جامعة أسