conditioning.

8- Acute and chronic risk of poisoning

9- Restricted-use pesticides.

10- Mode, mechanism of pesticide action.

Good Luck,,,,

Assiut University
Department of Zoology
Course no. (404)

Faculty of Science
Second semester - final exam
Time: 3 h.

Parasitology & Malacology

A-Parasitology

Answer the following questions, illustrating your answer with lablled drawings:-

1-Write short notes on four Items:-

a- Life cycle of Paragonimus Westermani. (12 degree)
b- Hydatid cyst of Echinococcus granulosus. (11 degree)
c- Reproductive systems of Acanthocephala. (11 degree)
d- Microfilaria of Wuchereria bancrofti and those of loa loa and Onchocerca Volvulus. (11 degree)
e- Life cycle of Diphyllobothrium latum. (11 degree)

2- Answer three questions only of the followings.

1- Write briefly on: (15 degree)
   a- Crithidia form.
   b- Trichomonas vaginalis.

2- Compare between the trophozoite of Entamoeba histolytica and Entamoeba coli. (15 degree)

3- Explain briefly on Asexual cycle of plasmodium spp. (15 degree)

4- Enumerate the Protozoa transmitted to man by Arthropods, Mention the mode of infection in each case. (15 degree)

لاحظ أن الأمتحان في صفحتين

Section B Malacology

Answer the first question. Then chose Four notes from the other illustrating your Answers with labelled drawing:

First question. **(18 degree)**

Write the name of the different classes of phylum mollusca and their useful aspects to man and his domastic animals.

Second question.

Write a brief account of the following notes:-

1- The functions of haemocytes in mollusca. Discus two of them in detail. **(18 degree)**

2- The factors influencing miracidia- mollusk contact during the contact and invation processer. **(18 degree)**

3- The types, origin, and formation of molluscan haemolymph cells. **(18 degree)**

4- The innate internal defence mechamism in mollusca. **(18 degree)**

5- Respone and actions of mollusc to the molluscicids. **(18 degree)**

6- The role, and relationships between Aschelminthes and terrestial snails as intermedial hosts. **(18 degree)**

Good Luck

لجنة الممتحنين

أ.د/ جمال حسن عابد أ.د/ نوال مازن د/ تركية أبو المجد

Department of Zoology Faculty of Science **Exam:** Animal behavior, evolution and special ecosystems. **4th year** Zoology Code: **410Z.**	جامعة أسيوط اليوبيل الذهبي ١٩٥٧ - ٢٠٠٧ كلية العلوم- قسم علم الحيوان	امتحان الفرقة: الرابعة شعبة: علم الحيوان المقرر: سلوك وتطور وبيئات خاصة رقم المقرر ورمزه: ٤١٠ ح الزمن: ساعتـــــــان فصل دراسي ثان: ٨ يونيو ٢٠٠٨

I- Animal behavior

Answer four only of the following: (40 marks)

1- From your view, does animals communicate? Explain with few examples.
2- What are the behavioral patterns in animal behavior?
3- Give the scientific terms for:
   a-Unconscious reactions of animals to the external stimuli by turning towards or away from the source of stimulus.
   b-The immediate comprehension and respond to a new stimulation without trial and error.
4- Do you think that animals are smarts? And how far animal considered an intelligent being?
5-Is there a relation-ship between trial and error and insight learning? Discuss your point.

II- Evolution

Write only on three of the following: (40 marks)

1- Evolution and adaptation - Types of isolation.
2- Mutation theory.
3- Inheritance of aquired characters and the objections on this theory.
4- Appraisal of natural selection theory.

III- Special ecosystems

Answer four only of the following: (40 marks)

1- Draw a diagram showing the important soil layers where animals live in.
2- Explain the following terms: geobionts- heiedaphone- saprophages-tunnellers-LD50.
3- Show by drawing only **five** adaptations to subterranean life.
4-Write two main differences between mechanical and behavioral methods for collecting soil fauna.
5-**Choose the correct answer of the following and write it in your paper :**
-The best material to preserve soil animals (ethanol – formalin - sodium chloride).
-Soil provides their organisms by the following except (food-shelter – concealment - pH).
-Most of the soil fauna are (mesofauna - macrofauna - microfauna).
-Predation, parasitism and herbaceous are (feeding - locomotion – behavior activities).
-The best method for collecting the surface dwelling insects is (lighted traps – hands - brushing).

تمنيـــاتنـــــا بالتوفيـــــــق

د. عزة عوض – د.جمال السكري – أ.د. ناصر الشيمي

Assiut University
Faculty of Science
Department of Zoology

Date: 8 June 2008
Time: 2 hours

Second Semester - Final Exam.
Course No. (412Z) Animal Physiology&Behavior

Students:4th Year

Animal Physiology

Answer the following questions:- وضح بالرسم كلما أمكن ذلك

1- Write on Three topics only from the following:- (50 degree)
   a- Synthesis of thyroid gland hormones?
   b- What are the actions of glucagon and Insulin? And how are these hormones regulated.
   c- Posterior pituitary gland hormones.
   d- Describe the Renin-aldosterone pathway for blood volume regulation.
   e- What are the functions of hypthalamus?

2-Discuss Three topics only:- (50 degree)
   a- What is semen – draw parts of spermatozoon.
   b- Draw labeled diagram of the ovarian cycle and explaine the functions of placenta.
   c- Types of nerve cells.
   d- Transmission of the nerve impulse through the nerve fiber.

Animal Behavior

Comment on five only of the following: (50 degree)

1- What are animal tropisms?
2- Factors affecting animal behavior?
3- What are the types of animal behavior?
4- From your point of view, is there a relation- ship between instinct and learning in animal? Write your opinion.
5- Discuss animal habituation.
6- Give your definition for :-
   Inherited behavior- Insight Learning - Leadership – Social behavior – Insectis pheromones.

---------- Good Luck

لجنة الممتحنين

د/ عزه محمد عوض

أ.د/ خديجة عبدالحميد

بسم الله الرحمن الرحيم

Assiut University
Faculty of Science

Department of Zoology

Four year(Entomology)
Medical Entomology
and Pathology
Time : 3 Hours

May 2008

A- Medical Entomology

Answer three of the following questions. Illustrating your answer with labeled drawings.

1- Write notes on:- 41.25 degree

a- Filariasis b- Chagas diseas

c- Onchocerciasis d- Envenomization

2- a- Write acomprehensieve essay on myiasis .

b- Enumerate the parasites transmitted by Fleas. Discuss of one of them .

41.25 degree

3- Write notes on :

a- Epidemic typhes fever b- Loiasis

c- Different species of Tabanidae d- External charactes of alimentary canal of Tse tse .

41.25 degree

4- a- Write a brief account of different types of transmission of diseases .

b- Discuss the principle characters distinguishing Anopheline and Culicine mosqutoes.

41.25 dgree

B- Insect Pathology 41.25 degree

Write a short notes on four only:-

1-Sings and symptoms of insect diseases.

2-Structure of Mocroporidia . 3- Stability of viruses .

4-Spor survival. 5-Pathway of infection by microsporidia.

6- Some factores in use protozoa for pest control.

أ.د/ عبد العال عبد المجيد د/ مصطفى حلمى شافع

Assiut University
Faculty of Science
Department of Zoology

Date: 3 June 2008
Time: 2 hours

Second Semester - Final Exam.

Course No. (406Z) Fish Biology — Students: 4th Year

Answer the following questions:

1- Explain three of the following items including the first (a) and the third (c) of them: (40 Degree)

a- Factors influencing growth of fishes and methods of measurement.

b- Bioluminescence and its significant functions.

c- The role of chloride cells in osmoregultion with emphasize on ultrastrcuture.

d- Classification of fishes according to their food and feeding habits.

2- Write on three of the following topics including the first (a) of them: (35Degree)

a- Coloration and its significant functions in fishes.

b- Factors affecting food and feeding habits of fishes.

c- Air breathing in fishes.

d- Spawning behavior of oviparous fishes.

3- Discuss three of the following topics including the last (d) of them: (35Degree)

a- Fish stractural adaptations for food and feeding habits.

b- Production of electricity in fishes.

c- Body shapes and caudal fin shapes in fishes.

d- Anadromous and catadromous migrations in fishes.

4- Discuss briefly four of the following items: (40 Degree)

a- Requisite conditions for fish suitable for fish culture.

b- Principles of management used to supply seeds for aquaculture production.

c- Determinants of egg and larval quality.

d- Different types of ponds.

e- Water criteria for fish farming.

---------- Good Luck----------

Prof.Dr Usama Mohamed Mahmoud

كلية العـــلوم قسم الرياضيـات	امتحان نهائي دور مايو ٢٠٠٨م	تاريخ الامتحان :
	أسم المقرر : حاسب آلـــي	
	رقم المقرر :	زمن الامتحان : ساعتان
	الفرقـــة : الرابعة (حشرات)	

أجب عن أربعة فقط من الأسئلة الآتية : -

١- أ) أكتب برنامج فورتران لحساب مضروب العدد N .

ب) إذا كان لدينا مجموعة من المعلومات معطاة بشكل أزواج مرتبة (x_i , y_i) وعددها n كالتالي :

$$(x_1 , y_1) , (x_2 , y_2) , \ldots\ldots , (x_n , y_n)$$

أكتب برنامج فورتران لحساب معامل الارتباط r بين القيم : $x_1 , x_2 , \ldots\ldots , x_n$

والقيم : $y_1 , y_2 , \ldots\ldots , y_n$

$$r = \frac{\sum_{i=1}^{n} x_i y_i - \frac{\sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{n}}{\sqrt{\left[\sum_{i=1}^{n} x_i^2 - \frac{(\sum_{i=1}^{n} x_i)^2}{n}\right]\left[\sum_{i=1}^{n} y_i^2 - \frac{(\sum_{i=1}^{n} y_i)^2}{n}\right]}}$$

حيث :

٢- أ) أكتب برنامجاً رئيسياً يقرأ عددين حقيقيين N1 , N2 ثم أكتب برنامجاً روتينياً يحسب مجموعهما والفرق بينهما وحاصل ضربهما وخارج قسمتهما .

ب) قم بعمل برنامج فورتران تستخدم فيه طريقة نيوتن - رافسون في إيجاد جذر المعادلة :

$$f(x) = e^x - x - \frac{1}{2} = 0$$

وذلك بأخذ القيمة الأبتدائية $x_0 = \frac{1}{2}$ وعدد خطوات مناسب .

حيث أن طريقة نيوتن - رافسون تعتمد علي العلاقة التكرارية : $x_i = x_{i-1} - \frac{f(x_{i-1})}{f'(x_{i-1})} , \; i \geq 1$

٣- أ) إذا كانت $A = (a_{ij})$ مصفوفة مربعة ذات الأبعاد $n \times n$ أكتب برنامجاً لقراءة عناصر المصفوفة A ثم يجد ويطبع D المعرفة كالتالي : $D = \sum_{i=1}^{n} |a_{ii}|$

ب) بفرض أن : $\overline{X} = < x_1 , x_2 , x_3 >$, $\overline{Y} = < y_1 , y_2 , y_3 >$

أكتب برنامجاً لإيجاد الزاوية θ المحصورة بين المتجهين $\overline{X} , \overline{Y}$ حيث : $\theta = \tan^{-1} \frac{\|\overline{X} \times \overline{Y}\|}{\overline{X} . \overline{Y}}$

من فضلك أنظر باقي الأسئلة خلف الورقة ،،،،

جامعة أسيوط

قسم الرياضيات - كلية العلوم

دور مايو 2008 م

امتحان الفرقة الرابعة علوم " شعبة الرياضيات"

نهائى ميكانيكا الموائع رقم المقرر ورمزه 420ر

الزمن: ثلاث ساعات

أجب عن خمسة أسئلة فقط :-

السؤال الاول :

أ – اكتب معادلات الحركة لمائع لزج غير قابل للانضغاط مع الاخذ فى الاعتبار ان الفرض النيوتينى متحقق مع التعليق عليها ثم استنتج منها (i) معادلات الحركة للمائع الغير لزج. (ii) معادلات الاتزان للمائع الغير لزج . *(الدرجة 32 موزعة بالتساوى)*

ب- سحب جسيم مغمور جزئيا فى الماء وكانت المقاومة لحركته R تعتمد على الكثافة ρ واللزوجة μ وطول الجسم l والسرعة u وعجلة الجاذبية g . مستخدما طريقة π استنتج علاقة دالية.

السؤال الثانى:

أ- اذا كان الجهد المركب لانسياب مستوى $w = \ln(z)$ أدرس انسياب المائع وحالاته المختلفة . *(الدرجة 32 موزعة بالتساوى)*

ب- أدرس السطح $\frac{x^2}{a^2}\tan^2 t + \frac{y^2}{b^2}\cot^2 t = 1$ حيث a,b ثوابت من حيث كونه سطحا حدوديا من عدمه.

السؤال الثالث:

أ- عرف كلا من : السطح المتآخم -الشد السطحى – شدة المصب - المعنى الطبيعي لمجال السرعة - الدوران في حالة الحركة ذات الجهد. *(الدرجة 32 موزعة بالتساوى)*

ب- أعتبر معادلة بلاسيوس بالصورة $f'(\infty)=1$ $f(0)=f'(0)=0,$ $2f''' + ff'' = 0;$ ، استخدم المتسلسلات اللانهائية لايجاد توزيع السرعة.

السؤال الرابع:

أ- استنتج معادلة حركة الانسياب الزاحف لاستوكس *(الدرجة 32 موزعة بالتساوى)*

ب- منبعان شدة كل منهما m موضوعان على الترتيب عند النقطتين $(\pm k,0)$ في مائع غير محدود. أثبت أنه عند أي نقطة فى المستوى المركب على الدائرة $x^2+y^2=k^2$ فإن سرعة المائع تكون موازية للمحور الصادى وتتناسب عكسياً مع الإحداثي الصادي لها. أوجد أيضاً النقطة على المحور الصادي التي تكون عندها السرعة أكبر ما يمكن.

السؤال الخامس:

أ- يندفع البخار من غلاية خلال انبوبة مخروطية الشكل نصف طرفى قطريها d, D وكانت v, V سرعتى البخار المناظر على الترتيب وبفرض ان الحركة تنبعث من جهة رأس المخروط . أوجد علاقة بين v, V . *(الدرجة 32 موزعة بالتساوى)*

ب- استنتج معادلات الحركة لمائع غير لزج غير قابل للانضغاط اذا كانت القوة الجسمية قوة محافظة.

السؤال السادس:

أ- أدرس حركة انسياب لمائع يتحرك بين اسطوانتين دائريتين متحدتى المحور نصفى قطريهما R_1, R_2 $(R_1 \succ R_2 \succ 0);$ *(الدرجة 32 موزعة بالتساوى)*

ب- أدرس الانسياب لمائع له دالة الجهد $\varphi = m\tan^{-1}\left(\frac{y}{x}\right)$ حيث m تمثل الشدة لهذا الانسياب.

انتهت الاسئلة تمنياتنا بالتوفيق

أ.د./محمد أحمد منصور & د./أحمد يوسف

٤ – أ) إذا كانت :

$$f(x) = \begin{cases} x^3 , & x \geq 1 \\ x^2 , & -1 \leq x < 1 \\ |x| , & x < -1 \end{cases}$$

أكتب برنامج فورتران لإيجاد قيمـــة f عند قيمـــة معطاه x .

ب) إذا كانت دالة المسافة لجزئي يتحرك حسب المعادلة : $d = f(t) = |\sin t + 2 \cos t|$

حيث t ترمز للزمن ويقاس بالثانية والمسافة d وتقاس بالمتر . أكتب برنامج فورتران لإيجاد السرعة عند اللحظ
. t = a

---

٥ – أ) إذا كانت $A = (a_{ij})$ مصفوفة مربعـــة ذات الأبعاد 2×2 . أكتب برنامج فورتران لقراءة عناصر المصفو
A ثم أكتب برنامجاً فرعياً لإيجاد محدد A .

ب) تتبع تنفيذ البرنامج التالي ثم أوجد مخرجاته .

```
INTEGER   A , B , C , D , H , R
A = 3
B = 2
C = 4
D = 5
F = A + 2* ( B+ 2 ) /  D * C
G = A / B ** 2
H = A + B * D ** B - C
R = 3 * ( 4 + 2* ( 2 ** 3 / 2 ) ** ( 9 / 3 ))
PRINT * , F , G , H , R
STOP
END
```

انتهت الأسئلة مع تمنياتي لكم بالتوفيق ،،،
لجنة الممتحنين : د/ مديحة عبد المجيد سليم

بسم الله الرحمن الرحيم

قسم النبات . كلية العلوم

Assiut University
Faculty of Science
Department of Botany
The Fourth year (Botany)

Date.May 27 (2008)
Time: 3 hours
Semeate 2 nd final Examinetion
Course: (402) Plant Biochemistry and Algae

Section (A) Algae

Answer TWO items Only from each question

1- A- Write briecly on the vitamin growth factors which could growth of Phytoplankton. (22.5 Marks)

b- Phytoplanktonic genera of chlorococcales and pennales. (22.5 Marks)

c- Write in detail: Turbulence is one of the many faetors which control the spring bloom of diatoms in temperate cokes. (22.5 Marks)

11- a- What the different methds used to collect phytoplankton. (22.5 Marks)

b- Write in detail on phosphorus and temperature as factors affecting the abundance of blue-green algae. (22.5 Marks)

c- What are the planktonic algal species in the orders Vovocoles,Centrals and Nostocales. (22.5 Marks)

III – a- Causes and Consequences of lake entrophicetion . (22.5 Marks)

b- Write on the factors which control the spring bloom of diatoms in temperate lakes. (22.5 Marks)

c- Write briefly on distribution and samipling of phytoplankton . (22.5 Marks)

Good Luck

أنظر خلفه

Department of Zoology Faculty of Science **Final exam:** Fish Biology and special ecosystems. **4th year** Chemistry/Zoology Code: **408Z.**	جامعة أسيوط بوسيل الذهبي ١٩٥٧ - ٢٠٠٧ كلية العلوم- قسم علم الحيوان	الامتحان النهائي للفرقة: الرابعة شعبة: كيمياء/ علم حيوان المقرر: بيولوجيا أسماك وبيئات خاصة رقم المقرر ورمزه: ٤٠٨ ح الزمن: ساعتـــــــان فصل دراسي ثان: ٣ يونيو ٢٠٠٨

First Section : Fish Biology

Answer the following questions:

1 - Explain in detail the factors affecting the growth and reproduction of Tilapia fish. (50 degree)

2 - With drawings, explain the different culture systems of Tilapia in Africa. (50 degree)

Second section: Special ecosystems

I-Write briefly on four of the following: (40 marks)

1- The mechanical methods for collecting soil animals.
2- Adaptations to the subterranean life.
3- Classification the soil fauna according to the presence.
4- Preservation the soil animals.
5- Collecting animals in the field.

II- Put (√) or (x) for the following: (10 marks)

-Soil is a decomposition product ( ).
-Rotifers are included with soil fauna ( ).
-Soil provides their organisms by shelter ( ).
-Earth worms are ideal example of soil fauna ( ).
-Most of soil fauna are meso-fauna ( ).
-Legs of the excavators are modified for feeding ( ).
-Heiedaphon is the surface organic layers of the soil ( ).
-Lighted traps are best method for collecting the surface dwelling insects ( ).
-Collembolans live near the soil surface have long spring organ ( ).
-Snails are considered with soil fauna ( ).

تمنياتنا بالتوفيق أ.د. محمد توفيق - أ.د. ناصر الشيمي

Assiut University
Faculty of Science
Botany Department

بسم الله الرحمن الرحيم

جمهورية مصر العربية ،أسيوط ٧١٥١٦
جامعة أسيوط
كلية العلوم ،قسم النبات

Plant Biochemistry — Second Term Examination 2007 – 2008

Time Allowed: 1.5 hours - 402 B — Fourth Year: Special Botany

Section A: Plant Biochemistry

Read carefully and choose the write answer for at least 45 questions:

(Every questions 2 marks)

(7 pages)

1- Which of the following alkaloids is not synthesized in opium poppy?
- a- Morphine
- b- Thebaine
- c- Codeine
- d- Atropine

2- An example of indole alkaloids is,
- a- Pilocarpine
- b- Reserpine
- c- Papaverine
- d- All of above

3- Approximately how many alkaloids have been isolated from plants so far?
- a- 500
- b- 1000
- c- 2000
- d- 3000

4- Terpenoid containing alkaloids (sterol alkaloids) occur in plants in combination with,
- a- Carbohydrates
- b- Proteins
- c- Both (a) and (b)
- d- None of the above

5- Most important function of alkaloids in plants appears to,
- a- Act as growth hormone
- b- Provide protection against predators
- c- To attract animals for pollination
- d- None of the above

6- Flavones and flavonols absorb,

a- UV-radiations
b- infra-red rays
c- blue rays
d- all of above

7- Isoflavones (isoflavonoids) mostly occur in,

a- palms
b- leguminous plants
c- cruciferous plants
d- all of above

8- Isoflavones differ from other flavonoids in structure mainly in position of ring-B which is shifted from,

a- position 2 to position 3 of middle ring
b- position 2 to position 4 of middle ring
c- position 2 of central ring to position 5 of ring-A
d- none of the above

9- Isoflavonoids are known to,

a- act as phytoalexins
b- act as insecticides
c- cause infertility in mammals especially sheep
d- all of above

10- Rotenone, awidely used insecticide is,

a- isoflavnoid
b- sesquiterpene
c- flavonol
d- none of the above

11- Which of the following organic compounds are not plant phenolics?

a- Lignins
b- Tannins
c- Essential oils
d- Flavonoids

12- Which of the following pathway is not involved in secondary carbon metabolism in plants?

a- Mevalonic acid pathway
b- Pentose phosphate pathway
c- Malonic acid pathway
d- Shikimic acid pathway

13- The fundamental 5-C unit of terpenoids (i.e., isoprene) has,

a- Branched carbon skeleton
b- Unbranched carbon skeleton
c- Ringed carbon skeleton

d- None of the above

14- Sesquiterpene contains,

a- 10 carbons
b- 15 carbons
c- 20 carbons
d- None of the above

15- Isoprene units are synthesized in plants from acetyl-CoA through,

a- Malonic acid pathway
b- Shikimic acid pathway
c- Mevalonic acid pathway
d- All of above

16- Which one of the following is not a simple plant phenolic?

a- Caffeic acid
b- Salicylic acid
c- Abietic acid
d- Ferulic acid

17- Which of the following is building block of lignins?

a- Coniferyl alcohol
b- Sinapyl alcohol
c- p-Coumaryl alcohol
d- All of above

18- Primary function of lignin in plants is,

a- To provide mechanical support to plant
b- To provide protection from physical, chemical and biological attack
c- Both (a) and (b)
d- None of the above

19- The basic carbon skeleton of lignin is,

a- $C_6 - C_3 - C_6$
b- $(C_6 - C_3)_n$
c- $(C_6)_n$
d- $(C_6 - C_3 - C_6)_n$

20- Flavonoids are phenolic compounds that contain,

a- 15 - C
b- 10 - C
c- 30 - C
d- None of the above

21- Except in flowers, anthocyanins are never found in plants in,

a- fruits
b- stems and leaves
c- roots
d- none of the above

22- The colour of tomato fruits is due to the presence of,

a- anthocyanins
b- carotenoids
c- flavonols
d- none of the above

23- The aglycone of anthocyanin which is called as anthocyanidin, is a,

a- flavynium cation
b- flanynium anion
c- flavin molecule
d- none of the above

24- In anthocyanins, the sugars (in the form of one or two glucose or galactose units) are mostly attached to,

a- 3rd position of middle ring
b- 7th position of ring-A
c- 4 position of ring-B
d- none of the above

25- Characteristic colour of anthocyanins is determined by the presence of –OH groups (and sometimes their methylation) at specific positions in their molecule at,

a- ring A
b- ring B
c- middle ring
d- none of the above

26- Mustard oil glycosides are also known as,

a- Glucosinolates
b- Cyanogenic glycosides
c- Steroids glycosides
d- None of the above

27- A non-protein amino acid which is basic in nature is,

a- Lysine
b- Arginine
c- Ornithine
d- Histidine

28- Which of the following statements is not correct?

a- All organic compounds containing nitrogen and heterocyclic ring are alkaloids
b- Alkaloids are bitter in taste and soluble in most of organic solvents
c- Most alkaloids are colourless, crystalline non-volatile solids and are optically active
d- Many alkaloids exhibit important pharmacological properties.

29- Which of the following alkaloids does not contain nitrogen in heterocyclic ring?

a- Narcotine
b- Ephedrine

c- Morphine
d- Quinine

30- In plants, alkaloids usually accumulate in,

a- Young actively growing parts
b- Epidermal and hypodermal cells
c- Bundle sheaths and latex vessels
d- All of above

31- The steroids are,

a- Triterpenes and their derivatives
b- Tetraterpenes
c- Polyterpenes
d- None of the above

32- Which of the following steroids has primary function in plants?

a- Cholesterol
b- Sitosterol
c- Ponasterone-A
d- None of the above

33- Bitter principles from citrus fruits are,

a- Ecdysteroids
b- Cardenolides
c- Sapogenins
d- Limnoids

34- Digitoxin, a steroid glycoside obtained from Digitalis is prescribed for,

a- Liver ailments
b- Heart ailments
c- Kidney ailments
d- None of the above

35- A saponin (sapogenin) called yamogenin, is obtained from *Dioscorea* (Yam) and is used in making,

a- Oral contraceptives
b- Insecticides
c- Perfumes
d- None of the above

36- The influence of chemicals released by one plant species on another plant or animal species with resulting benefits to the species which contain them, is called as,

a- Allopathy
b- allelopathy
c- Homoeopathy
d- None of the above

37- **The plant phenolic compounds, which contain up to 10 - C in their basic carbon skeleton, are sometimes grouped as,**

a- Simple plant phenolics
b- Complex plant phenolics
c- Flavonoids
d- None of the above

38- **Except flavonoids, all other plant phenolics are biosynthesized in plants through,**

a- Malonic acid pathway
b- Mevalonic acid pathway
c- Shikmic acid pathway
d- None of the above

39- **The basic carbon skeleton of flavonoid is,**

a- $C_6 - C_3 - C_6$
b- $(C_6 - C_3 - C_6)_n$
c- $(C_6 - C_3)_n$
d- $C_6 - C_2 - C_6$

40- **Which of the following enzymes is most extensively studied enzyme of secondary metabolism in plants?**

a- Chalcone synthase
b- Phenylalanine ammonia lyase
c- Allene oxide cyclase
d- None of the above

41- **Which of the following is a category of nitrogen containing secondary plant products?**

a- Alkaloids
b- Cyanogenic glycosides and glucosnolates
c- Non-protein amino acids
d- All of above

42- **Which of the following substances is not a cyanogenic glycoside?**

a- Linamarin
b- Solanine
c- Lautostralin
d- Amygdalin

43- **Which part of the flavonoid molecule is synthesized through shikimic acid pathway?**

a- Ring - A
b- Ring - B
c- Ring - A and oxygen of the middle ring
d- Ring - B and 3-carbons of the middle ring

44- In plants, flavonoids occur as glycosides that are soluble in water and are mostly,

a- Coloured
b- Colourless
c- Red coloured
d- Yellow coloured

45- Flavonoids mostly accumulate in,

a- Cytosol
b- Chloroplast
c- Chromoplast
d- Vacuole

46- Most common anthocyanidins in plants are,

a- pelargonidin
b- delphinidin
c- cyanidin
d- all of above

47- The colour of delphinidin is,

a- scarlet (bright red)
b- crimson (deep red)
c- bluish-purple
d- none of the above

48- Besides specific structural features of anthocyanins, the colour of anthocyanin is also influenced by,

a- occurrence of different anthocyanins and their association especially at high concentration in the same flower or plant organ
b- pH of the vacuole and co-existence of anthocyanins with other flavonoids
c- association of anthocyanins with cheleated metal ions
d- all of above

49-Flavones and flavonols differ from anthocyanins in structure mainly in,

a- ring-A
b- ring-B
c- middle ring
d- none of the above

50-The pigments flavones and flavon0ls are,

a- yellowish
b- ivory coloured
c- colourless
d- all of above

Prof. Dr. M. Zidan

Good Luck

بسم الله الرحمن الرحيم

قسم النبات . كلية العلوم

Assiut Iniversity
Faculty of Science
Department of Botany
The fourth year (Chemistry an Botany)

Date: June 10 (2008)
Time : 2 hours
Semester 2 nd. Final Examination
Course : Algae and Virology 410

Section (A) Algae

Answer Two items Only from each question

1- a- Water has certain properties which make it possible for pland animal to live in it. Write in detail. (22.5 marks)

b- The availabbnility of nutrients along with adequate light and temperature are considered as the most important factors regulating phytoplankton growth. Discuss briefly. (22.5 marks)

c- Mention in detail about the harmful effects in the presence of the high extracellular products in natural fresh or marine waters. (22.5 marks)

2- a- Johannes Mueller usedf a fine – mesh net to concentrate the microscopic organisms in open ocean. Write on the difficulties for quantitative studies of phytoplankton by plankton nets. (22.5 marks)

b- Write in detail on the factors involved in the production of a particular bloom include temperature, increases in nutrient levels and an increase in solar radiation. (22.5 marks)

c- What are the planktonic algal species in the order Volvocales, Chlorococcales and in pennales ..... (22.5 marks)

Cood Luck

أنظر خلفه

Assiut University
Facuity of science
Department of Botany
The fourth year,chemistry /Botany

Date: June, 10,2008
Time: 2hours
Semester: 2nd ,final Exam.
Course: Algae& Virology (410R)

Section (B) :Virology

Please Answer the Following Two Questions

1- (a) Are there dissimilarties between viruses an other microorganisms ? (10 Marks).

(b) Explain:V1:R/1: (1.2)/20:S/S:S/Ap (6 Marks).

(c) Give three items for chemotherapy of virus infection (6 Marks).

2- (a) Define three only : Poly A- Satellite virus- Necrosis- Gibbs concept – Vpg (3 Marks/each).

(b)Mention four cytological changes in plant cell after virus infection (8 Marks).

(c) " Rochow (1972) put a proposal for dependent transmission of persistent aphid – borne viruses" comment (6 Marks).

Good luck

Prof Dr. Sameh .k.Hemida

Faculty of Science Botany Department	بسم الله الرحمن الرحيم	كلية العلوم قسم النبات
Phytos. +Flora and genetics Course No. 434B Time allowed : Three Hours	Second Semester Final Examination: 2007 – 2008 Fourth Year : Chemistry and Botany	

Section (A): Phytosociology and Flora of Egypt

Answer the following questions:

1-Write short notes on THREE ONLY of the following:

a- The ecological amplitude. (17.5 mark)
b- Xerosere. (17.5 mark)
c- Association of species. (17.5 mark)
d- Frequency. (17.5 mark)

2-a- Write briefly on sand dunes of Mariut region, with special reference to some weeds grow on this habitat. (13.5 mark)

b- Write short notes on THREE only of the following:

(i) Onions and species cultivated in Egypt. (13 mark)
(ii) Characteristic plants of the Eastern desert. (13 mark)
(iii) Phytogeographical regions of Egypt. (13 mark)
(iv) Leguminous street trees cultivated in Egypt. (13 mark)

Good Luck

Prof. Mohamed Abou El-Ela & Prof. Momen Zareh

باقي الأسئلة في الخلف

ثانياً : الوراثـــــــــــــــة

أجب عن الأسئلة الآتيـــــــة :-

السؤال الأول:- (٤٠ درجة)

علل لما يأتـــي :-

أ - لكي تتم عملية تضاعف الـ DNA بالطريقة الصحيحة يلزم تكوين بروتين SSB.

ب - تكوين تثائيات الثيمين بين خيطي الـ DNA.

ج - حدوث طفرة العين العودية.

د - العقم النصفي Semi Sterility في الأفراد الحاملة لإنتقال خليط .

السؤال الثاني :- (٤٠ درجة)

فرق بين المصطلحات الوراثية التالية:

1. Transition mutation – Transversion mutation.
2. non sense mutant – mis-sense mutant.
3. Paracentric inversion – pericentric inversion.
4. depurination – deamination.

السؤال الثالث:- (٢٥ درجة)

وضح بالرسم فقط مع كتابة البيانات ما يلي:

أ- التأثير الطفري لكل من حمض النيتروز وشبيهات القواعد (٨ درجة)

ب- الخطوات العامة لتفاعل إنزيم البلمرة المتسلسل (PCR)
Polymerase chain reaction (٨ درجة)

ج- الجينات المختلفة لأوبيرون اللاكتوز والبروتينات المختلفة التي تشفر لها في حالة تشغيل الأوبيرون. (٩ درجة)

مع تمانيتنا بالتوفيق،،

جامعة أسيوط	امتحان نهائي دور مايو ٢٠٠٨م	تاريخ الامتحان :
كلية العلوم	أسم المقرر : حاسب آلي	
قسم رياضيات	رقم المقرر :	زمن الامتحان : ساعتان
	الفرقة : الرابعة (نبات)	

أجب عن أربعة فقط من الأسئلة الآتية : -

١-أ) أكتب برنامج فورتران لحساب مضروب العدد N .

ب) إذا كان لدينا مجموعة من المعلومات معطاة بشكل أزواج مرتبة (x_i , y_i) وعددها n كالتالي :

$(x_1 , y_1) , (x_2 , y_2) , ... , (x_n , y_n)$

أكتب برنامج فورتران لحساب معامل الارتباط r بين القيم : $x_1 , x_2 , ..., x_n$

والقيم : $y_1 , y_2 , ..., y_n$

$$r = \frac{\sum_{i=1}^{n} x_i y_i - \frac{\sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{n}}{\sqrt{\left[\sum_{i=1}^{n} x_i^2 - \frac{(\sum_{i=1}^{n} x_i)^2}{n}\right]\left[\sum_{i=1}^{n} y_i^2 - \frac{(\sum_{i=1}^{n} y_i)^2}{n}\right]}}$$

حيث :

٢-أ) أكتب برنامجاً رئيسياً يقرأ عددين حقيقيين N1 , N2 ثم أكتب برنامجاً روتينياً يحسب مجموعهما والفرق بينهما وحاصل ضربهما وخارج قسمتهما .

ب) قم بعمل برنامج فورتران تستخدم فيه طريقة نيوتن - رافسون في إيجاد جذر المعادلة :

$$f(x) = e^x - x - \frac{1}{2} = 0$$

وذلك بأخذ القيمة الأبتدائية $x_\circ = \frac{1}{2}$ وعدد خطوات مناسب .

حيث أن طريقة نيوتن - رافسون تعتمد علي العلاقة التكرارية : $x_i = x_{i-1} - \frac{f(x_{i-1})}{f'(x_{i-1})} , \quad i \geq 1$

٣-أ) إذا كانت $A = (a_{ij})$ مصفوفة مربعة ذات الأبعاد $n \times n$ أكتب برنامجاً لقراءة عناصر المصفوفة A ثم يجد ويطبع D المعرفة كالتالي : $D = \sum_{i=1}^{n} |a_{ii}|$

ب) بفرض أن : $\overline{X} = < x_1 , x_2 , x_3 > \quad , \quad \overline{Y} = < y_1 , y_2 , y_3 >$

أكتب برنامجاً لإيجاد الزاوية θ المحصورة بين المتجهين $\overline{X} , \overline{Y}$ حيث : $\theta = \tan^{-1} \frac{\|\overline{X} \times \overline{Y}\|}{\overline{X} . \overline{Y}}$

من فضلك أنظر باقي الأسئلة خلف الورقة ،،،،

٤ – أ) إذا كانت :

$$f(x) = \begin{cases} x^3 , & x \geq 1 \\ x^2 , & -1 \leq x < 1 \\ |x| , & x < -1 \end{cases}$$

أكتب برنامج فورتران لإيجاد قيمـــة f عند قيمـــة معطاه x .

ب) إذا كانت دالة المسافة لجزئي يتحرك حسب المعادلة : $d = f(t) = |\sin t + 2 \cos t|$

حيث t ترمز للزمن ويقاس بالثانية والمسافة d وتقاس بالمتر . أكتب برنامج فورتران لإيجاد السرعة عند اللح
. t = a

---

٥ – أ) إذا كانت $A = (a_{ij})$ مصفوفة مربعـــة ذات الأبعاد 2×2 . أكتب برنامج فورتران لقراءة عناصر المص
A ثم أكتب برنامجاً فرعياً لإيجاد محدد A .

ب) تتبع تنفيذ البرنامج التالي ثم أوجد مخرجاته .

```
NTEGER   A , B , C , D , H , R
 = 3
 = 2
 = 4
 = 5
 = A + 2* ( B+ 2 ) /  D * C
 = A / B** 2
 = A + B * D ** B - C
 = 3 * ( 4 + 2* ( 2 ** 3 / 2 ) ** ( 9 / 3))
PRINT * , F , G , H , R
STOP
END
```

انتهت الأسئلة مع تمنياتي لكم بالتوفيق ،،،
لجنة الممتحنين : د/ مديحة عبد المجيد سليم

Assiut University Faculty of Science Department of Botany		Date: 8 June, 2008 Time allowed: 2 hours
Second Semester Final Examination **Subject: Course no 404 B (*Biotechnical analyses*)** **Students: Special Botany Students (Fourth year)**		

Part I

Answer the following questions:

I-Explain TWO only of the following: (23 Mark)

1-Principles of bioassay and application of microorganisms and animals in chemical compounds bioassay.

2-Give example for using mycoflora, flora and fauna as bioindicator for ecosystem integrity.

3-HPLC system and its application in aflatoxin analysis.

II-Write on *TWO* only of the following: (22 Mark)

1-Types of immunoassay and quantitative estimation of toxic substance with using ELISA.

2-Types of chromatography and application of chromatogram in purification and estimation of chemical compounds.

3-Types of spectrophotometers and their applications.

Prof. Dr. Hassan A. H. Hasaan

Part II

Answer TWO only of the following:

I-Describe how to use the particle bombardment technique to produce insect resistant (Bt) transgenic plants.

(22.5 Mark)

II-Suppose that you have been requested to check a plant cultivar that will enter your country, for its purity from a specific DNA plant virus, explain in details how can you achieve this task on the level of DNA? (keep in your consideration that you have the primers for this virus).

(22.5 Mark)

III- a) Write in details about the western blot technique.

b) Which results are more reliable, those based on the mRNA level or those are based on the protein level and why? (22.5 Mark)

Dr. Mostafa Kouth

Good Luck

Faculty of Science Botany Department	بسم الله الرحمن الرحيم	كلية العلوم قسم النبات
Phytosociology and Flora of Egypt Time allowed : Three Hours 432 B	Second Term Examination 2007 - 2008 Fourth Year : Special Botany	

Section (A) : ***Phytosociology***

Answer the following questions

I -Answer <u>FOUR ONLY</u> of the following :

Compare between : .....(45.0 marks).

a- Abundance and Constancy.
b- Association and Sociability.
c- Presence and Fidelity .
d- Denuded and clip quadrates .
e- Hydrosere and Xerosere .

II- Write short notes on <u>FOUR ONLY</u> : .....(45.0 marks)

a- Factors affecting the grouping of species .
b- Frequency diagram as a test for homogeneity in the plant community .
c- Fidelity and the characteristic species .
d- Life forms and the biological spectrum .
e- Phytosociological tables .

GOOD LUCK

Prof. Dr. F.M.Salama

باقي الأسئلة خلف الصفحة

Faculty of Science Botany Department	بسم الله الرحمن الرحيم	كلية العلوم قسم النبات
Phytos. and Flora ime allowed : 3 hours		Second Semester : May 2007 / 2008 Fourth year (Botany)

(Section A: Flora)

Answer the following TWO questions (45 mark each)

1. Write short notes on FOUR only of the following :- (11.25 mark each)

a) Fruit trees cultivated in Egypt and belonging to Rutaceae & Pyroideae.
b) Types of vegetation of Bahariya Oasis and the plants inhibit each vegetation.
c) Phytogeographical regions of Egypt.
d) Cucumbers and spices cultivated in Egypt.
e) Rocky ridges of Mariut region, with special referance to some weeds grow on this habitat.

---

2. Write short notes on FOUR only of the following :- (11.25 mark each)

a) Ornamental garden bulbs cultivated in Egypt.
b) Weeds growing in Egypt and belonging to Leguminosae and Compositae.
c) George Schweinfurth and Nabil El-Hadidi.
d) Leguminous street trees cultivated in Egypt.
e) Eastern desert, with special referance to some characteristic plants grow in this habitat.

Prof. Momen Zareh

Assiut University
Faculty of Science- Department of Botany

Date :Tuesday, 3 June 2008
Time allowed: 3 hours

Second Semester Final Examination

Course No. 408 B: (Microbiology and Microbial Toxins)
Fourth year- Chemistry & Microbiology

Section (A): Microbiology

Answer THREE questions only:

1- Giving illustrations describ the pathogens and the disease symptoms of:

A- Ptyriasis versicolor… (8 marks) B- White and Black piedra… (8 marks)
C- Mycotic keratitis…….(9 marks) (Total marks = 25)

2- Describe the clinical manifestations of each of the following:

A- Tinea capitis……..(8 marks) B- Onychomycosis……..(8 marks)
C- Tinea pedis…….. …..(9 marks) (Total marks =25)

3- Give an account of :

A- Mode of action and uses of polyenes and azoles as antifungal agents ……
…… (12.5 marks)
B- Superficial and systemic infections by *Aspergillus* species……..(12.5 marks)
(Total marks = 25)

4- Explain giving examples the role of the dimorphic fungi in human and animal diseases with special focus on:

A- Name of diseases……(5 marks)
B- Name and shapes of fungal species involved……..(5 marks)
C- Mode of transmission……(5 marks)
D- -Site of lesions……(5 marks)
E- Main hosts……..(5 marks)
Total marks = 25)

Best wishes
Professor Dr. A. M. Moharram

Attention: Please see next page for (Section B)……

Faculty of Science **Physiology of Fungi & Industrial Microbiology**
Botany Department **June 2008 -Three Hours**
Chemistry & Microbiology **Fourth Year**

Section I: Physiology of Fungi (90 marks)

Answer the following questions

I-Give an account on the following :- (20 marks)

a- The regulation of fungal secondary metabolites.

b- The Important Factors Effect on Fungal growth.

c- B- Lactam biosynthetic pathway.

II- Write on THREE ONLY of the following: (36 marks)

a- General characters ; composition and function of fungal cell wall .

b- Effects of pH and temperature on fungal growth.

c- Metabolic pathways of the amino acids synthesis in fungal cell.

III- Explain THREE ONLY of the following: (34 marks)

a- The principal pathways of fungal secondary metabolism.

b- Effect of light on fungal growth.

c- Glycolysis and gluconeogensis in yeast and filamentous fungi.

d- N_2 metabolism in fungi.

Section II : Industrial Microbiology (90 marks)

Answer the following questions

1- Give an account of TWO ONLY of the following: (45 marks)

a) The different steps for treatment of raw material in baker's yeast production and the different kinds of the produced yeast.

b) Production of steroid on large scale by submerged culture ; with explains the hydroxylation and side- chain degradation reactions ?

c) Vinegar production in industry and their different kinds ?

2- Write about THREE ONLY of the following: (45 marks)

a) Industrial production of natural penicillin and the classification of antibiotics according to their chemical structure .

b) Production of ethanol biologically .

c) Give the advantages and disadvantage of the different type of fermentation process ?

d) Defined the screening?

Good Luck

Assistant Prof. Dr: Eman M. M.

Assiut University
Faculty of Sciences
Geology Department

امتحان طلاب الفرقة الرابعة شعبة الجيولوجيا وشعبة الجيوفيزياء
(٤٣٤ ج) جيولوجيا تصويرية وجيولوجيا البيئة

June, 2008 **Time allowed : 2 Hours**

I. PHOTOGEOLOGY

ANSWER *ONLY TWO* OF THE FOLLOWING QUESTIONS (52 points)
Illustrate your answer with suitable drawings

1] Express geometrically how parallax difference on vertical aerial photographs is a function of height difference of ground points. (26 point)

2] Write short notes on the photogeologic characteristics of:
a) Interbedded horizontal and inclined sedimentary rocks. (9 points)
b) Lava flows. (8 points)
c) Granitic terrain. (9 points)

3] Explain how we can use drainage pattern and texture as tools in lithologic and structural photo-interpretation (26 point)

II. ENVIRONMENTAL GEOLOGY

ANSWER *ONLY TWO* OF THE FOLLOWING QUESTIONS (52 points)

1] a) The Solar System is formed of a number of planets, including Earth, rotating around the Sun. What is the relation between the distance of these planets from the Sun and their material composition? What distinguish Earth from other planets in this respect? (13 points)

b) Give brief account on water problems, water uses and water losses in the Arab Countries. (13 points).

2] a) Discuss the significance of Population Profile of a given country. Calculate the *Doubling Date* for Egypt given the population at the year 2000 is 78 million and the growth rate 2% (13 points).

b) Give an account on the possible impacts of Climate Change on the biological and physical environments (13 points).

3] a) In the early history of the Planet Earth it was reheated by several processes. What are these processes and what is the impact of this reheating on the consequent development of the Earth? (13 points)

b) Give brief account on the possible impact of Climate Change on Egypt (13 points).

Good Luck

بسم الله الرحمن الرحيم

جامعة أسيوط
كلية العلوم - قسم الجيولوجيا

امتحان الفرقة الرابعة بكلية العلوم شعبة الجيوفيزياء

المادة:جيولوجيا مصر (٤٢٨ ج)

الدور يونيو ٢٠٠٨م　　الدرجة: ١٤٠ درجة　　الزمن: ساعتان

Answer only *four* questions of the following:

1) **Correlate the Oligocene-Miocene rock units and their equivalent time units in the northern Western Desert and the Gulf of Suez. (35 marks)**

2) **a) Write on the lithostratigraphy, paleoecology and paleontology of the Global Stratotype Section and Point (GSSP) of the Paleocene/Eocene Boundary. (20 marks)**

   b) The greater part of northern Egypt is affected by folding. Discuss. (15 marks)

3) **a) Write on the sediments of the Eocene Series along the Nile Valley. (20 marks)**

   b) Give reasons: the missing of the Paleozoic rocks over most parts of Egypt. (15 marks)

4) **a) Write on the stratigraphy of the Jurassic System at Gebel Maghara. (20 marks)**

   b) The main fault trends predominantly in Egypt, give examples. (15 marks)

5) **a) Compare between the Stable and Unstable shelves with respect to the Paleogene sediments. (20 marks)**

   b) Tectonic subdivision of the Egyptian Territory and the characteristics of each division. (15 marks)

أنتهت الأسئلة
مع أجمل الأمنيات بالتوفيق والتفوق
أ.د/ مصطفى محمود يوسف
أ.د/ خالد عبدالقادر عوده
أ.د/ ناجح عبدالرحمن عبيدالله

Assiut University
Faculty of Science
Geology Department

Date: 1 June, 2008
Time allowed: 2 hours.

Second Semester Final Examination

Subject: Mineral Exploration (414G)
Students: Fourth Year Geology Students

Part I (Geochemical methods)

Write briefly on **Two only** of the following:-

1- Iron Ore or Cupper Ore in Egypt and prospecting Criteria. (26 Degree)
2- Prospecting Criteria of Ore minerals. (26 Degree)
3- Method of prospections. (26 Degree)

Part II (Geophysical methods)

Answer the following questions:

1. Identify **Four only** of the following :- (20 Degree)

Telluric current – Schlumberger array – Ore dressing and refining – Isothermal and Viscous remanent magnetization – Drift correction.

2. Write briefly **on Two only** of the following :- (33 Degree)

i. Peter's method (as interpretation of magnetic data).
ii. Electrode configurations for measuring apparent resistivity.
iii. Factors governing the choice of Exploration areas.

Name of Examiners: 1- Dr. Galal Abd El-Fatah Hassan
2- Dr. Mohamed Fekry Khalil

Good Luck

جامعة أسيوط
كلية العلوم - قسم الجيولوجيا

امتحان طلاب الفرقة الرابعة شعبة الجيوفيزياء

مقرر (٤١٢ ج) أحواض ترسيب وطباقية سيزمية وتتابعية

الزمن ساعتان — يـــه ٢٠٠٨

I. Sedimentary Basins

Answer Two questions only from the following:

1-Define the following terms (26.5 degree)

Basin axis
Depocentre
Post-depositional basin
Molasse sediments
Flysch sediments

2- a. What are the basins-related to the subduction? (13 degree)

b. Describe briefly the types of sedimentary rocks and their economic importance in the proto-ocean gulf stage basins (13 degree)

3- Mention briefly the steps of sedimentary basin-assessment to developing a petroleum play (26 degree)

II. Seismic and Sequence Stratigraphy

ANSWER THE FOLLOWING QUESTIONS .

Illustrate your answers by diagrams wherever possible (52.5 Marks)

1. Illustrate by diagrams ONLY the effect of sea level changes on the development of systems tracts in **EITHER** Siliciclastic **OR** Carbonate sediments. (24.5 marks

2. Write on **TWO** of the following: (28 marks)

a) Types, hierarchy and causes of stratigraphic cycles (14 marks)

b) Classification of stratal patterns showing stratal discontinuities on seismic sections. (14 marks)

c) Define, describe and illustrate:

(i) parasequence and parasequence sets

(ii) Type (1) and Type (2) sequence boundaries (14 marks)

(GOOD LUC

Assiut University
Faculty of Sciences
Geology Department

امتحان طلاب الفرقة الرابعة شعبة الجيولوجيا وشعبة الجيوفيزياء
(٤٣٤ ج) جيولوجيا تصويرية وجيولوجيا البيئة

June, 2008 **Time allowed : 2 Hours**

I. PHOTOGEOLOGY

ANSWER *ONLY TWO* OF THE FOLLOWING QUESTIONS (52 points)
Illustrate your answer with suitable drawings

1] Express geometrically how parallax difference on vertical aerial photographs is a function of height difference of ground points. (26 point)

2] Write short notes on the photogeologic characteristics of:
a) Interbedded horizontal and inclined sedimentary rocks. (9 points)
b) Lava flows. (8 points)
c) Granitic terrain. (9 points)

3] Explain how we can use drainage pattern and texture as tools in lithologic and structural photo-interpretation (26 point)

II. ENVIRONMENTAL GEOLOGY

ANSWER *ONLY TWO* OF THE FOLLOWING QUESTIONS (52 points)

1] a) The Solar System is formed of a number of planets, including Earth, rotating around the Sun. What is the relation between the distance of these planets from the Sun and their material composition? What distinguish Earth from other planets in this respect? (13 points)

b) Give brief account on water problems, water uses and water losses in the Arab Countries. (13 points).

2] a) Discuss the significance of Population Profile of a given country. Calculate the *Doubling Date* for Egypt given the population at the year 2000 is 78 million and the growth rate 2% (13 points).

b) Give an account on the possible impacts of Climate Change on the biological and physical environments (13 points).

3] a) In the early history of the Planet Earth it was reheated by several processes. What are these processes and what is the impact of this reheating on the consequent development of the Earth? (13 points)

b) Give brief account on the possible impact of Climate Change on Egypt (13 points).

Good Luck

Assiut University
Faculty of Science
Department of Geology

Date: 3 June 2008
Time allowed: Two Hours

Second Semester Final Examination

Subject: Subsurface Geology (G440)
Student: Fourth year (all groups)

Answer the following questions

1- El-Kharga Oasis is a depression having two major rock units resting over the basement rocks. The first unit is the Nubian sandstone that is saturated partially by water. The second unit is the Qusseir shale that overlie conformably the Nubain sandstone unit. The two unit are affected by different sets of faults that resulted in number of basins. If you have enough subsurface information about the two units, show how you can use structure contour maps and isopach maps in studying the geologic history of the area and evaluating the water –bearing zone of the Nubian sandstone unit. (22 Marks)

2- **Write on <u>three only</u> of the following: (24 Marks)**
   a- Using of structure contour map in the detection of normal faults with different downthrows (8 marks)
   b- Applications of geophysical and geochemical maps (8marks)
   c- Using of facies map in studying ancient erosion surfaces (8marks)
   d- Using of isopach maps in studying uplifts and subsidence (8 marks)

3- **Answer <u>three only</u> of the following: (24 Marks)**
   a- Compilation between palinspastic and structure contour maps in studying the tectonic history of an area (8 marks)
   b- Constructing and applications of panel diagrams (8marks)
   c- Integration between isopach maps in studying migration of ancient shoreline (8 marks)
   d- Constructing and applications of paleotopographic map (8 marks)

Best wishes

Prof.. Dr. Mahmoud M. Senosy

امتحان نهائي دور مايو ٢٠٠٨م	تاريخ الامتحان :
أسم المقرر : حاسب آلـــي	زمن الامتحان : ساعتان
رقم المقرر :	
الفرقـــة : الرابعة (جيوفيزيقا)	

أربعة فقط من الأسئلة الآتية : -

تب برنامج فورتران لحساب مضروب العدد N .

ا كان لدينا مجموعة من المعلومات معطاه بشكل أزواج مرتبة (x_i , y_i) وعددها n كالتالي :

$(x_1 , y_1) , (x_2 , y_2) , ... , (x_n , y_n)$

تب برنامج فورتران لحساب معامل الأرتباط r بين القيم : $x_1 , x_2 , ..., x_n$

$y_1 , y_2 , ..., y_n$

قيم :

$$r = \frac{\sum_{i=1}^{n} x_i y_i - \frac{\sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{n}}{\sqrt{\left[\sum_{i=1}^{n} x_i^2 - \frac{(\sum_{i=1}^{n} x_i)^2}{n}\right]\left[\sum_{i=1}^{n} y_i^2 - \frac{(\sum_{i=1}^{n} y_i)^2}{n}\right]}}$$

ث :

أكتب برنامجاً رئيسياً يقرأ عددين حقيقيين N1 , N2 ثم أكتب برنامجاً روتينياً يحسب مجموعهما والفرق بينهما وحاصل ضربهما وخارج قسمتهما .

م بعمل برنامج فورتران تستخدم فيه طريقة نيوتن - رافسون في إيجاد جذر المعادلة :

$$f(x) = e^x - x - \frac{1}{2} = 0$$

ذلك بأخذ القيمة الأبتدائية $x_o = \frac{1}{2}$ وعدد خطوات مناسب .

حيث أن طريقة نيوتن - رافسون تعتمد علي العلاقة التكرارية : $x_i = x_{i-1} - \frac{f(x_{i-1})}{f'(x_{i-1})} , \quad i \geq 1$

إذا كانت $A = (a_{ij})$ مصفوفة مربعة ذات الأبعاد $n \times n$ أكتب برنامجاً لقراءة عناصر المصفوفة A ثم يجد ويطبع D المعرفة كالتالي : $D = \sum_{i=1}^{n} |a_{ii}|$

) بفرض أن : $\overline{X} = < x_1 , x_2 , x_3 > , \quad \overline{Y} = < y_1 , y_2 , y_3 >$

اكتب برنامجاً لإيجاد الزاوية θ المحصورة بين المتجهين $\overline{X} , \overline{Y}$ حيث : $\theta = \tan^{-1} \frac{\|\overline{X} \times \overline{Y}\|}{\overline{X} . \overline{Y}}$

من فضلك أنظر باقي الأسئلة خلف الورقة ،،،،

٤ – أ) إذا كانت :

$$f(x) = \begin{cases} x^3 & , \quad x \geq 1 \\ x^2 & , \quad -1 \leq x < 1 \\ |x| & , \quad x < -1 \end{cases}$$

أكتب برنامج فورتران لإيجاد قيمـــة f عند قيمـــة معطاه x ٠

ب) إذا كانت دالة المسافة لجزئي يتحرك حسب المعادلة : $d = f(t) = |\sin t + 2 \cos t|$

حيث t ترمز للزمن ويقاس بالثانية والمسافة d وتقاس بالمتر ٠ أكتب برنامج فورتران لإيجاد السرعة عند اللحـ

$t = a$ ٠

---

٥ – أ) إذا كانت $A = (a_{ij})$ مصفوفة مربعـــة ذات الأبعاد 2×2 ٠ أكتب برنامج فورتران لقراءة عناصر المصف

A ثم أكتب برنامجاً فرعياً لإيجاد محدد A ٠

ب) تتبع تنفيذ البرنامج التالي ثم أوجد مخرجاته ٠

```
INTEGER  A , B , C , D , H , R
A = 3
B = 2
C = 4
D = 5
F = A + 2 * ( B + 2 ) / D * C
G = A / B ** 2
H = A + B * D ** B - C
R = 3 * ( 4 + 2* ( 2 ** 3 / 2 ) ** ( 9 / 3))
PRINT * , F , G , H , R
STOP
END
```

انتهت الأسئلة مع تمنياتي لكم بالتوفيق ،،،

لجنة الممتحنين : د/ مديحة عبد المجيد سليم

Assiut University
Faculty of Sciences
Geology Department

امتحان طلاب الفرقة الرابعة شعبة الجيولوجيا وشعبة الجيوفيزياء
(٤٣٠ ج) استشعار عن بعد وجيولوجيا تطبيقيـة

June, 2008

Time allowed : 2 Hours

I. REMOTE SENSING

ANSWER ONE QUESTION *ONLY* OF THE FOLLOWING
Illustrating Your Answer With Diagrams **(52 1/2 points)**

1] Write briefly on:

a) Wavelength bands
b) Atmospheric effects
c) Spectral reflectance curves
d) Lineaments and circular features

2] Give short notes about:

a) Detection of hydrothermal alteration halos around polymetallic sulfides.
b) Detection of sedimentary Uranium deposits.

II. APPLIED GEOLOGY (52 1/2 points)

السؤال الأول (اجبارى) (١/٢ ٢٦ درجة)

أ) اذكر الدراسات الواجب عملها للتعرف على خصائص التربة.
ب) ناقش مسببات انهيار الميول الجانبية مع ذكر الإجراءات الواجب عملها لحماية الميول الجانبية للجسور والقطوع الترابية.

أجب عن سؤال واحـد فقط مما يأتى:

السؤال الثانى:

أ) تكلم ن المشروعات اللازم عملها لحماية الشواطئ. (١٣ درجة)
ب) أذكر أنواع الأنفاق مع مناقشة الدراسات الجيولوجية اللازمة لاختيار موقع النفق.(١٣ درجة)

السؤال الثالث:

أ) تكلم عن الاختبارات التى يجب اجرائها لدراسة عمل أساسات فى التربة والصخور المفككة مع مناقشة المشاكل الهندسية المتعلقة بالأساسات. (١٣ درجة)
ب) أذكر التصنيف الهندسى للصخور المختلفة. (١٣ درجة)

Good Luck

جامعة أسيوط

كلية العلوم – قسم الجيولوجيا

امتحان طلاب الفرقة الرابعة شعبة الجيولوجيا وشعبة الجيوفيزياء)

مقرر (٤١٠ ج) جيولوجيا اقتصادية

يونيـــــــه ٢٠٠٨ الزمن ساعتان

ANSWER THREE QUESTIONS ONLY OF THE FOLLOWING:

Quest. No. 1. (35 Marks)

i) Explain the genetic model for thef formation of the porphyry Cu-(Mo) and /or Mo-(Cu) deposits. (7 marks)

ii) What are the most characteristic geologic features for these porphyry deposits and What necessary criteria you use in the exploration of such deposits . (7 marks)

iii) The process of supergene enrichment is important for concentration of valuable secondary minerals. Choose one metal and explain How its enrichment goes in the zone of oxidation. (7 marks)

(iv) What do you know about:

Wilson Cycle ; Major Bushveld Complex (South Africa) (7 marks)

(v) Explain the following statement and Give examples:

The consistant associations between specific rock and specific ore is important landmarks in ore exploration. (7 marks)

Quest. No 2. (35 Marks)

i) What are the different sources of the hydrothermal fluids ? (7 marks)

ii) What are the evidences for fissure filling hydrothermal deposits? And What are their common forms ? (7 marks)

iii) The chemical processes by which ore concentration formed are commonly controlled by different parameters. What are these parameters? And Where these types of deposits occur in Egypt? (7 marks)

(iv) How magma become sulfide saturated early in its crystallization history? Where these type deposits occur in Egypt ? (7 marks)

(v) Mechanical concentration is responsible for vast wealth of placer deposits either very early in the earth history (i.e. paleo placers) or even recently (now a days placers) What factors enhance this process ? Mention the most famous local and world-wide type deposits. (7 marks)

(باقى الأسئلة على الصفحة الثانية)

Quest. No. 3. (35 Marks)

i) What are the factors you need to consider in explaining the origin of magmatic complex pegmatitic rocks? Where these rocks occur in Egypt and What are their famous known exploited minerals ? (8 marks)

ii) The wide uses of geologic materials (rocks and Minerals) in the different aspects of life activities, could cause a negative and serious impact on human health and environment. Mention the causes of such dangerous problems and suggest How future efforts of persons responsible for decision making should be directed to avoid these fetal problems . (6 marks)

iii) What is meant by mantle metasomatism? And How primary diamond could be formed through this process? (7 marks)

(iv) What are the main genetic differences between : Cu – Zn – Pb (Kruko type) deposits at Samiuki district, Eastern Desert, Egypt; Zn –Pb (Mississipi Valley Deposits) deposits of Um Gheig Red Sea coast, and the Ni – Cu – PGEs occur in Gabbro-Akarem, Southern Eastern Desert. (9 marks)

(v) What are the factors affecting deposition and localization of hydrothermal deposits (5 marks)

Quest. No. 4 (35 Marks)

i) What types of ore deposits that might exist at the following compressional tectonic settings (illustrate your answer diagrammatically)

a- ocean-continent collision ; b- Continent-continent collision (7 marks)

ii) Demand of Alluminium metal is dramatically increasing in the last twentieth century, What these deposits bearing metal occur in Egypt. (7 marks)

iii) How can you distinguish between:

False gossan and true gossan ; Stratiform layered chromite and Podiform Alpine Chromite; Early magmatic stage deposits and Late magmatic stage deposits; High temperature hydrothermal alteration zone and Low temperature hydrothermal alteration zone (12 marks)

iv) What are the important factors necessary for the formation of marine brine? And What are the paragenetic sequences of the deposited evaporate assemblages (5 marks)

(v) What are the most two commonly and safety used products of the metamorphic process. (4 marks)

GOOD LUCK

Assiut University
Faculty of Science
Chemistry Department

June , 2008
Time: 3 hrs.

(Final Exam .of Organic Chemistry for Zoology and Entomology B. Sc. Students
(Chromatography, Natural Products , Chemotherapy and Spectroscopy)

ظة : الأمتحان يقع فى ثلاث صفحات

Answer the following questions

Section (A): Chromatography (52.5 Marks

Write briefly on only Four of the following:

1) Classification of chromatography according to development procedure.
2) Factors influencing retention.
3) Adsorbents, additives and location of TLC.
4) Partition, ion exchange, and gel of open column chromatography.
5) Carrier gas, solvent requirements , derivatization and application of GC.

Section B : Natural products (52.5 Mark)

Answer the following questions :

I) a) Illustrate the stereochemistry of only four of the following natural products :
Progesterone , Ecgonine , Menthone , Hyocyamine , Steroid nucleus , Dipentane

b) Draw the structural formula of only four of the following :
Chenodeoxycholic acid , geraniol , cocaine , ergocalciferol , Atropine

II) Write on only four of the following :

a) Oxidative degradation of piperic acid
b) Give the structural formula and synthesis of an alkaloid of pyrrolidine –pyridi group
c) Determination of the position of the two angular methyl groups in cholesterol
d) Formulate the chemical reactions of ergosterol
e) Rules of the nomenclature of alkaloids , mention three methods for detecti alkaloids

III) Complete Only four of the following equations :

a) Ephedrine $\xrightarrow[\text{ii) AgOH}]{\text{i) } 2CH_3I}$? $\xrightarrow{\text{heat}}$?

b) Coniine $\xrightarrow{\text{Zn dust}}$? $\xrightarrow{KMnO_4}$?

c) Camphor $\xrightarrow{NH_2NH_2}$? $\xrightarrow{\text{EtONa}}$?

d) Cholic acid $\xrightarrow{[O]}$? $\xrightarrow{[H]}$?

e) α – Terpineol $\xrightarrow{NOCl}$? $\xrightarrow{\text{EtONa}}$? $\xrightarrow{H_2SO_4}$?

أنظر خلفه باقى الأسئلة

ection C : Chemotherapy (52.5 Mark)

-Answer seven only of the following ..... (40 marks)

1 - What are the defenses of the body against Bacteria invasion? (6 marks)

2 - Define the chemotherapeutic index - phenol coefficient? (6 marks)

3 - What types of microorganisms which cause diseases? (6 marks)

4 - What is difference between bactericidal bacteriostatic agents? (6 marks)

5 - Outline method of the synthesis of sulfathiazole? (6 marks)

6 – Write on Mode of action of sulfa drugs (6 marks)

7- What are the properties must be found in chemotherapeutic agents? (6 marks)

8 – Draw the structural formula of Tetracycline (6 marks)

9 - Draw the structural formula of Streptomycin (6 marks)

10 – How sulfa drugs estimated? (6 marks)

11 – Structure action relationship of sulfa drugs. (6 marks)

-Write on one only of the following ..... (10.5 marks)

1- One method for syntheis of Penicillin. - 2 - One method for syntheis of Chloramphenicol - 3 –Chemical properties of Streptomycin

ection D : Spectra (52.5 Mark)

-Propose structures for compounds that fit the following H-NMR data (4-only) ..... (30 marks)

-$C_5H_{10}O$

H doublet at	$\delta = 0.95$
H singlet at	$\delta = 2.10$
H multiplet at	$\delta = 2.43$

b- $C_4H_6Cl_2$

3H singlet at	$\delta = 2.18$
2H doublet at	$\delta = 4.16$
1H triplet at	$\delta = 5.71$

-C_4H_7BrO

H singlet at	$\delta = 2.11$
H triplet at	$\delta = 3.52$
H triplet at	$\delta = 4.4$

d- $C_{10}H_{14}$

9H singlet at	$\delta = 1.30$
5H singlet at	$\delta = 7.30$

-C_3H_5Br

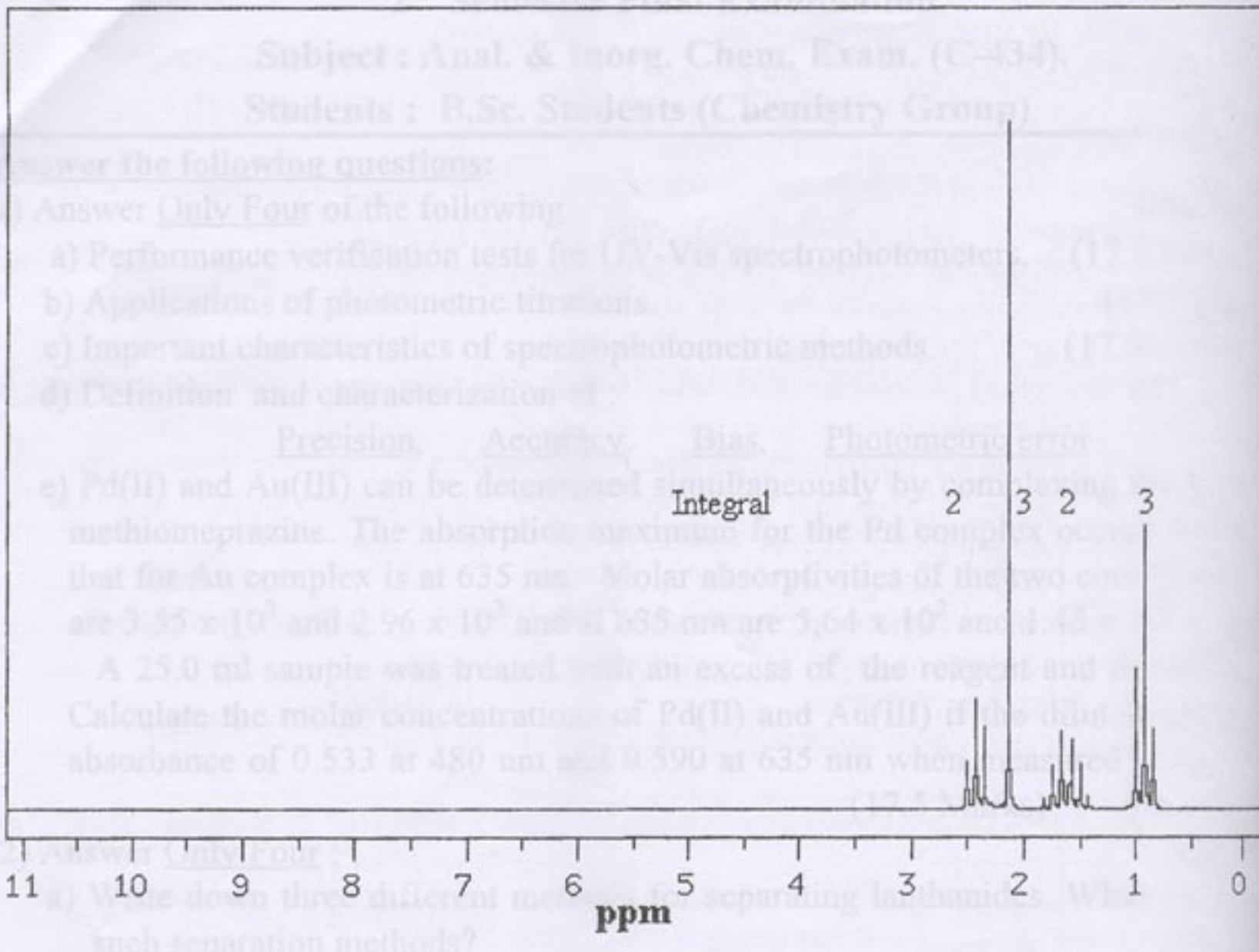
H singlet at	$\delta = 2.32$
H broad singlet at	$\delta = 5.35$
H broad singlet at	$\delta = 5.54$

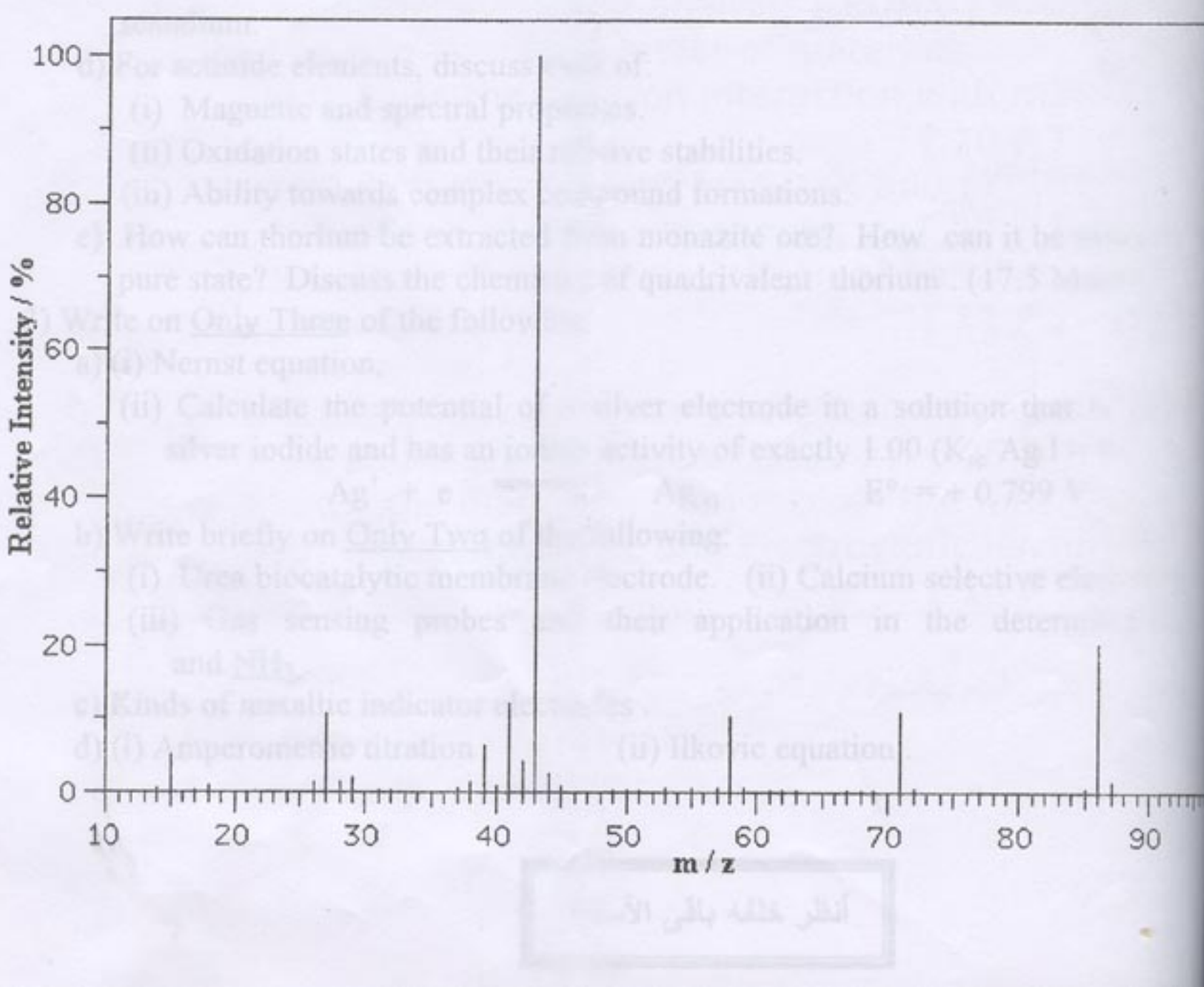
f- $C_9H_{11}Br$

2H quintet at	$\delta = 2.15$
2H triplet at	$\delta = 2.75$
2H triplet at	$\delta = 3.38$
5H singlet at	$\delta = 7.22$

-The H-NMR and mass spectra of the compound (A), $C_5H_{10}O$ are shown below. Deduce the structure of compound A, and interpret each NMR signal and each Fragment. ....:..... (22.5 marks)

أنظر الصفحة التالية باقى الأسئلة


Integral
2
3
2
3
11
10
9
8
7
6
5
4
3
2
1
0
ppm


Relative Intensity / %
100
80
60
40
20
0
10
20
30
40
50
60
70
80
90
m / z

Assiut University
Faculty of Science
Chemistry Department

Date : 19 June 2008

Time : 3 hrs.

2nd Semester Final Examination

Subject : Anal. & Inorg. Chem. Exam. (C-434).

Students : B.Sc. Students (Chemistry Group)

Answer the following questions:

1) Answer Only Four of the following: (70 Marks)

a) Performance verification tests for UV-Vis spectrophotometers. (17.5 Marks)

b) Applications of photometric titrations. (17.5Marks)

c) Important characteristics of spectrophotometric methods. (17.5 Marks)

d) Definition and characterization of : (17.5 Marks)

Precision, Accuracy, Bias, Photometric error .

e) Pd(II) and Au(III) can be determined simultaneously by complexing the two ions methiomeprazine. The absorption maximum for the Pd complex occurs at 480 nm that for Au complex is at 635 nm. Molar absorptivities of the two complexes at 48 are 3.55×10^3 and 2.96×10^3 and at 635 nm are $5,64 \times 10^2$ and 1.45×10^4 respectiv

A 25.0 ml sample was treated with an excess of the reagent and diluted to 50. Calculate the molar concentrations of Pd(II) and Au(III) if the diluted solution ha absorbance of 0.533 at 480 nm and 0.590 at 635 nm when measured in a 1.0 cm (17.5 Marks)

2) Answer Only Four : (70 Marks

a) Write down three different methods for separating lanthanides. What are the bas such separation methods? (17.5 Mark

b) Discuss the chemistry of quadrivalent cerium. How can Ce(IV) be separated f trivalent lanthanides? (17.5 Marks

c) How can scandium be obtained from one of its main ores? Discuss the chemistr scandium. (17.5 Marks

d) For actinide elements, discuss each of: (17.5 Marks

(i) Magnetic and spectral properties.

(ii) Oxidation states and their relative stabilities.

(iii) Ability towards complex compound formations.

e) How can thorium be extracted from monazite ore? How can it be obtained in a pure state? Discuss the chemistry of quadrivalent thorium . (17.5 Marks)

3) Write on Only Three of the following: (70 Marks)

a) (i) Nernst equation,

(ii) Calculate the potential of a silver electrode in a solution that is saturated w silver iodide and has an iodide activity of exactly 1.00 (K_{sp} Ag I = 8.3×10^{-17}).

$$Ag^+ + e \rightleftharpoons Ag_{(s)} \quad , \quad E^\circ = +0.799 \text{ V}.$$

b) Write briefly on Only Two of the following: (23.5 Mark

(i) Urea biocatalytic membrane electrode. (ii) Calcium selective electrode.

(iii) Gas sensing probes and their application in the determination of and NH_3.

c) Kinds of metallic indicator electrodes . (23 Marks

d) (i) Amperometric titration . (ii) Ilkovic equation . (23 Marks

أنظر خلفه باقى الأسئلة

4) Answer **ONLY SEVEN** of the following: **(70 marks)**

a- State the difference between: **(10 marks)**

i) Uncertainty and Error

ii) Quality assurance and Quality control

b- Calculate the number of plates in the column resulting in the chromatographic peak of $t_R = 42.1$ and $w_b = 7.0$ mm. **(10 marks)**

c- Compare between the flame ionization, electron capture and mass spectrometric detectors with respect to their application, sensitivity range and linearity. **(10 marks)**

d- Define **Only Four** of the following: **(10 marks)**

Number of theoretical plates- retention factor K- separation factor α- separation efficiency of a column- Internal standard

e- Ethanol and methanol are separated in capillary GC column with retention times of 370 and 385 s, and base widths (w_b) of 16.0 and 17.0 s, respectively. An unretained air peak occurs at 10.0 s. calculate the separation factor and the resolution. **(10 marks)**

f- What is the role of ion-pairing agents in HPLC? **(10 marks)**

g- "Capillary electrophoresis permits better separation of peptide with similar hydrophobicity index". Discuss this statement. **(10 marks)**

h- Complete the following sentences: **(10 marks)**

i) You can carry out quality control check in analytical chemistry by measuring: _____, _____, _____, and _____.

ii) The three out of control conditions in a quality control chart are: ----------,----------, and---------- .

iii) Experimentally, plate height is a function of ----------, of the chromatographic band and the ----------it has traveled through the column.

iv) "Reverse Phase Chromatography" is a form of ---------- chromatography where chemically bonded phase is ----------or ---------- and the mobile phase is more ---------- than the stationary phase.

Good Luck

Examiners:

Prof. Dr. Kamal Idriss,
Prof. Dr. Abbas Hamam,
Prof. Dr. Mahmoud Ghandour, and
Prof. Dr. Nagwa Abo El-Maali.

Assiut University
Faculty of Science
Physics Department

2nd Term Final Exam
Time : 2 hrs
Date : 5 / 06 / 2008

Electron Optics 442P

4Th year [Phys. & Elec. + Phys. & Chem.]

Answer only three from the following questions : [41 P each]

1. a-Sketch the diagram of high vacuum system (HVS) [15 P]
   b - Describe the function of each part. [15 P]
   c- Describe Operation steps to obtain high vacuum [11 P]

2. Discuss briefly each of the following:
   a- SEM applications [10 P]
   b- TEM applications [10 P]
   c- camera constant in TEM [11 P]
   d- Types of electron diffraction [10 P]

3. Energy dispersive x-ray analysis (EDAX) is widely used as non-destructive test of materials.
   a- Discuss the electron interaction with materials [10 P]
   b- Sketch the diagram for EDAX and explain the function of each component [20 P]
   c- Discuss the characterization of an alloy sample using EDAX [11 P]

4. a- Discuss briefly the factors affecting the resolution of light and electron microscopes. [25 P]
   b- Sketch the diagram , then explain the function of both Electromagnetic and Electrostatic lenses [16 P]

مع تمنياتى لكم بالنجاح والتوفيق

Instructor : Prof.Dr. M.M.Hafiz
e-mail : fldphafiz@yahoo.com

Assiut University
Faculty of Science
Chemistry Department

May 2008

Time : 3 hrs.

Final Exam. of Organic ChemistryC-462 for B.Sc. Students

(Chemotherapy, Natural Products, Chromatography and Spectroscopy)

Answer the following Four Sections:

Section (A): Chemotherapy **(52.5 Marks)**

1) Synthesis of vitamin B_6.
2) The large scale synthesis of the antibiotic Chloramphenicol.
3) Structure elucidation of the thiazole moiety of Vitamin B_1.
4) The structure action relationship in Sulfa drugs.
5) a) What are the complications that may result if the peptic ulcer is left untreated?
   b) Write on the antiulcer medications?

Section (B): Natural Product **(52.5 Marks)**

Choose Only Five of the following:

1) Complete the following equations:

(a) Myrcene $\xrightarrow{O_3}$?

(b) Menthol $\xrightarrow{[O]}$?

(c) Geraniol $\xrightarrow[H_2SO_4]{dil}$?

2) Show by equations the conversion of cholesterol to :
   a) 5-β– Cholanic acid b) Dehydroepiandrosterone
3) How can you synthesis the following alkaloids
   a) Ephedrine b) adrenaline
4) Give one example (name and structure) for each of the following :
   a) Bile acids b) sex hormones c) non-steroid horanones
5) Write short notes on
   a- Blance`s rule b- Isolation of mono and sequiterpenoids
   c- Structure of natural rubber
6) Show by equation how you might synthesis the following terpanoids
   a) α- terpineol starting from isoprene b) Carvone starting from α- terpineol

Section (C): Chromatography **(52.5 Marks)**

Write briefly on only Four of the following:

1) Classification of chromatography according to development procedure.
2) Factors influencing retention.
3) Adsorbents, additives and location of TLC.
4) Partition, ion exchange, and gel of open column chromatography.
5) Carrier gas, solvent requirements , derivatization and application of GC.

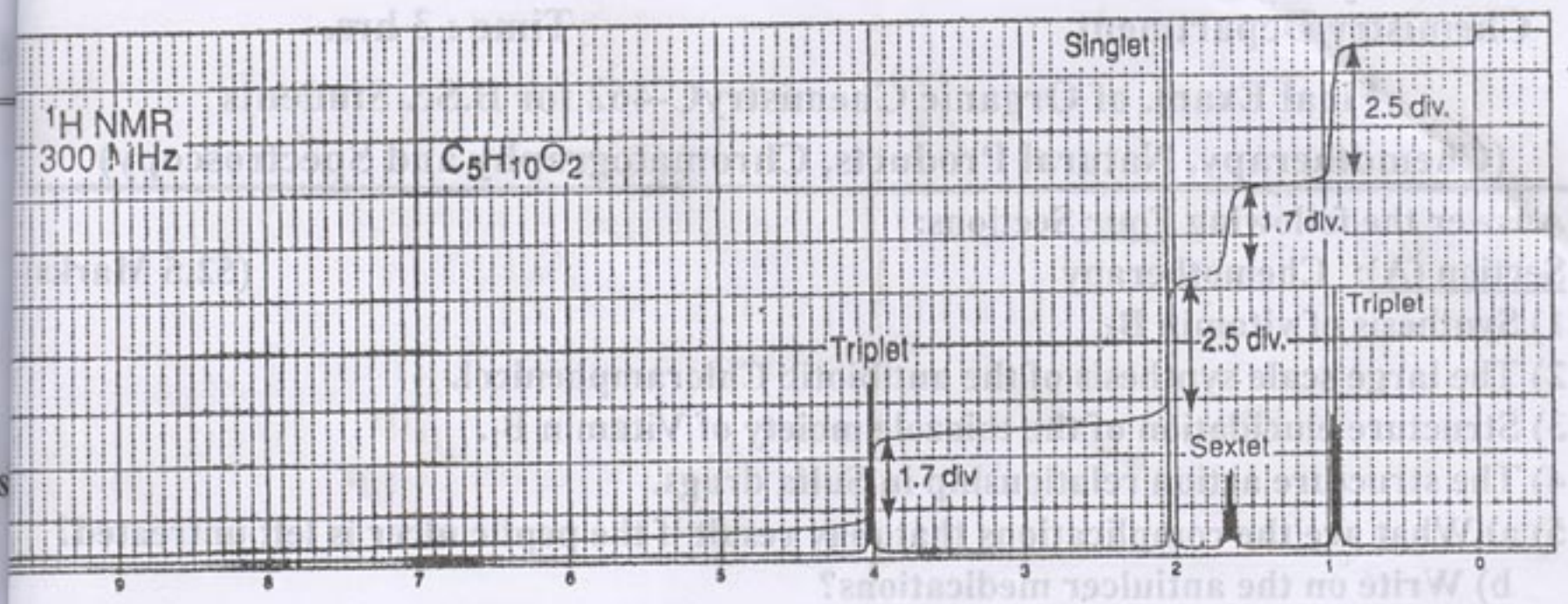
Section (D): Spectroscopy **(52.5 Marks)**

A) Write on Only Three of the following:
   1) Basic principles and isotope abundances in MS.
   2) Mclafferty rearrangement.
   3) The fragmentation pattern of methyl propyl ketone and benzyl alcohol.
   4) The chemical shift in n.m.r. spectroscopy.

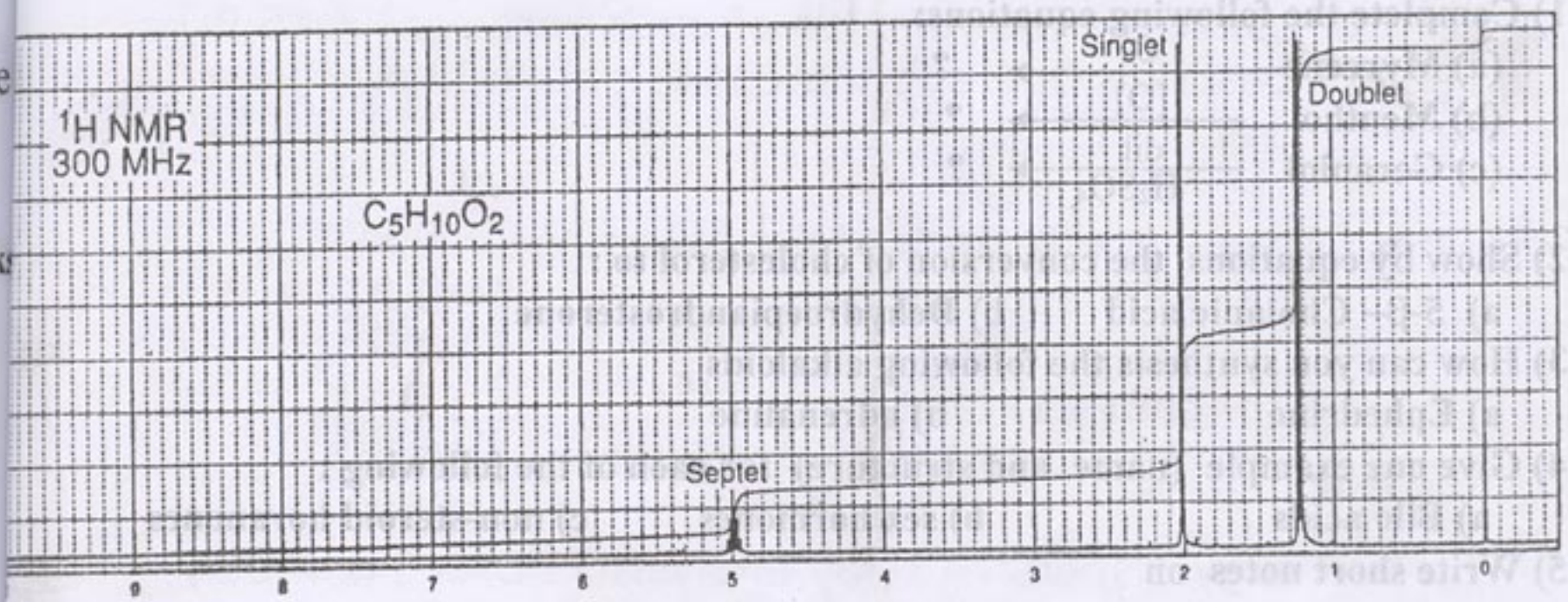
B) The attached ^1H n.m.r. figures (a,b) are isomers of an organic compound with formula $C_5H_{10}O_2$. Give an account on each band and deduce their structural formulae.

أنظر خلفه باقى الأسئلة

(a)


^{1}H NMR
300 MHz
$C_5H_{10}O_2$
Singlet
2.5 div.
1.7 div.
Triplet
2.5 div.
Triplet
Sextet
1.7 div
9
8
7
6
5
4
3
2
1
0

(b)


^{1}H NMR
300 MHz
$C_5H_{10}O_2$
Singlet
Doublet
Septet
9
8
7
6
5
4
3
2
1
0

Assiut University
Faculty of science
Chemistry Department

Time allowed: 3 hours.
May. 2008

Final Examination of Organic Chemistry (442:Chem) for the degree of Bachelor of Science (Chemistry Major)

(Biochemistry, Chemotherapy and Advanced Organic Chemistry).

Answer the following Three sections:-

Section A (Biochemistry).

(40 Mar

Account briefly on **Two** of the following:

1- The biochemical reactions involved in Krebs cycle.

2- The cases in which sugar appears in urine.

3- The reactions occurring during transformation of acetyl coenzyme –A into th isoprene unit (isopentyl pyrophosphate).

Section B (Chemotherapy).

(40 Mar

Write on **FOUR** only out of the following:

1- Synthesis of vitamin B_6.

2- The large scale synthesis of the antibiotic Chloramphenicol.

3- Structure elucidation of the thiazole moiety of Vitamin B_1.

4- The structure action relationship in sulfa drugs.

5- a)- What are the complications that may result if the peptic ulcer is left untreated?

b)- Write on the antiulcer medication.

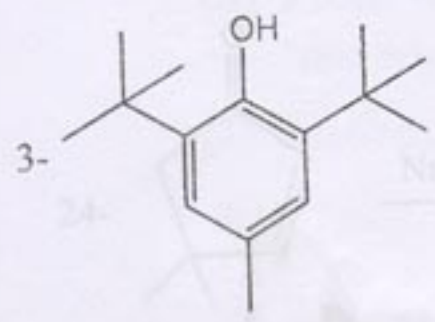
Section C (Advanced Organic Synthesis).

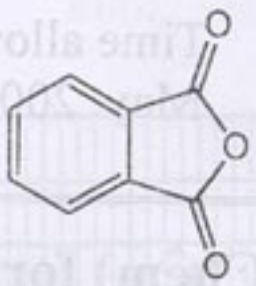
(80 Mar

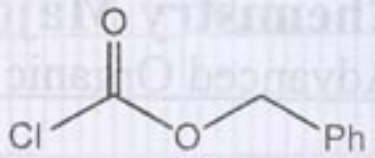
(I)- Complete the following equations. (Answer **TWENTY** equations only).

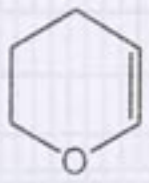
1- $CH_3NH_2 \xrightarrow{\text{anodic oxidation}}$?????????????

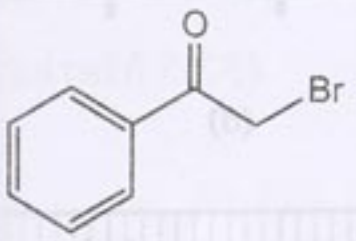
2- $(CH_2)_3$ (COONa, COOR) $\xrightarrow{\text{electrolysis}}$?????????????

3- 

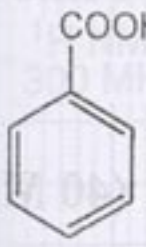
4- $CH_3CH_2NH_2$ +  → A $\xrightarrow{H_2N\text{-}NH_2}$ B + C

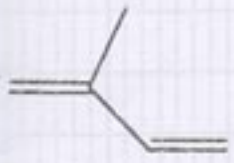
5- $CH_3CH_2\text{-}NH\text{-}CH_3$ +  $\xrightarrow{\text{Base}}$ A $\xrightarrow[\text{AcOH}]{\text{HBr}}$ B

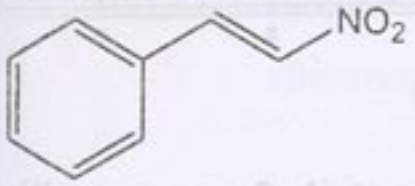
6- C_2H_5OH +  $\xrightarrow{H^+}$ A $\xrightarrow{H_2O/\ H^+}$ B

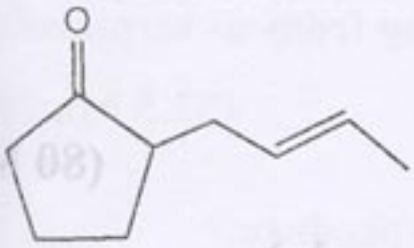
7-  $\xrightarrow[i\text{-PrOH}]{\text{Al(O } i\text{-Pr)}_3}$????????????

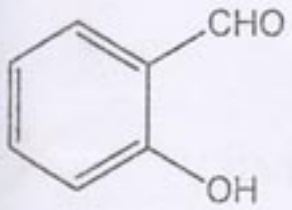
85%

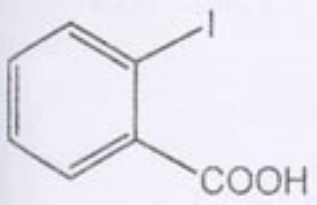
8-  $\xrightarrow[\text{EtOH}]{\text{Na, NH}_3}$ A $\xrightarrow[90\%]{H_3O^+}$ B

9-  $\xrightarrow{\text{Na, NH}_3}$????????????

10-  $\xrightarrow[\text{EtOH, } H_2SO_4\text{, rt}]{H_2,\ Pd/C}$????????????

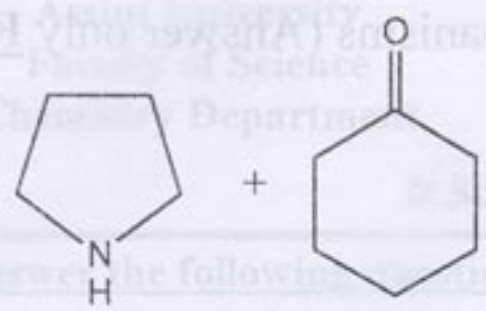
11-  $\xrightarrow[BF_3,\ CH_2Cl_2]{Me_3SiOOSiMe_3}$????????????

12-  $\xrightarrow{H_2O_2,\ NaOH}$????????????

13-  $\xrightarrow[H_2SO_4]{KBrO_3}$ A $\xrightarrow[\text{TsOH}]{Ac_2O}$ B

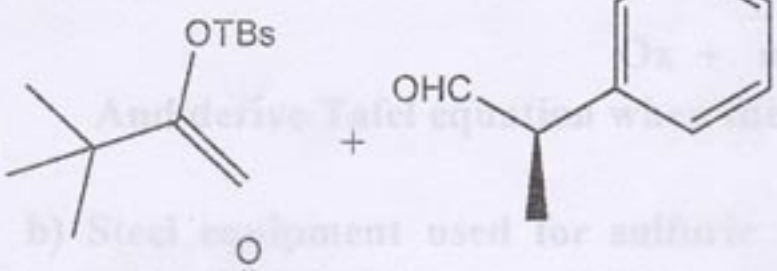
14-  $\xrightarrow[\text{CuCl, AcOH}]{\text{BuOOH}}$????????????

15-



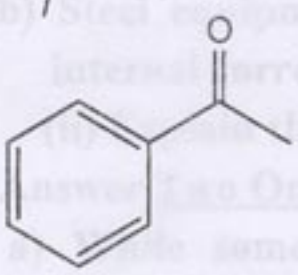
$\xrightarrow{H^+}$ A $\xrightarrow[2)\ HCl/H_2O]{1)\ CH_3Br}$ B

16-



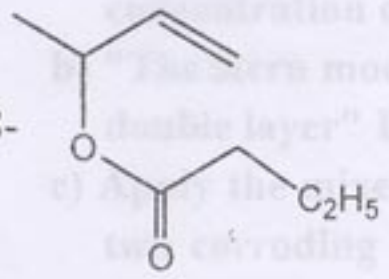
$\xrightarrow{BF_3.OEt_2}$????????????

17-



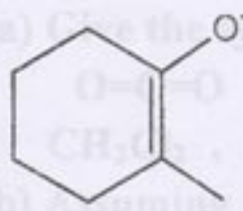
$\xrightarrow[THF,\ -78\ C]{LDA,\ TMSCl}$????????????

18-



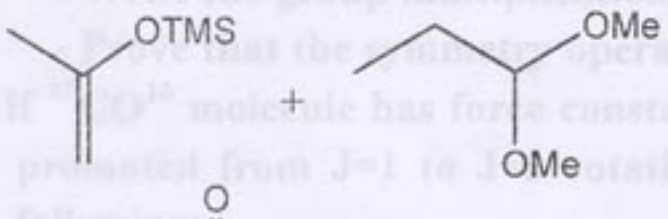
$\xrightarrow[2)\ TMSCl]{1)\ LDA,\ -78\ C}$ A $\xrightarrow[60\ C]{heat}$ B

19-



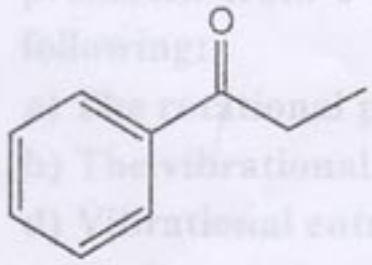
$\xrightarrow{m\ CPBA}$?????????

20-



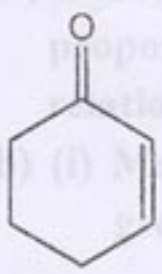
$\xrightarrow{TiCl_4}$?????????

21-



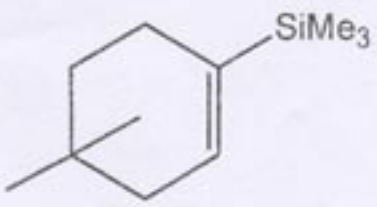
$\xrightarrow{Base}$?????????

22-



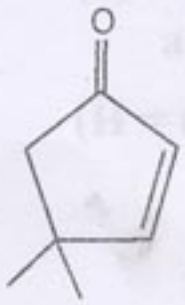
$\xrightarrow{Me_2CuLi}$?????????

23-



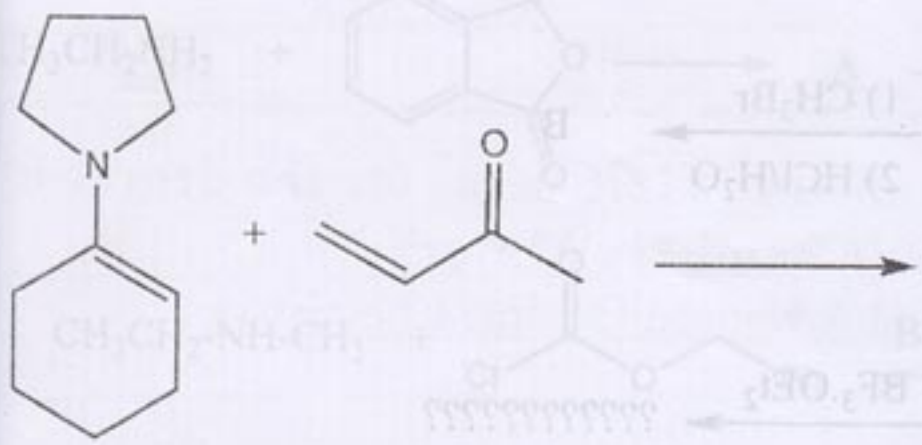
$\xrightarrow[AlCl_3]{CH_3COCl}$?????????

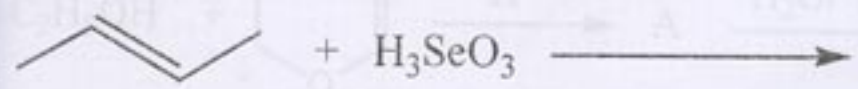
24-

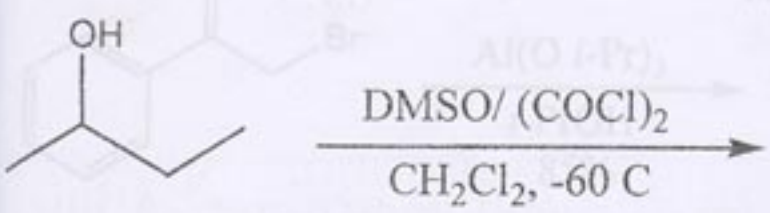


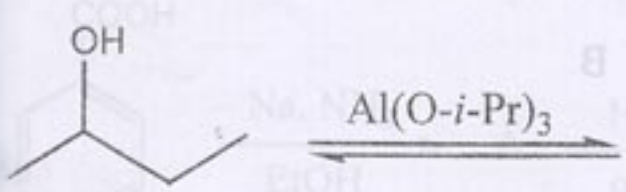
$\xrightarrow{NaBH_4,\ CeCl_3}$?????????

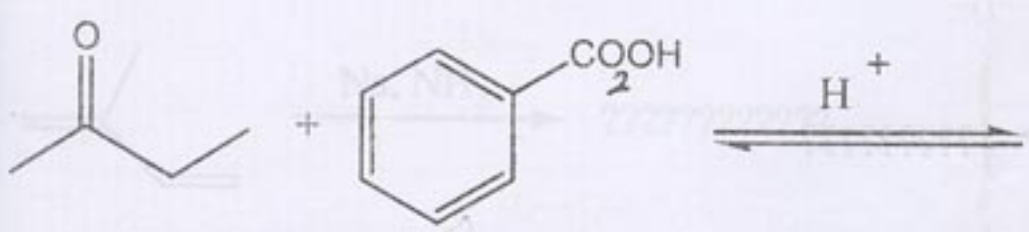
II)- Complete the following equations and describe their mechanisms (Answer only **FIVE**)

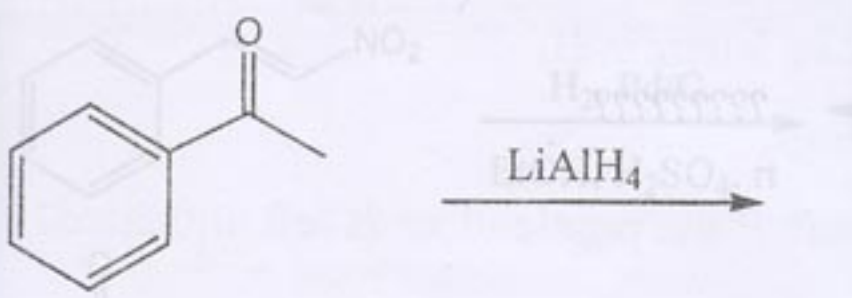


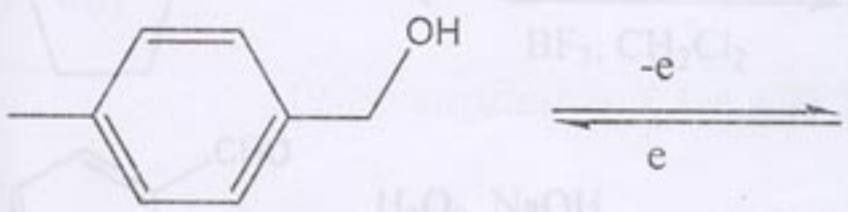


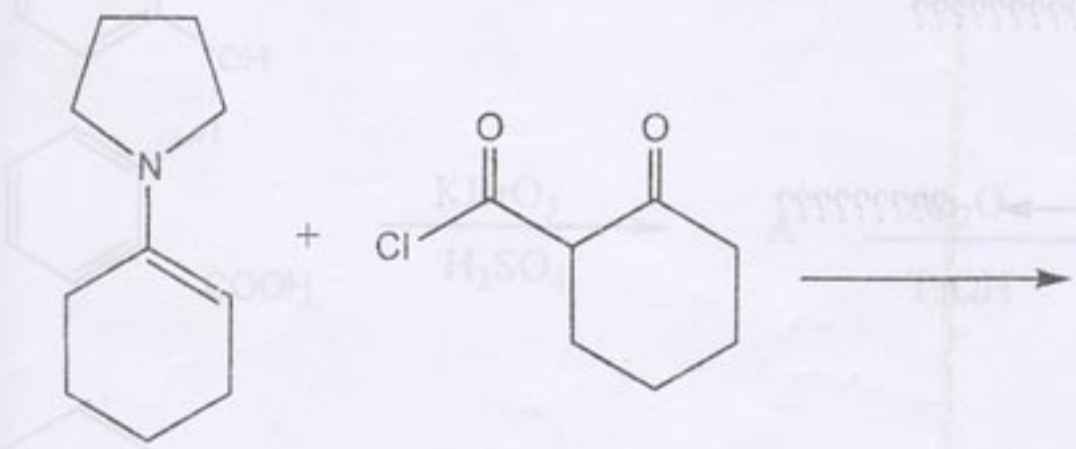












Assiut University
Faculty of Science
Chemistry Department

May 2008

Time : 3 hrs.

B.Sc. Examination in Physical Chemistry (422)

Answer the following questions:

1) a) Discuss the electrode kinetics for the process:

$$Ox + ne \underset{K_{-1}}{\overset{K_1}{\rightleftharpoons}} Red$$

And derive Tafel equation when the reaction occurs with high cathodic overvoltage. (25 Marks)

b) Steel equipment used for sulfuric acid manufacture is to be electrically protected fro internal corrosion . (i) What type of protection would you select?
(ii) Explain the theory of such type of protection? (24 Marks)

2) Answer Two Only of the following :

a) While some electrodes undergo activation polarization some electrode processes ar diffusion controlled, they undergo concentration polarization". Derive an equation relatin concentration overvoltage to the limiting diffusion current. (24Marks)

b) "The Stern model was found to be more realistic way of describing the structure of the ioni double layer" Discuss this statement. (25 Marks)

c) Apply the mixed potential theory to explain the corrosion behaviour of a galvanic couple o two corroding metals in acidic medium. Indicate the kinetic parameter which plays th main role in determining the corrosion rate of such couple. (25 Marks)

3) a) Give the symmetry elements and the proper point group for Ten of the following:
O=C=O , H-C≡N, Cyclopropane , Square planar $[AuCl_4]^-$, NO_3^- , IF_7 , PCl_5, NH_3 CH_2Cl_2 , Cis-planar and trans-planar configurations of H_2O_2 . (25 Marks)

b) Assuming that boric acid, H_3BO_3, belongs to the point group C_3 : (24Marks)
- Write the group multiplication table of this point group.
- Prove that the symmetry operations satisfy the requirements of a mathematical group.

4) If $^{12}CO^{16}$ molecule has force constant 1870 Nm^{-1} and absorbs radar wavelength 1.3 mm to b promoted from J=1 to J=2 rotational energy levels at 27°C Determine Four Only of th following: (49Marks)

a) The rotational partition function and characteristic rotational temperature.
b) The vibrational partition on function c) Vibrational heat capacity.
d) Vibrational entropy . e) Rotational entropy.

5) a) Lead, cadmium and mercury have low values of heat of adsorption of atomic hydrogen. propose a mechanism for the hydrogen evolution reaction on such metals and deduce a relationship between H_2 overvoltage and reaction rate. (25Marks)

b) (i) Making use of the D_3 character table, give the following direct products in this poin group : A_1XE, A_2XE , EXE , A_1XA_1 and A_2XA_2 (12Marks)

D_3	E	$2C_3$	$3C_2$
A_1	1	1	1
A_2	1	1	-1
E	2	-1	0

(ii) From the translational partition function, derive the heat capacities C_v and C_p and what is the relationship between them? (12 Marks)

($H = 6.626x10^{-34}$ Js , $N = 6.02x10^{23}$ mol^{-1} , $K = 1.38x10^{-23}$ $J°K^{-1}$, $C=3x10^8$ m s^{-1})

Good Luck

كلية العلوم قسم الرياضيات	امتحان نهائي دور مايو ٢٠٠٨م أسم المقرر : حاسب آلى رقم المقرر : ٤٤٨ ر	تاريخ الامتحان : ٢٠٠٨/٦/١٠ الفرقة : الرابعة شعبة : الكيمياء الفصل الدراسى الثانى ٢٠٠٧ - ٢٠٠٨ الزمن : ساعتان

ب عن الأسئلة الآتية:-

.حل منظومة المعادلات الاتية باستخدام طريقة جاوس للحذف، ثم اكتب برنامج يقوم بحلها.

$10x-2y-2z=6$, $-x+10y-2z=7$, $-x-y+10z=8$

(٢٢ درجة)

.اكتب برناج يقوم بايجاد معادلة الانحدار $y=ax+b$ حيث

$$a=\frac{\Sigma y\Sigma x^2-\Sigma x\Sigma xy}{n\Sigma x^2-(\Sigma x)^2},\quad b=\frac{n\Sigma xy-\Sigma x\Sigma y}{n\Sigma x^2-(\Sigma x)^2}$$

التى تحقق التوفيق الامثل لمجموعة النقط الاتية:-

x	2	3	4	5	6	7	8	10	12	13
Y	5	7	10	10	15	16	18	20	21	30

(٢٢ درجة)

-أ) اكتب الخطوات الاساسية لادراج رسم بيانى للبيانات الاتية:-

X	-2	-1	0	1	2
Y	-1	0	1	2	3

ب) فى برنامج اكسل اكتب الخطوات الاساسية لايجاد معكوس المصفوفةA من الرتبة 3x3

(٢٢ درجة)

ب عن سؤال واحد من السؤالين الاتيين:-

.اكتب برنامجا لحساب المتوسط الحسابى $\bar{x}$ والانحراف المعيارى D للبيانات 10,12,1,4,7,8,9,4 حيث

$$\bar{x}=\frac{\sum_{i=1}^{n}x_i}{n},\qquad D=\left(\frac{\sum_{i=1}^{n}x_i^{\,2}}{n}-\frac{\left(\sum_{i=1}^{n}x_i\right)^2}{n^2}\right)^{\frac{1}{2}}$$

(٢٤ درجة)

ه- أ) فى برنامج اكسل اكتب الخطوات الاساسية لايجاد حاصل ضرب المصفوفتينA, B ولهما نفس الرتبة 3x3

ب) اكتب برنامج لايجاد التكامل $n=32$,$\int_1^2\left(x^2+3\right)dx$ حيث

$$\int_a^b f(x)dx=\frac{\Delta x}{2}\left[f(a)+2\sum_{i=2}^{n}f(x_i)+f(b)\right],\quad \Delta x=\frac{b-a}{n+1}$$

(٢٤ درجة)

انتهت الأسئلة مع تمنياتي لك بالتوفيق ،،،

د.محمد احمد حسين

Assiut University **June 2008**
Faculty of Science
Chemistry Department **Time: 3 hours**

C-452 Final Examination in Analytical and Inorganic Chemistry For B.Sc. Students
(Double Major Groups)

Answer the following questions:

1) Complete the following sentences with the correct choice (between brackets).
i- Cleavage of cubic ionic crystals can be achieved along.....
(planes perpendicular to the cube faces- any arbitrary plane- edge to edge plane)
ii- A cubic crystal has .....axes of symmetry.
(six 2-fold - two 6-fold - four 2-fold)
iii- Orthorhombic system consists of .....
(3 unequal perpendicular axes- 3 equal axes not perpendicular-
3 equal axes with equal angles but not 90^o)
iv-ABCBAC arrangement represents ..... close packing.
(body centered cubic- face centered cubic- hexagonal)
v- The monoclinic system contains..... Bravais lattices.
(only primitive - two- three)
vi- The number of atoms per unit cell in the body centered cubic system is.....
(2- 4 - 6 - 8)
vii- The constituent units of metallic crystals are.....
(atoms – ions – electrons)
viii- Body centered cubic arrangement has a coordination number of.....
(6 - 8 - 12)
ix- In the rhombohedral crystal system .....
($a\neq b\neq c$, $\alpha=\beta=\gamma=90^o$ - $a=b=c$, $\alpha=\beta=\gamma\neq 90^o$ – $a=b=c$, $\alpha=\beta=\gamma=90^o$)
x- Hexagonal close packed metals are characterized by .....malleability.
(low - medium - high)

2) Answer the following question.
a- From the molecular orbital theory, explain the nature of bonding in octahedral comlexes. Draw the diagram which illustratesthe possible formation of σ bonds in these complexes.
b- Give the set of rules of Russell- Saunders (L-S) coupling. derive the various term symbols representing the various energy states in which the carbon atom may be found. (the allowed states ofC^6 $1s^2\ 2s^2\ 2p^2$ are $S^1\ D^1\ P^3$).
c- Answer **only one** of the following:
(i) According to the valence bond theory, give example of octahedral and example of square planar complexes.
(ii) In terms of crystal field theory explain:
- The probabilities of distribution of electrons in case of d^3 and d^6 orbitals in octahedral complex.
- The factors affecting the magnitudeof crystal field splitting parameter Δ_o.

بقية الأسئلة فى الخلف

Answer **three only** of the following question:

a- Define:
   (i) Amperometry.
   (ii) Equivalent conductance.
   (iii) Diffusion current

b- Write briefly on:
   i- Limitations of glass electrode.
   ii- Advantages of dropping mercury electrode.

c- Calculate the concentration of acid in a 10-ml aliquot that required a generation time of 165 sec. For the appearance of the pink colour of phenolphtalein. The voltage drop across a 100Ω resistor was 0.849 V.

d- The specific conductance at 25°C of a saturated solution of $BaSO_4$ was $4.58x10^{6-}$ $\Omega^{-1}Cm^{-1}$ And that of water was $1.52x10^{6-}$. What is the solubility of $BaSO_4$ at 25°C, Calculate the solubility product. [$\lambda(Ba^{++})= 64$, $\lambda(SO_4^{--}) =80$].

Answer the following question:

a- Discuss the chemical and physical factors affecting deviation from Beer's law.

b- The %T of separate solutionsof coloured substances M and N each at a concentrationof $5x10^{-4}$ are measured at the wavelenghts given below. An unknown solution containing these two compounds is also measured. From the data below, caculate the concentration in mg/ml of M and N if their molecular weights are 170 and 234 respectively.

Soln.	%T at 530nm	%T at 690nm
M	50	90
N	90	25
Unknown	75	40

c- Answer **only one** of the following:

(i) Discuss photometric titration of a mixture of strong and weak acids with strong alkali. Sketch the graph.

(ii) The molar absorptivityof a particular solutionis $2x10^4$. Calculate the transmittance through a cell with 1.0cm path lengh for a $1.0x10^{-5}$ M solution.

Best Wishes

Assiut University	Physics & Physics and Chemistry	Magnetic Resonance
Faculty of Science	4th year	422 P
Physics Department	Exam date: 10 / 6 / 2008	Time allowed: 2 hours

Use the following physical constants when you need:

Electron charge $e = 1.6x10^{-19}$ *Coulomb*, Electron mass $m_e = 9.11x10^{-31}$ *kg*,
Proton mass $m_p = 1.673x10^{-27}$ *kg*, Planck's constant $h = 6.626\ x10^{-34}$ *J.s*
The gyromagnetic ratio of H^1, $g = 5.586$ *Dielectric permittivity* $K = 9\ x10^9\ Nm^2/Coul^2$
Boltzmann Constant $k = 1.38\ x\ 10^{-23}$ *J/K*

Section (A)

Answer the following question:

i) **Complete the following sentences: (50 degrees)**

1- The gyromagnetic ratio of an electron with total angular momentum J can be calculate using the relation:

$\gamma =$

2- The magnetic moment associated with the electron spin equals

$\mu =$

3- The nuclear magneton is calculated using the relation

$\mu_N =$

4- The nuclear magnetic moment of the proton (H^1) is calculated by

$\mu_{nuc} =$

5- The spin orbit coupling results in an additional energy

$\Delta E_{so} =$

6- The interaction between the nuclear magnetic moment and the electron spin results in hyperfine coupling energy calculated from the relation

$\Delta E =$

7- In an ESR experiment using a constant photon energy, the hyperfine coupling constant is determined from the values of the magnetic fields at resonance using the relation

$a =$

8- The spin-spin relaxation time can be determined from the absorption line in an ESR experiment using the relation

$T_2 =$

9- The ratio of protons distributed between lower and higher energy states in a magnetic field H at temperature T is calculated using the relation

$n_+/n_- =$

10- The ground state of a $3d^{5+}$ free ion can by determined using a "fill in the boxes arrangement" as follows:

d^n						L	S	Ground term
d^5								

(ii) underline the correct answers (30 degrees)

1- In a magnetic resonance experiment, the applied static magnetic field results in (splitting of the energy levels - transition between the energy levels) while the incident photons result in (splitting of the energy levels - transition between the energy levels).

2- The energy required for electron spin flip in a magnetic field is (larger – smaller - equal to) the energy required for proton spin flip.

3- (The spin-spin relaxation time - The spin-lattice relaxation time) describes the time required for the magnetic moments to align in the field direction.

4- According to Hund's rules, symmetric spin state has (lower - higher) energy because of the (symmetric- anti symmetric) spatial state associated with it.

5- According to Hund's rules, larger angular momentum L indicates electrons orbiting in the (same – opposite) direction and is associated with (higher – lower) energy.

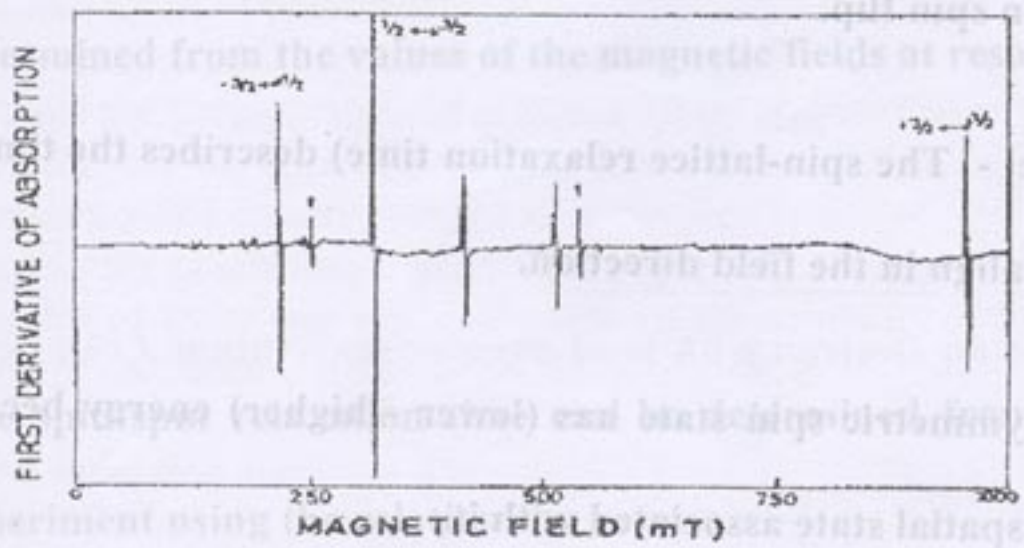
6- In an octahedral crystal field, (d_{z^2} orbitals - d_{xy} orbitals) lie on the same axis as negative charges, therefore have higher energy than (d_{z^2} orbitals - d_{xy} orbitals).

Section (B)

Answer only one of the following two questions: (42.5 degrees for each question)

Q1-a) Write the Bloch equations describing a system of magnetic moments in a steady magnetic filed *H* and excited by photons considering the relaxation effects, then show a figure describing the paramagnetic susceptibilities of the system at resonance. (15 degrees)

b) The following Figure show the EPR spectrum of Cr^{3+} ions in an octahedral field



(i) draw the energy level diagram of Cr^{3+} ions indicating the allowed transitions.

(ii) determine the ground term of the Cr^{3+} free ion by the "fill in the boxes" arrangement. (15 degrees)

c) Calculate the Larmor frequency of the proton spin in a magnetic field of *1 T* and also the energy required for a spin flip of the proton. (12.5 degrees)

Q2-a) In a magnetic resonance experiment by sweeping the magnetic field at constant photon energy for a system with S=1/2, I=*3/2*, deduce the equations of the magnetic fields at resonance and the hyperfine coupling constant *(a)*. (15 degrees)

b) Show in one diagram the crystal field splitting of the d-orbitals energy levels in a tetrahedral field, an octahedral field and a square-planer field. (12.5 degrees)

c) Calculate the hyperfine coupling constant (in *eV*) in the hydrogen atom using the spectral line with a wave length of *21 cm*. (15 degrees)

Best wishes

Examiner: Dr. Mohamed Almokhtar

Department of Mathematics

Faculty of Science

اسم الرياضيات

كليه العلوم

شعبه :الفيزياء والالكترونيات
رقم المقرر 408 ر

امتحان الفرقه: الرابعه
اسم المقرر: تحليل عددي

دور مايو 2008 م
الزمن: ساعتان

Answer four questions only:-

1- Derive Adams fourth-order predictor corrector method to approximate the solution of the initial-value problem

$$y' = f(t,y),\ \ a \le t \le b,\ \ \ y(a) = \propto,$$

;

In the following two forms

$$w_4^{(0)} = w_3 + \frac{h}{24}[55f(t_3,w_3) - 59f(t_2,w_2) + 37f(t_1,w_1) - 9f(t_0,w_0)] \qquad \textit{as a predictor}$$

$$w_4^{(1)} = w_3 + \frac{h}{24}[9f\left(t_4,w_4^{(0)}\right) + 19f(t_3,w_3) - 5f(t_2,w_2) + f(t_1,w_1)] \qquad \textit{as a corrector}$$

[30 points]

2-a Study the convergence of general iteration technique and show that for any vector $x^{(0)} \in R^n$ the sequence defined by $x^k = Tx^{k-1} + c$ for each $k \ge 1$ and $c \ne 0$ converges to the unique solution

$$x \ = Tx \ + c \ \ iff \ \ \rho(T) < 1$$

[15 points]

2-b Derive the relaxation method given as:

$$x_i^{(k)} = (1-w)x_i^{(k-1)} + \frac{w}{a_{ii}}\left[b_i - \sum_{j=1}^{i-1} a_{ij}\,x_j^{(k)} - \sum_{j=i+1}^{n} a_{ij}\,x_j^{(k-1)}\right]$$

(where w is the accelerating parameter), write SOR algorithm.

[15 points]

3-a Find the first two iterations using Gauss-Seidel Method for the following linear system:-

$$2x_1 - x_2 + x_3 = -1$$

$$x_1 + x_2 + 3x_3 = 0$$

$$3x_1 + 3x_2 + 5x_3 = 4$$

use $x^{(0)} = (1,1,1)^{(t)}$

[15 points]

[P.T.O.]

4-b Solve the following linear systems using direct factorization of the form A=LU where A is the coefficient matrix:

$$3x_1 + x_2 = -1$$

$$2x_1 + 4x_2 + x_3 = 7$$

$$2x_2 + 5x_3 = 9$$

[15 points]

4- Using the following lemma which states that *if*:

$$a_{i+1} \leq (1+m)a_i + n \ \ for\ each\ i = 0,1,2,\dots,k,$$

Then

$$a_{i+1} \leq e^{(i+1)m}\left(\frac{n}{m} + a_0\right) - \frac{n}{m}$$

where *n* and *m* are positive real numbers

rove that:

If $y(t)$ denote the unique solution to the I.V.P $y' = f(t,y),\ a \leq t \leq b,\ y(a) = \propto$ and if f is continuous and satisfies Lipschitz condition with constant L on

$$D = \{(t,y) | a \leq t \leq b, -\infty < y < \infty\}$$

and a constant M exists with the property that

$$|y''(t)| \leq M \ \ for\ all\ t \in [a,b]$$

Then

$$|y(t_i) - w_i| \leq \frac{hM}{2L}\left[e^{L(t_i - a)} - 1\right]$$

For each *i*=0,1,2,...,N. Where w_i is the approximate solution of $y(t_i)$ using Euler's Method.

[30 points]

5-a Give a finite difference method to solve the B.V.P. $y''(x) = P(x)y' + q(x)y + r(x),\ \ y(a) = \propto, y(b) = \beta$

[15 points]

5-b Apply Newton's method to get the first two iterations for solving the system

$$x_1^2 - 10x_1 + x_2^2 + 8 = 0$$

$$x_1 x_2^2 + x_1 - 10x_2 + 8 = 0$$

Starting with (0.5, 0.5). **[15 points]**

[Good Luck]

لجنه الممتحنين ا.د. صلاح الجندى, د. فاطمه عبد المنعم

جامعة اسيوط
كلية العلوم
قسم الفيزياء

امتحان الفصل الدراسى الثانى
المادة: اهتزازات وموجات (٤٢٤ف)
الفرقة: رابعة علوم جيوفيزياء
الزمن: ساعتان

أجب عن أربعة أسئلة فقط

السؤال الأول:

أ- ثبت سلك من المطاط طوله ℓ بقوة شد T ثم ثبت بالسلك جسم كتله m على مسافة a من إحدى نقاط التثبيت وأزيح الجسم راسيا إلى أعلى مسافة X ثم ترك حرا لكى يتذبذب اثبت أن النظام يعمل حركة توافقية بسيطة ثم أوجد التردد الزاوي لهذه الحركة. (١٢ درجة)

ب- سلك لولبى من الصلب طوله 8 cm وعند تعليق كتله من نهايته يصبح طوله 14 cm أحسب زمن ذبذبة الكتلة عند أزاحها رأسيا . (٨ درجات)

السؤال الثانى:

حركة توافقية بسيطة يعبر عنها بالمعادلة $x = 5\sin(10\pi t - \pi/3)$ حيث x هى الإزاحة تقاس بالسنتيمتر t الزمن بالثانية w هى السرعة الزاوية وتقاس بالتقدير الدائرى أوجد:

أ- التردد الطبيعي والزمن الدورى (٧درجات)

ب- أقصى إزاحة وسرعة وعجلة (٧ درجات)

ج- الإزاحة والسرعة والعجلة بعد فترة زمنية (0.3 sec) (٦ درجات)

السؤال الثالث:

أ- أوجد معادلة المسار للحركتين الاهتزازتين المتعامدتين المتساويتين فى التردد والمختلفتين فى السعة والطور (١٢ درجات).

ب- أوجد معادلة المسار للحركتين المتساويتين فى التردد والمختلفتين فى السعة وفرق الطور بينهما يساوي $\pi/2$. (٨ درجات)

السؤال الرابع :

أوجد المعادلة التفاضلية للحركة الاهتزازية المخمدة ثم أوجد إزاحة هذه الحركة . (١٠درجات)

اثبت أن القدرة الممتصة من القوة القسرية الخارجية بواسطة النظام المهتز المقيد تتساوي مع القدرة المستنفذة بواسطة قوة الاحتكاك لهذا النظام (١٠درجات)

السؤال الخامس:

أ- أذكر ما هو المقصود بالموجة الموقوفة ثم أوجد معادلة الحركة لهذه الموجة (٨ درجات)

ب- استنتج الشرط اللازم للحصول على عقد وبطول للموجة الموقوفة فى الحالة الثابتة (١٢ درجة)

انتهت الأسئلة

مع أطيب التمنيات بالنجاح

جامعة اسيوط
كلية العلوم
قسم الفزياء

الفرقة الرابعة فيزياء
يونيو 2008
الزمن ساعتان

فيزياء حسابية

ب عن **اربعة** اسئلة فقط مما يلى موضحا اجابتك بالرسم كلما امكن علما بان الاسئلة التالية
اوية فى الدرجات وان الرموز الواردة لها نفس المعنى المعتاد

1) Show that the function f(x) = log (1-x) can not be expanded in a Tailor series about x = 1 . Find the Tailor series expansion around x = 0 for this function and the radius of convergence of the series.

2) a) Use Newton's and the modified Newton's methods to find the positive real roots of the furetion $f(x) = x^4 - 8.6x^3 - 35.51x^2 + 464.4x - 998.4$ in the interval $0 \le x \le 10$ accurate to $\mathbf{10^{-5}}$.

2) b) Find the positive square root of 11 accurate to $\mathbf{10^{-4}}$.

3) a) Find forwad , backward and certral difference expressions for the first derivative of a function accurate to $O(h^2)$.

3) b) The following function represents physical data taken at equally spaced intervals

t	0	0.5	1	1.5	2	2.5	3
F (t)	1.0	0.80	0.20	0.25	0.31	0.38	0.44

Find $f^{\backslash}(1.5)$ to $(0.5)^2$ Why did you choose the used representation

4) Define the absolute and relative errors for a computed quantity . Compute the absolute and relative errors in evaluating the first derivative of the function $f(x) = e^x$ around x = 1 with h = 0.1 by using central representation of $O(h^2)$. Given e = 2.718282 . Comment.

5) a) Fit the parabola $f(x) = Ax^2 + Bx + C$ to the points o,- h and – 2h to g forms of the first and second derivatives .

5) b) Find the Tailor series for f (x) = cos x around x = 0 to $O(x)^5$. Then show that this expantion is in reality to $O(x)^6$.

انتهت الاسئلة

كلية العـــلوم قسم الرياضيات	امتحان نهائي دور مايو ٢٠٠٨م أسم المقرر : تطبيقات حاسب للفيزياء رقم المقرر : ٤٤٨ ر	تاريخ الامتحان : ٢٠٠٨/٦/١ الفرقة : الرابعة شعبة الفيزياء الزمن : ساعتان

يجب عن ثلاثة اسئلة فقط من الاسئلة الاتية:

1-Write a program for solving the system of differential equations:

$$y' = x^3 - t^2 y - t^2, \quad x' = t x^2 - y^4 + 3t, \quad y(2) = 5, \; x(2) = 3$$

over the interval [2,5] with h=0.25 use the Taylor series method of order 4

(35 marks)

2-Explain the main steps in setting up a program to solve this two-point boundary Value problem by the finite –difference metho

$$x'' = x\sin t + x'\cos t - e^t, \quad x(0) = 0, \quad x(1) = 1.$$

Show any preliminary work that must be done before programming .Use N=100.

(35 marks)

3-Derive the system arising from Crank-Nicolson method to the heat equation

$$u_{xx}(x,t) = u_t(x,t), \quad u(0,t) = u(1,t) = 0, \quad u(x,0) = \sin(\pi x)$$

and write a program to compute u(x,t) at t=0.1 and any given points

$$x_i = ih, \quad h = 0.1, \; t_j = jk, \quad k = h^2$$

(35marks)

4-Cosider the wave equation

$$u_{xx}(x,t) = u_{tt}(x,t), \quad u(x,0) = \sin(\pi x), \quad u_t(x,0) = \frac{1}{4}\sin(2\pi x), \quad u(0,t) = u(1,t) = 0.$$

Derive the scheme arising from the finite –difference method with

$x_i = ih, \quad t_j = jk$

and write a program to compute u(x,t) at any given points

(x_i, t_j) on the interval [0,1] with h=0.1 , k=0.05 (35marks)

انتهت الأسئلة مع تمنياتي لك بالتوفيق ،،،،،

د/ محمـد أحمـد حسيـــن

Assiut University
Faculty of Science
Physics Department

B.Sc. Exam.
19 June 2008
Time: 2 hours
(Superconductivity)

جامعة أسيوط
كلية العلوم
قسم الفيزياء

Answer four questions only from the following

(20 Degree) **1-(a) Prove** that in a closed resistance less circuit, the currents carried in paralle Paths are inversely proportional to the self inductances of those paths?

(b) Write a short account on the magnetization for Ideal and Non-ideal Superconducting specimens?

(20 Degree) **2-(a) Explain** that the superconducting state has a higher degree of order than that of the normal state?

(b) Discuss the meissner effect in a superconducting material?

(20 Degree) **3-(a) Find** the relation between the flux density distribution B(x) and the Applied field B (a) during superconducting specimen by using London Equation $\nabla^2 B = \frac{B}{\lambda_l^2}$ where λ_l is the London penetration depth?

(b) Write a short account on the permeability and susceptibility of a Superconductor.

(20 Degree) **4- Write a short account on:**

(a) First-order and second order transitions in superconducting materials.

(b) Variation of the penetration depth with temperature.

(20 Degree) **5- (a) Explain** the basis of measuring the magnetization of a superconducting material?

(b) Define the following terms:

I-Screen Currents.
II-Critical Field.
III-Penetration Depth.

Exam. Is over

Dr. E. F. Abo Zeid

Best regards.....

Assiut University | Power Electronics | 4th year Electronics
Physics and Electronics Dept. | Final Exam, May 2008 | Time: 2 hrs

Answer all questions

Questions 1 (40 pts)

In the following multiple-choice questions, circle ONE best answer for each question

1.1) The boost converter can be used to,
- a) step down the voltage
- b) step up the voltage
- c) output negative voltage
- d) provide isolated power supply

1.2) A single-phase full bridge diode rectifier is connected with an inductive load. The input voltage is V_s (rms value, sinusoidal). The **rms** value of dc output voltage equals to,
- a) $1.35V_s$
- b) $0.9V_s$
- c) V_s
- d) $2V_s$

1.3) In a single phase single diode rectifier with a resistive load, the input current waveform is
- a) sinusoidal
- b) square
- c) half sinusoidal
- d) irregular

1.4) Compared with linear power supplies, switch mode power supplies usually have higher energy efficiency and small physical size. This is because the switch mode supply
- a) uses less components
- b) uses a high switching frequency
- c) uses small inductances
- d) uses integrated circuits

1.5) In the following switching devices, which one is **NOT** turned off when gate signal is removed?
- a) MOSFET (Mental-Oxide-Semiconductor Field Effect Transistor)
- b) IGBT (Insulated Gate Bipolar Transistor)
- c) BJT (Bipolar Junction Transistors)
- d) Thyristor

Questions 2 (30 pts)

The single-phase ac voltage controller of Figure 1 has a **120V** rms **60-Hz** source.
The load resistance is **10 Ω.** The delay angles of thyristors T1 and T2 are equal: $\alpha_1 = \alpha_2 = \pi/2$.

2.1) Calculate the rms output voltage v_o
2.2) Calculate the input power factor
2.3) sketch to scale the following waveforms in two cycles
- a) the voltage waveform across the load resistance,
- b) the current waveform of the thyristors.

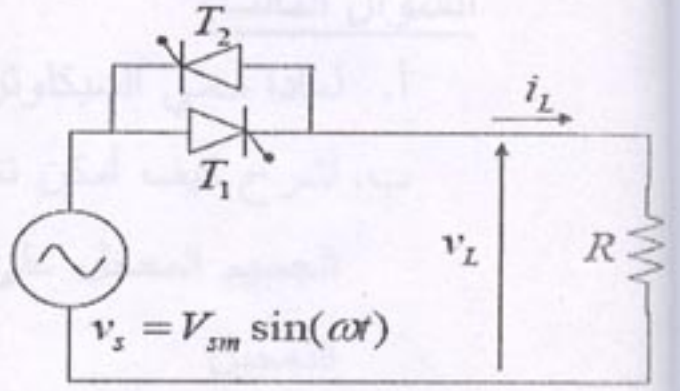


Figure 1: single-phase ac voltage controller

Questions 3 (30 pts)

In Figure 2, the dc input voltage is **48V**. The filter inductance L is **100μH** and filter capacitance C is **870μF**. The duty cycle is adjusted by the controller to keep the output voltage constant at reference voltage V_{ref} in steady state. The switching frequency is **10kHz**. The load resistance is **2.5Ω**.
When the reference voltage is **12V**, answer with assuming that $V_o = V_{ref} = 12$V in steady state.

3.1) Find the boundary current and determine the operation mode ,
3.2) Find the output ripple voltage (peak-to-peak) across the load,
3.3) List all methods to reduce the output voltage ripple.

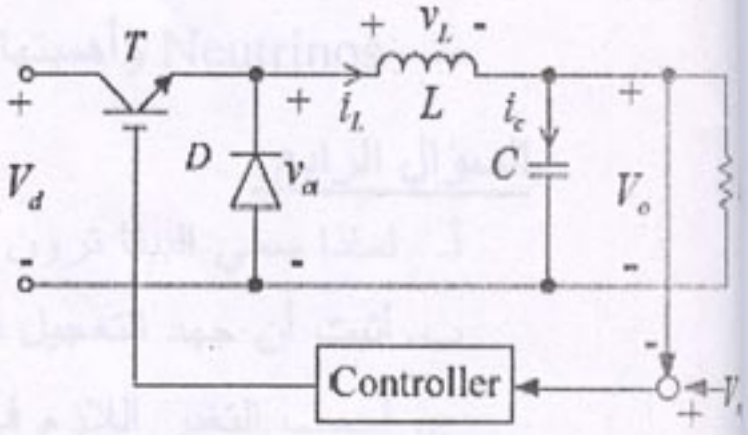


Figure 2: Buck converter with controller

Questions 4 (22.5 pts)

Draw the power circuit of the square-wave half-bridge inverter and sketch the steady-state currents for an inductive load.

Best wishes

Dr. Tarek Abdelmohsen

بسم الله الرحمن الرحيم

جامعة أسيوط
كليـــة العلوم
قسم الفيزياء

الفرقة رابعة علوم فيزياء
المادة : ٤٦٢ ف مقرر خاص

الزمن : ساعتان
الفصل الدراسي الثاني
٢٠٠٨

أجب عن ***ثلاثة أسئلة*** فقط من الأسئلة الأتية:

السؤال الأول :

تكلم بالتفصيل عن أحد المعجلات المستخدمة في الفيزياء النووية من حيـــث التركيـــب والتشغيل والطاقة والأحتياطات والأقتصاديات والأهمية . [٢٠ درجة]

السؤال الثاني :

تكلم بالتفصيل عن أحد الجسيمات الأولية من حيث الأهمية فـــي التفـــاعلات النوويـــة والتصنيف والخواص:

Mass – Charge – Spin – Parity – Stability – Decay [٢٠ درجة]

السؤال الثالث:

أ. لماذا سمي السيكلوترون Magnetic Resonance Machine

ب. أشرح كيف أمكن تشغيل المعجل الخطي بجهد ثابت التردد رغم ازدياد ســـرعة الجسيم المعجل على امتداد المسار ــ أوجد العلاقة بين تردد الجهد وطول أنبوبة التعجيل

ج. أشرح فكرة معجل Tandem Van de Graaff

د. أشرح الخواص العامة Leptons وأهم أفرادها

ه. Neutrinos وأهميتها وأنواعها [٢٠ درجة]

السؤال الرابع:

أ. لماذا سمي البيتا ترون Magnetic Induction Machine

ب. أثبت أن جهد التعجيل في السيكلوترون يكون ثابت التردد

ج. أحسب التغير اللازم في المجال المغناطيسي المسلط على السيكلوترون أذا أردنا تحويله من تعجيل البروتونات إلى تعجيل الديوترونات أو جسيمات ألفا

د. الخواص العامة Baryons وأهم أفرادها

ه. نظرية Quarks [٢٠ درجة]

بسم الله الرحمن الرحيم

جامعة أسيوط
كليـــة العلوم
قسم الفيزياء

الفرقة رابعة علوم فيزياء
المادة : ٤٦٢ ف مقرر خاص

الزمن : ساعتان
الفصل الدراسي الثاني
٢٠٠٨

أجب عن *ثلاثة أسئلة* فقط من الأسئلة الأتية:

السؤال الأول :

تكلم بالتفصيل عن أحد المعجلات المستخدمة في الفيزياء النووية من حيث التركيب والتشغيل والطاقة والأحتياطات والأقتصاديات والأهمية . [٢٠ درجة]

السؤال الثاني :

تكلم بالتفصيل عن أحد الجسيمات الأولية من حيث الأهمية في التفاعلات النووية والتصنيف والخواص:

Mass – Charge – Spin – Parity – Stability – Decay

[٢٠ درجة]

السؤال الثالث:

أ. لماذا سمي السيكلوترون Magnetic Resonance Machine

ب. أشرح كيف أمكن تشغيل المعجل الخطي بجهد ثابت التردد رغم ازدياد سرعة الجسيم المعجل على امتداد المسار– أوجد العلاقة بين تردد الجهد وطول أنبوبة التعجيل

ج. أشرح فكرة معجل Tandem Van de Graaff

د. أشرح الخواص العامة Leptons وأهم أفرادها

ه. Neutrinos وأهميتها وأنواعها

[٢٠ درجة]

السؤال الرابع:

أ. لماذا سمي البيتا ترون Magnetic Induction Machine

ب. أثبت أن جهد التعجيل في السيكلوترون يكون ثابت التردد

ج. أحسب التغير اللازم في المجال المغناطيسي المسلط على السيكلوترون أذا أردنا تحويله من تعجيل البروتونات إلى تعجيل الديوترونات أو جسيمات ألفا

د. الخواص العامة Baryons وأهم أفرادها

ه. نظرية Quarks

[٢٠ درجة]

(١)

Assiut University
Faculty of Science
Department of Physics

Date: May 31st, 2008

Time allowed: Two hours

Second Semester Final Examination
Subject course No. : Physics (432) (Laser Physics)
Student: Fourth Year

Answer Four Questions Only (20 degrees for each question)

Question 1

a. Define: the stimulated emission and metastable state

b. Define the population inversion, and draw it in the 3-level laser

c. Explain briefly "the laser idea" and the conditions of obtaining "Maser" and "Laser".

Question 2

a. Define the pumping process and write short notes on types of pumping and their suitability (ملائمتها) to laser type.

b. How can we overcome on the adverse factors (العوامل المعوقة) that impose the application of laser in communications?

Question 3

a. Draw the energy levels diagram involved in the operation of He-Ne Laser system. Explain briefly the laser action in this case (i.e. How dose laser come out?)

b. Define the Q-switching and its idea. State briefly the two mechanisms to fabricate Q-switching apparatus.

Question 4

a. How could Laser be benefit in chemical reactions. What are the difficulties in this case?

b. Define the "Hologram" and the virtue (مزايا) of laser in this case. Sketch only (بالرسم فقط) how to make and how to produce? State in points the characteristics of a Hologram.

Question 5

a. Compare between eye operations before and after the applications of laser in medicine.

b. How Holography will be used in optical storage of information?

اسم الممتحن: د. المغربى محمد المغربى

******* **Good Luck** *******

Assiut University
Faculty of Science
Department of Physics

Date: May 31st, 2008

Time allowed: Two hours

Second Semester Final Examination
Subject course No. : Physics (432) (Laser Physics)
Student: Fourth Year

Answer Four Questions Only (20 degrees for each question)

Question 1

a. Define: the stimulated emission and metastable state

b. *Define the population inversion, and draw it in the 3-level laser*

c. Explain briefly "the laser idea" and the conditions of obtaining "Maser" and "Laser".

Question 2

a. Define the pumping process and write short notes on types of pumping and their suitability (ملائمتها) to laser type.

b. How can we overcome on the adverse factors (العوامل المعوقة) that impose the application of laser in communications?

Question 3

a. Draw the energy levels diagram involved in the operation of He-Ne Laser system. Explain briefly the laser action in this case (i.e. How dose laser come out?)

b. Define the Q-switching and its idea. State briefly the two mechanisms to fabricate Q-switching apparatus.

Question 4

a. How could Laser be benefit in chemical reactions. What are the difficulties in this case?

b. Define the "Hologram" and the virtue (مزايا) of laser in this case. Sketch only (بالرسم فقط) how to make and how to produce? State in points the characteristics of a Hologram.

Question 5

a. Compare between eye operations before and after the applications of laser in medicine.

b. How Holography will be used in optical storage of information?

اسم الممتحن: د. المغربى محمد المغربى

******* Good Luck *******

جامعة أسيوط امتحان الفصل الدراسى الثانى يونيو ٢٠٠٨م الفرقة: رابعه علوم

كلية العلوم فيزياء الاطياف الجزيئية الشعبة: الفيزياء وفيزياء الاكترونيات

قسم الفيزياء الزمن: ساعتان

أجب عن أربعه أسئلة فقط مما يأتي: -

١ – اشرح بالتفصيل تركيب وطاقة وطيف الجزيء ثنائي الذرية كقمة متماثلة .

٢ – احسب الثوابت ألد ورانية ($\bar{B}_\nu$, $\bar{\bar{B}}_\nu$) لحزمة طيفية مستعينا بالجدول التالي:-

m	$\nu(cm^{-1})$	m	$\nu(cm^{-1})$
-5	25780.32	+1	25801.81
-4	25783.53	+2	25805.80
-3	25786.90	+3	25810.01
-2	25790.41	+4	25814.23
-1	25794.03	+5	25818.77
0			

٣ – اشرح بالتفصيل تركيب وطاقة وطيف الجزيء ثنائي الذرية كمذبذب غير توافقي.

٤ – أحسب الثوابت التذبذبية ($\bar{W}_e$, $\bar{\bar{W}}_e$, $\bar{W}_e\bar{x}_e$, $\bar{\bar{W}}_e\bar{\bar{x}}_e$) من الجدول التالي مع استنتاج المعادلات المستخدمة.

	Band wave numbers (cm^{-1})			
$\bar{\nu}\backslash\bar{\bar{\nu}}$	0	1	2	3
0	64703	62601.8	60484.7	58393.2
1	66231.3	64087.6	61950.4	59881.6
2	67674.8	65533.1	63416.1	61325.2
3	69087.8	66944.3	64828.1	62720.8
4	70469.5	68323.4	66199.0	64116.5

٥ – أ – اكتب مقال مختصر عن طيف الامتصاص في جزيء ثنائي الذرية.

ب – اكتب مقال مختصر عن الطيف المستمر في جزيء ثنائي الذرية.

========== انتهت الأسئلة ==========

مع تمنياتنا بالنجاح والتوفيق

Assiut University
Faculty of Science
Physics Department

2nd Term Final Exam
Time : 2 hrs
Date : 5 / 06 / 2008

Electron Optics 442P

4Th year [Phys. & Elec. + Phys. & Chem.]

Answer only three from the following questions : [41 P each]

1. a-Sketch the diagram of high vacuum system (HVS) [15 P]
   b - Describe the function of each part. [15 P]
   c- Describe Operation steps to obtain high vacuum [11 P]

2. Discuss briefly each of the following:
   a- SEM applications [10 P]
   b- TEM applications [10 P]
   c- camera constant in TEM [11 P]
   d- Types of electron diffraction [10 P]

3. Energy dispersive x-ray analysis (EDAX) is widely used as non-destructive test of materials.
   a- Discuss the electron interaction with materials [10 P]
   b- Sketch the diagram for EDAX and explain the function of each component [20 P]
   c- Discuss the characterization of an alloy sample using EDAX [11 P]

4. a- Discuss briefly the factors affecting the resolution of light and electron microscopes. [25 P]
   b- Sketch the diagram , then explain the function of both Electromagnetic and Electrostatic lenses [16 P]

مع تمنياتى لكم بالنجاح والتوفيق

Instructor : Prof.Dr. M.M.Hafiz
e-mail : fldphafiz@yahoo.com

Assiut University **Faculty of Science** **Department of Physics**		**Date: 02/06/2008** **Term: 2nd 2008** **Time: 2 hour**

Advanced Solid State Physics (PHYS 412)

Constants:

$h = 6.626 \times 10^{-34} J.s$, $\hbar = 1.054 \times 10^{-34} J.s$, $k_B = 1.38 \times 10^{-23} J/K$, $e = 1.6 \times 10^{-19} C$, $m_e = 9.1 \times 10^{-31} kg$

$c = 3 \times 10^{8} m/s$, $\mu_0 = 4\pi \times 10^{-7} H/m$, $\mu_B = 9.27 \times 10^{-24} A.m^2$ $N_A = 6.02 \times 10^{23}$ atom/mol

$1\ eV = 1.6 \times 10^{-19} J$, $1\text{Å} = 10^{-10} m$

PART I: (Answer the following question)

Choose the correct option (Full Mark will be given for 30 correct answers) (40 points)

1) The quantum mechanics value of molar electronic specific heat is $1.5\ R$, where $R = N_A k_B$.

a) True b) False

2) If ρ_i and $\rho_{ph}(T)$ are the impurity and phonon contributions to the resistivity of a metal, the total resistivity is $\rho = \rho_i + \rho_{ph}(T)$.

a) True b) False

3) For a screw dislocation the Burgers vector is parallel to the dislocation line.

a) True b) False

4) Diffusion along a grain boundary is faster than through the bulk crystal.

a) True b) False

5) Dislocations are example of a three-dimensional crystal defect.

a) True b) False

6) Plastic deformation in crystals do not occurs by slip.

a) True b) False

7) Induced magnetic dipole moment occurs in diamagnetic materials only.

a) True b) False

8) Cobalt is a ferromagnetic material at temperatures above its Curei temperature.

a) True b) False

9) At room temperature, metallic nickel is a ferromagnetic material.

a) True b) False

10) For fixed number of atoms per unit volume, the dielectric constant of monoatomic gas is essentially independent of temperature.

a) True b) False

11. Mobility of the electron is

a) flow of electron per unit electric field
b) reciprocal of conductivity
c) average electron drift velocity per unit electric field
d) none of the above

12. If the mobility of electrons in a metal increases, the resistivity

a) decreases
b) increases
c) remains the same
d) increases with increasing the applied electric field.

13. Ohms Law relates the electric field E, conductivity σ and current density J as

a) $J = E/\sigma$
b) $J = \sigma E^2$
c) $J = \sigma/E$
d) $J = \sigma E$

14. The average drift velocity of electrons in a metal is related to the electric field E and time between successive collisions τ as

a) $\sqrt{\frac{eE\tau}{m}}$
b) $\sqrt{\frac{m}{eE\tau}}$
c) $\frac{eE\tau}{m}$
d) $\frac{m}{eE\tau}$

15. If σ is the electric conductivity, K thermal conductivity, L Lorentz number, which of the following relations gives Wiedmann-Franz law ?

a) $\frac{K}{\sigma} = LT$
b) $\frac{\sigma}{K} = LT$
c) $\frac{K}{\sigma} = \frac{L}{T}$
d) $\frac{\sigma}{K} = \frac{L}{T}$

16. If the Fermi energy of a metal is *1.4 eV*, the Fermi temperature of the metal is approximately

a) $1.623 \times 10^3\ K$
b) $1.623 \times 10^4\ K$
c) $1.623 \times 10^5\ K$
d) $1.623 \times 10^6\ K$

17. If E_H, J_x and B_z are the Hall field, current density in x-derection and z-component of the magnetic field, then the Hall constant is given by

a) $R_H = \frac{E_H / J_x}{B_z}$
b) $R_H = \frac{J_x / E_H}{B_z}$
c) $R_H = \frac{B_z}{E_H / J_x}$
d) non of these

18. In thermoionic emission a plot of log (J_x/T^2) versus $(1/T)$ is

a) a straight line with positive slope
b) a straight line with negative slope
c) not a straight line
d) a straight line with constant slope

19. The DC conductivity and AC conductivity of a metal are equal, when

a) $\omega\tau \ll 1$
b) $\omega\tau = 1$
c) $\omega\tau \gg 1$
d) the applied electric field is zero

20. The magnetic dipole moment is the product of current in the loop and

a) flux enclosed by current loop
b) square of area enclosed by current loop
c) area enclosed by current loop
d) non of the above

21. The susceptibility of a diamagnetic material is essentially independent of temperature (T)

a) under all circumantances
b) as long as the the electronic structure of the material is independent of T
c) at very low T of $10K$
d) at very high T

22. Magnetic induction B and magnetic field intensity H are related by

a) $B = \mu_o H^2$
b) $B = \mu_o^2 H$
c) $B = \mu_o \mu_r H$
d) $B = \mu_o + H$

23. Magnetic susceptibility χ of a magnetic material is given by

a) $\chi = \mu_r - 1$
b) M/H
c) $\chi = (\mu - \mu_0)/\mu_0$
d) all these are correct

24. The magnetization of a solid is related to its magnetic induction B and the field strength H by the relation

a) $M = \frac{B}{\mu_o} - H$
b) $B = \mu_o H + M$
c) $B = H + \mu_o M$
d) $B = \mu_o (H - M)$

25. Which of the following material does not have permanent magnetic dipoles?

a) paramagnetic
b) diamagnetic
c) ferromagnetic
d) antiferromagnetic

26. In a ferromagnetic material, susceptibility is

a) very small and positive
b) very small and negative
c) very large and positive
d) very large and negative

27. For a paramagnetic material, the energy difference between spin magnetic dipole parallel and antiparallel to an external field H is

a) $\mu_B H$
b) $\frac{\mu_o H}{4\pi}$
c) $2\mu_o \mu_B H$
d) $\mu_o \mu_B H$

28. The temperature below which certain materials are antiferromagnetic and above which they are paramagnetic is called

a) Curei temperature
b) Neel Temperature
c) Weiss temperature
d) Fermi Temperature

29. In a paramagnetic material, susceptibility is

a) very small and positive
b) very small and negative
c) very large and positive
d) very large and negative

30. The electronic polarizability of a monoatomic gas atom is related to the radius of the atom R as:

a) $4\pi\varepsilon_0 / R$
b) $4\pi\varepsilon_0 R$
c) $4\pi\varepsilon_0 R^3$
d) $4\pi\varepsilon_0 R^2$

31. The dipolar polarizability per molecule in polyatomic gas is given by

a) $p/3k_BT$ b) $p^2/3k_BT$ c) $p^3/3k_BT$ d) $p^2/3k_BT^2$

32. The dipole moment per unit volume of a solid is the sum of all the individual dipole moments and is called

a) polarization of the solid b) permittivity of the solid
c) electrostatic moment d) non of the above

33. In a dielectric material, the polarization is

a) linear function of applied field b) square function of applied field
c) exponential function of applied field d) logarithmic function of applied field

34. For a given dielectric material as the temperature increases, the ionic polarizability

a) increases b) decreases
c) remains the same d) increases first and then decreases

35. The polarization P in a solid dielectric is related to the electric field E and the electric displacement D by the relation

a) $E = \varepsilon_o D + P$ b) $D = \varepsilon_o D + E$ c) $D = \varepsilon_o E + P$ d) $D = \varepsilon_o (P + E)$

36. The formula $\frac{\varepsilon_r - 1}{\varepsilon_r + 2} = \frac{N\alpha}{3\varepsilon_0}$ is:

a) Debye equation b) Clausius-Mosotti relation
c) Lorentz relation d) none of the above.

37. A Frenkel Defect is:

a) a vacancy-like point defect in an ionic crystal
b) a defect that maintains the electrical charge neutrality in an ionic solid
c) both of the above d) none of the above

38. A Shottky Defect is:

a) a vacancy-like point defect in an ionic crystal
b) a defect that maintains the electrical charge neutrality in an ionic solid
c) both of the above d) none of the above.

39. Fick's First Law states that

a) the diffusivity is proportional to the concentration gradient.
b) the flux is proportional to the concentration gradient.
c) the diffusivity is independent of composition.
d) None of the above

40. The diffusivity depends on temperature as:

a) exp(-T). b) 1/T. c) 1/exp(-T). d) exp(-1/T).

PART II: (Answer Three (3) only of the following questions)

(20 points)

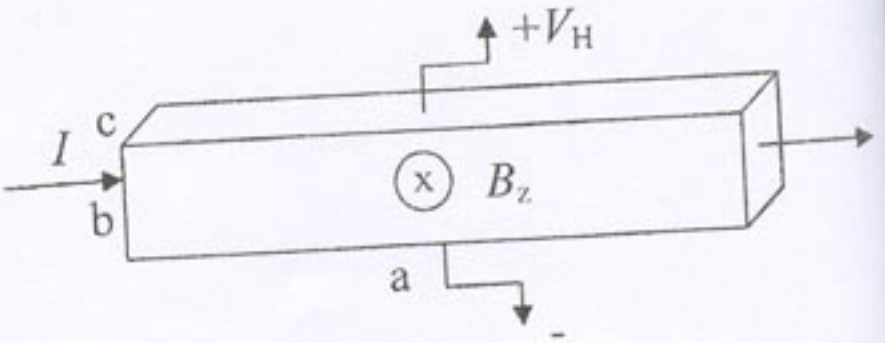
Q(I) :

A semiconducting crystal of dimensions $a = 12\ mm$ long, $b = 5\ mm$ wide and $c = 1\ mm$ thick has a magnetic flux density of $B_z = 0.5\ Tesla$ applied from front to back perpendicular to the large faces (ab). When a current of $I = 20\ mA$ flows lengthwise in the direction shown through the specimen, the voltage measured across its width is found to be $V_H = 37\ \mu V$.

a. What are the Hall coefficient and the concentration (n) of charge carriers of this semiconductor? (10 points)

b. Estimate the Hall voltage (V_H) if a sample of copper of similar dimensions is used under the same values of B_z and I (For Cu, $n = 8.5 \times 10^{28}/m^3$). Comment on the result. (6 points)

c. The cyclotron frequency ν_c in the semiconductor were found to be 20 GHz, find the effective mass of electrons in this semiconductor. (4 points)



Q(II): **(20 points)**

The diffusion coefficients for iron in nickel are: $D = 9.4\text{x}10^{-16}\ m^2/s$ at $T = 1273\ K$, and $D = 2.4\text{x}10^{-14}\ m^2/s$ at $T = 1473\ K$.

a. Find the values of $D_o\ (m^2/s)$ and the activation energy $E_{M.x}$ in eV units. (14 points)

b. Find the temperature T at which the diffusion coefficient is $D = 5.0\text{x}10^{-15}\ m^2/s$. (6 points)

Q(III): **(20 points)**

a. Given the average component of the dipole moment of a molecule in the direction of the applied field $\mathcal{E}$ as $\bar{p}_x = p \cdot L(u)$, $L(u) = \coth u - \frac{1}{u}$, $u = \frac{p\varepsilon}{k_B T}$

Use an appropriate approximation to obtain expressions of the dipolar polarizability (α_d) and total polaraizability (α) of the molecule. Justify your approximation for $p = 10^{-29}$ *Coul.m*, $\mathcal{E}$ = 10^5 *V/m* and $T = 200K$. **Hint:** $\coth x = \frac{1}{x} + \frac{x}{3} - \frac{x^3}{45} + \frac{2x^5}{945} \ldots\ldots$ (10 points)

b. Name the quantities in Clausius-Mosotti equation $\frac{M}{\rho}(\frac{\varepsilon_r - 1}{\varepsilon_r + 2}) = \frac{N_A \alpha}{3\varepsilon_0}$ and **rewrite** it using the total polarizability(α) you obtained in ***Part a*** and show graphically how to find dipole moment (p) and (electronic+ ionic) polarizabilities (α_{ei}). (10 points)

Your Answer

M is :

ρ is :

N_A is :

ε_r is :

ε_0 is :

α is :

Q(IV): **(20 points)**

Iron has a *bcc* structure of a lattice constant $a = 2.86\ \AA$ and is a ferromagnetic metal whose magnetic moment per iron atom is $2.2\ \mu_B$ ($1\mu_B = 9.27\text{x}10^{-24}\ A.m^2$), its density and atomic weight are $7920\ kg/m^3$ and 55.6 respectively.

a. Find the number of atoms per unit volume $N\ (m^{-3})$ by two methods using the information given above. (6 points)

b. Use the value of N to calculate the saturation magnetization M_{sat} (A.m) and saturation magnetic induction $B_{sat}\ (Wb/m^2)$ of iron. (14 points)

Best wishes: Dr. Salah Makhlouf

Assiut University	Physics and Electronics & Computer Science	Using Computer in Physics
Faculty of Science	4th year	452 P
Physics Department	Exam date: 1 / 6 / 2008	Time allowed: 2 hours

Answer only four of the following five questions:

1- Write the function of the following MATLAB statements: (31 degrees)

Matlab statement	function
length (x)	
linspace(0, 2*pi,100)	
subplot(2,2,2)	
fft (x(1:2:n))	
taylor(f(x),n,a)	
A=[1 2 3 4]; B=[-2 6 -3 8]'; A*B	output on the screen:
A=[1 2 3 4]; B=[-2 6 -3 8]; A.*B	output on the screen:

2-a) Compute the Fourier Transform of a full wave signal (in the trigonometric form) and show the expected spectrum. (19 degrees)

b) Prove that the total energy of a signal can be obtained by integrating the power spectrum over frequency (Parseval's Identity). (12 degrees)

3-a) Compute the exponential Fourier series of a rectangular pulse with a full width T/k and plot its line spectra. (18 degrees)

b) Use the Fourier transform to get the diffraction pattern of a single slit of width *a*. (12.5 degrees)

4-a) Prove that the number of operations required to get a Fast Fourier transform of N terms, when N is a power of two, is $Nlog_2N$. (18 degrees)

b) Write a program in MATLAB for $Nlog_2N$ Fast Fourier Transform algorithm. (12.5 degrees)

5- a) Explain the mixed radix FFT used to get the Fourier Transform of 1000 points. (18 degrees)

(b) Describe the diffraction pattern of a two point slits when the distance between the two slits is b using the Fourier transform. (12.5 degrees)

With my best wishes

Examiner: Dr. Mohamed Almokhtar

Faculty of Science Operation Research 414 R June: 2008

Math. Dept Fourth Year: Computer Science Section Time:3 hours

---

Answer Four Questions only from yhe the following:

1-a) Prove that the sufficient condition for a stationary point $\underline{x}^*$ to be an extreme point is that the Hessian matrix of $f(\underline{x})$ evaluated at $\underline{x}^*$ is positive definite when $\underline{x}^*$ is a minimum point (20 marks)

-b) $Minimize\ f(\underline{x}) = x_1(1 - x_2) + x_3(3 - x_3^2)$ (20 marks)

2-a) Consider the problem

$$Minimize\ \ f(\underline{x}) \qquad ,\underline{x}\epsilon R^n$$

$$\text{Subject to } g_j(\underline{x}) = 0. \qquad ,j = 1, 2, \ldots . m$$

Prove that the necessary condition for this problem to have a relative minimum at $\underline{x}^*$ is that the gradient of the Lagrange function $L(\underline{x}, \underline{\lambda})$must be zero , and the sufficient condition is that the quadratic Q given by

$$Q = \sum_{i=0}^{n} \sum_{j=1}^{n} \frac{\partial^2 L}{\partial x_i \partial x_j} dx_i dx_j$$

evaluated at $\underline{x}^*$ must be positive definite (20 marks)

-b) Use the Lagrange multiplier method to find the extreme points of the problem

$$Minimize\ \ f(\underline{x}) = x_1^2 + x_2^2 - 3x_1x_2$$

$$Subject\ to\ g(\underline{x}) = x_1^2 + x_2^2 - 8 = 0.$$ (20 marks)

3-a) Derive the modified Newton method to solve the problem

$$Minimize\ f(\underline{x}) \quad ,\underline{x}\epsilon R^n$$ (20 marks)

-b) Use the derived method to find the solution of the problem

$$Minimize\ f(\underline{x}) = 4x_1^2 + x_2^2 - 2x_1x_2$$

$$Starting\ with\ \underline{x}_0 = (1,1) \qquad ,\varepsilon = .001$$ (20 marks)

4-a) Define

(i) The convex set (ii) The convex function

(iii) The convex programming (20 marks)

-b) Check if the following problem

$$Minimize\ \ f(\underline{x}) = 6x_1^2 - 2x_1x_2 + 3x_2^2$$

$$S.T\ \ g_1(\underline{x}) = x_1^2 + 3x_1x_1 + 5x_2^2 \quad ,\quad g_2(\underline{x}) = 2x_1^2 + x_1 + 5x_2^2$$

$$, g_3(\underline{x}) = 4x_1 + 4x_2 - 6$$

Is a convex programming or not (20 marks)

5-a) If the descent direction of the function

$$f(\underline{x}) = 3x_1\ 2 + 2x_2^2 + 2x_1x_2 + 7$$

At the point (1, 2) is given by (-1,-1). Compute analytically the step size α to minimize this function in the given direction, and then calculate the next point (20 marks)

-b) Prove that the gradient vector g of the function $f(\underline{x})\ at\ \underline{x}^*$ is orthogonal to the tangent plane of the surface $f(\underline{x}) = constant$ (20 marks)

Best Wishes

أ.د.طه مرسى على الجندى

Assiut University
M440: Operating Systems
Time: 3 Hrs

Faculty of Science
4th Year Computer Section
May 2008

Final Exam

1) Consider the following page reference string, (30 points)

1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6.

Assume we have three page frames for each process. Determine the number of page faults for FIFO, LRU and Optimal scheduling algorithms.

2-a) On a memory system with paging, a process can not access memory that it does not own. Why? How could the operating system allow page sharing? (10 points)

2-b) Explain the difference between internal and external fragmentation? (9 points)

3-a) What are the differences between user-level threads and kernel-level threads? (15 points)

3-b) Provide two examples in which multithreading provides better performance than single threading solution? (20 points)

4) Consider the following system with 5 processes and three resource types [*A* (10 instances), *B* (5 instances), and *C* (7 instances)]. The system at T_0 is in the following state.

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	1	7	5	3	3	2	1
P1	0	1	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	2	0	2	4	3	3			

a- Determine if the system in a safe state? (15 points)

b- Can we accept the request of (2,1,0) of P0? (15 points)

5) Suppose that the following processes arrive for execution at the times indicated. Each process will run the listed amount of time. In answering the questions, use nonpreemptive scheduling and base all decisions on the information you have at the time the decision must be made. (21 points)

Process	Arrival Time	CPU Time
P1	0.0	8
P2	0.4	4
P3	1.0	1

a- What is the average turnaround time for these processes with the FCFS scheduling algorithm?

b- What is the average turnaround time for these processes with the SJF scheduling algorithm?

c- What is the average turnaround time for these processes with the preemptive SJF scheduling algorithm?

6) Explain the atomic transaction scheme for solving the critical section problem? (20 points)

7) Compare between message passing and shared memory for process communication? (10 points)

With My best wishes
Dr. Ahmed Mostafa

بسم الله الرحمن الرحيم

Assiut University	**Statistical Mechanics**	**Fourth Year (Math Group)**
Faculty of Science	**454-M (Special course iii)**	**Second Semester May 2008**
Mathematics Dept.		**Time allowed: 3 Hours**

No limit is placed on the number of questions which a candidate may attempt, but full marks may be obtained on about FIVE questions.
The exam consists of 7 questions contained in 3 pages.

1- (a) For a reversible process, show that

(i) $$dS = \frac{C_V}{T}\left(\frac{\partial T}{\partial P}\right)_V\left[dP - \gamma\left(\frac{\partial P}{\partial V}\right)_T dV\right].$$

(ii) $$\left(\frac{\partial C_P}{\partial P}\right)_T = -T\left(\frac{\partial^2 V}{\partial T^2}\right)_P = -TV\left[\alpha^2 + \left(\frac{\partial \alpha}{\partial T}\right)_P\right]$$

where α is the coefficient of thermal expansion.

(16 points)

(b) The differential $\left(\frac{\partial T}{\partial P}\right)_H$ is called the Joule-Thomson coefficient and is of importance in refrigeration engineering. Show that it can be calculated from

$$\left(\frac{\partial T}{\partial P}\right)_H = -\frac{1}{C_P}\left[V - T\left(\frac{\partial V}{\partial T}\right)_P\right]$$

where H is the enthalpy.

(16 points)

2- Apply Tolman's general equipartition principle to obtain:

$$\overline{\left(\frac{c^2 P_x^2}{\varepsilon}\right)} = \overline{\left(\frac{c^2 P_y^2}{\varepsilon}\right)} = \overline{\left(\frac{c^2 P_z^2}{\varepsilon}\right)} = kT$$

for the case of a gas composed of particles where the energy ε of a particle has the relativistic dependence on momenta P_x, P_y, P_z as

$$\varepsilon = c(P_x^2 + P_y^2 + P_z^2 + m_0^2 c^2)^{\frac{1}{2}}$$

m_0 is the rest mass and c is the velocity of light.

Prove also that: $$\left\{\frac{m_0 u^2}{\sqrt{1-\frac{u^2}{c^2}}}\right\} = 3kT$$

where the relation between the momentum $\underline{P} \equiv (P_x, P_y, P_z)$ and the velocity $\underline{u} \equiv (\dot{x}, \dot{y}, \dot{z})$ is given by: $$\underline{P} = \frac{m_0 \underline{u}}{\sqrt{1-\frac{u^2}{c^2}}}.$$

(32 points)

3- Prove the following correspondences for a system belonging to a canonical ensemble:

Internal energy: $$U \Leftrightarrow -\frac{\partial \ell n\ Z}{\partial \beta}$$

Helmholtz free energy: $$F \Leftrightarrow -\frac{1}{\beta} \ell n\ Z$$

Entropy: $$S \Leftrightarrow k\left[\frac{\partial}{\partial T}(T\ \ell n\ Z)\right]$$

Apply these results to get U, F, S for a system of N magnetic dipoles the partition function Z of which is given by

$$Z = \{2\cosh(\beta\varepsilon)\}^N$$

where ε is the energy of a dipole.

(32 points)

4- (a) Derive the virial equation of state for a real gas up to the second virial coefficient $B_1(T)$.

(14 points)

(b) Use the approximation: $$\ell n\ Z_{conf.} \approx \ell n\ V^N - V^{-1} N^2 B_1(T).$$

to show that the relation between the specific heat C_v for real and ideal gas is given by

$$C_v(\text{real gas}) = C_v(\text{ideal gas}) - kV^{-1}N^2 \frac{d}{dT}\left(T^2 \frac{dB_1}{dT}\right).$$

(18 points)

5- The potential energy for a single one-dimensional classical oscillator contains a small quadratic anharmonic term so that the Hamiltonian for such an oscillator can be written as: $$H=\frac{1}{2m}p^2+\frac{1}{2}\lambda x^2+\alpha x^4$$

where $\alpha\overline{x^4} \ll kT$. Prove that the partition function Z up to the first order in α is given by: $$Z=\frac{2\pi kT}{\omega}\left[1-\frac{3\alpha}{\lambda^2}(kT)\right] \quad , \quad \omega=\sqrt{\frac{\lambda}{m}}$$

Use this result for Z to obtain the thermal energy of the oscillator $\bar{\varepsilon}$ and the specific heat C_v in the forms

$$\bar{\varepsilon}=kT\left[1-\frac{3\alpha}{\lambda^2}(kT)\right] \quad , \quad C_v=k\left[1-\frac{6\alpha}{\lambda^2}(kT)\right]$$

(32 points)

6- (a) Obtain the Maxwell-Boltzmann distribution of velocities, whence evaluate $\overline{v^n}$.

(16 points)

(b) If ε is the energy of one molecule of an ideal monatomic gas, use the result in (a) to obtain $\bar{\varepsilon}$, $\overline{\varepsilon^2}$ and $\overline{(\varepsilon-\bar{\varepsilon})^2}$, whence deduce the specific heat C_v.

(16 points)

7- (a) If N is the number of particles in a member system of the grand canonical ensemble, and μ is the chemical potential, prove that the variance of N is given by $$\overline{(N-\bar{N})^2}=kT\left(\frac{\partial\bar{N}}{\partial\mu}\right)_{V,T}.$$

(18 points)

(b) Write down the average number $\bar{n}_v$ of particles occupying the one particle quantum state v with energy ε_v for both Bose-Einstein *(B.E)* and Fermi-Dirac *(F.D)* perfect gases. Use this result to show that: $$\frac{\partial\bar{n}_v}{\partial\mu}=\frac{1}{kT}\bar{n}_v(1\pm\bar{n}_v) \quad \begin{matrix}+\ (B.E)\\ -\ (F.D)\end{matrix}$$

(14 points)

With best wishes
M. Boghdadi

جامعة اسيوط — امتحان الفصل الدراسى الثانى ٢٠٠٧ ـ ٢٠٠٨
كلية العلوم — المادة: هندسة تفاضلية(٤٠٤ ر) — الزمن: ثلاث ساعات
قسم الرياضيات — الفرقة: الرابعة ـ رياضيات — التاريخ: ٢٠٠٨/٥/٢٧

Answer five questions from the following:

[1] a) For a regular curve $\alpha = \alpha(t)$ in R^3 with the speed v. Find the moving trihedron (T, N, B) and curvature k and torsion τ. **(16- Marks)**

b) Compute the Frenet apparatus for the curve $\alpha = (t, \frac{t^2}{2}, \frac{t^3}{3})$. Study the case when $t \to \pm\infty$. **(16- Marks)**

---

[2] a) Define an isometry of R^n and prove that if F is an isometry of R^n then there exists a unique orthogonal transformation θ of R^n such that $F = T\theta$. **(16- Marks)**

b) For the isometry $F(p) = (\frac{1}{\sqrt{2}}(p_1 - p_3 + 1),\ p_3 + 1,\ \frac{1}{\sqrt{2}}(p_1 + p_3 + 1))$

find its transformation and orthogonal transformation parts. **(16- Marks)**

---

[3] a) Show that if $k = k(s) > 0$ and $\tau = \tau(s)$ are two continuous functions defined on an interval I, then there exists a curve $C : I \to R^3$ with parameter as its arc-length such that $k = k(s)$ and $\tau = \tau(s)$ are its curvature and torsion functions. **(16- Marks)**

b) Find the equation of a curve whose curvature and torsion respectively $k = \frac{a}{a^2 + b^2}$,

$\tau = \frac{b}{a^2 + b^2}$, a > 0 and b are constants. **(16- Marks)**

---

[4] a) Define a regular patch for a surface in R^3. Then prove that the Mong form $z = f(x, y)$ is a regular patch if f is a regular valued function on R^2. **(10- Marks)**

b) Define a ruled parametrization of a ruled surface. Then find the asymptotic lines on the ruled surface generated by the binormal of a unit speed curve. **(10- Marks)**

c)Prove that the normal curvature at a point on a regular surface is less than or equal the curvatures of all curves passing through that point. **(12- Marks)**

---

[5] a) Prove that the lines of curvatures on a regular surface constitute an orthogonal family of lines on that surface. **(10- Marks)**

b) Define the minimal surface and hence show that the Gauss curvature of a minimal surface is negative. **(12 -Marks)**

c)Define the Osculating Paraboloid of a regular surface and hence give a classification to the points of a surface. **(10 -Marks)**

بقية الاسئلة فى الصفحة التالية.....

[6] a) Define the lines of curvatures and principal curvatures on a regular surface. Then find the lines of curvatures on a cylinder. (12- Marks)

b) Define the geodesic curvature and geodesics on a regular surface and show that the geodesics on the Euclidean plane are straight lines. (10 Marks)

c) State $G-W$ equations for a regular surface and find the W – matrix on a principal patch. Hence show that the $G-W$ equations are identically satisfied on the plane R^2. (10 -Marks)

انتهت الاسئلة .....
بالتوفيق و النجاح

ا.د/ محمد عبداللطيف ا.د/ نصار السلمى

كليـــة : العلوم
قســـم : الرياضيات

امتحان نهائي دور مايو ٢٠٠٨م
اسم المقرر : جبر مجرد
الفرقـة : الرابعة علوم رياضيات

تاريخ الامتحان : ١/٦/٢٠٠٨
رقم المقرر : ٤٠٧ ر
الزمن : ثلاث ساعات

أجب عن خمسة أسئلة فقط مما يأتي :-

1- a) In the following whether the systems described are groups :

(i) $G = \{a \in R : -1 \le a \le 1 \text{ , } R \text{ is real}\}$, $a * b = \dfrac{a+b}{1+ab}$ $\forall\ a, b \in G$.

(ii) G = Set of all rationals of even denominators ,
$a * b = a + b \ \forall\ a, b \in G$ (16 marks)

b) Let $G = < Z , + >$ be a group , $H = < nZ , + >$.
Show that H is a subgroup of G and determine $[G : H]$ and write all the right cosets of H in G. (16 marks)

2- a) Let G be a group which for some integer $n > 1$,
$(ab)^n = a^n b^n \ \forall\ a, b \in G$, show that:

(i) $H = \{x^{n-1} : x \in G\}$ is a normal subgroup of G.

(ii) $a^{n-1} b^n = b^n a^{n-1} \ \forall\ a, b \in G$

(iii) $[a^{-1} , b^{-1}]^{n(n-1)} = e$. where $[a^{-1} , b^{-1}]$ is the commutator of a^{-1}, b^{-1} . (16 marks)

b) State and prove the first Sylow theorem . If the order of a group G is 33 . Show that $G = Z(G)$. (16 marks)

---

3 – a) Given a group G , N is a normal subgroup of G and H is a subgroup of G . Prove that
$H \cap N \lhd H$, HN is subgroup of G and $H/_{H \cap N} \cong HN/_{N}$.
(16 marks)

b) Let M and N be normal subgroups of G with $M \supseteq N$. Prove that $G/_{N}$ is finite if $G/_{M}$ and $M/_{N}$ are finite. (16 marks)

4- a) (i) If G is a finite abelian group and p is a prime dividing the order of G . Prove that G has an element of order p .
(ii) If the order of a group G is 33 does G has an element of order 3 ? explain . (16 marks)

أنظر بقية الأسئلة خلف الورقـة ،،،،

b) If G is a group of order p^r , $r \geq 1$. Show that G has a normal subgroup of order p^{r-1} . Is any group of order p^3 solvable ? explain (16 marks)

---

5 – a) Show that any two fields of quotients of any integral domains are isomorphic . (16 marks)

b) (i) Show that any Euclidean ring is a P I D .

(ii) Is $Z\left[\sqrt{-5}\right]$ an Euclidean ring ? How about $R[i]=\{a+bi : a,b \in R , R \text{ reals}\}$. (16 marks)

---

6 – a) (i) State and prove the Eisenstien theorem .

(ii) Is $Q[x]/(8x^3+6x^2-9x+24)$ a field ? How about $Q[x]/(1+x+x^2+x^3+x^4)$? explain . (16 marks)

b) Let D be an integral domain of characteristic p . Prove that $\varphi : D \to D'$ where $D' = \{x^p : x \in D\}$ and $\varphi(x)=x^p$ is an isomorphism . (16 marks)

انتهت الأسئلة مع تمنياتي لك بالتوفيق ،،،

لجنة الممتحنين : أ٠د/ أحمد عبد المنصف علام ، د/ نبيلة نصيف ميخائيل

كلية العـــلوم سم الرياضيات	امتحان نهائي دور مايو ٢٠٠٨م أسم المقرر : نمذجة رياضيـــة رقم المقرر : ٤١٦ر الفرقـــــة : رابعة رياضيات	تاريخ الامتحان : ٢٠٠٨/٦/٥م الزمن : ثلاث ساعات

Answer four questions only from the following : -

1- a) What is mathematical modeling - Construct a flow chart for a repeated cycle of the three modeling steps. (15 marks)

b) Give a depiction of the scientific method to identify a real world and a conceptual world . (10 marks)

c) Construct a visual portrayal to show that mathematical modeling depends on a basic philosophical approach through list of questions and answers . (15 marks)

2- a) Define linear and nonlinear models . How do we approximate a nonlinear model to properly estimate the behavior it describes ? (15 marks)

b) Given three competing products where the demand and supply functions are non linear . construct a math. model to make a decision for market equilibrium . . (15 marks)

c) Give an example to show the difference between the parameters and variables in math. model . (10 marks)

3- a) Define each of the following :
Precision – Sensitivity - Robust model . (15 marks)

b) State the methods of adjusting the data to the math. model and give an example to each method . (10 marks)

c) Construct a math. model for macroscopic traffic flow to show the relation between traffic speed and traffic density . (15 marks)

4- a) State model evaluation types . (10 marks)

b) Math. model may contain singularities . What is the singularity and catastrophe ? (15 marks)

c) Inflation (phenomenon in which prices rise rapidly and dramatically) has been a major economic and political problem in development countries . Construct an exponential model to describe an inflation . ? (15 marks

---

من فضلك أنظر باقي الأسئلة خلف الورقة ،،،،

5- a) Errors are always present in building a math. model - What is the error , systematic , random , absolute percentage errors . Show the difference between the errors and mistakes in building a math. model . (10 marks)

b) Give an classification to math . problems according to how much a priori information is available of the system. Give an example to one type only . (15 marks)

c) Give a formulation for an optimization problem using objective and constraints functions - Indicate the types of constraints - Thus using the bordered Hessian matrix to construct a model depends on :

maximize $f(x_1, x_2, \ldots x_n)$

Subject to $g(x_1, x_2, \ldots x_n) = c$

(15 marks)

انتهت الأسئلة مع تمنياتي لكم بالنجاح ،،،

لجنة الممتحنين : أ٠د/ أحمد عبد المنصف علام ، أ٠د/ نصار حسن عبد العال

Assiut University
Faculty of Science
Math Department, Computer Science
4th Year, 2nd Term, 2007/2008
3 Hours

Computer Technology Final Exam

1. (5 pts) In Hough transform, what is the main disadvantage of the c-m space?

2. (10 pts) In Hough transform, (a) prove the straight line polar form ($r= x \cos(\theta)+y \sin(\theta)$), (b) write the Hough transform algorithm that uses that polar form.

3. (10 pts) List ten applications of computer vision (describe each application briefly, use diagrams if possible)

4. (9 pts) List the three stages of edge detection (explain these stages, use diagrams if possible)

5. (4 pts) Define the following terms:
   (a) Gradient, (b) Laplacian

6. (4 pts) Write down the 4x4 matrix for rotating an object by 45 degree CCW around the z axis.

7. (6 pts) Describe what this transformation matrix does (be specific about the order of operations)

$$\begin{pmatrix} 0 & -1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

8. Show using diagrams the difference between the followings:
   a. (4 pts) Orthographic and Perspective.
   b. (4 pts) Front face and back face
   c. (4 pts) Valid polygon (convex) and invalid polygon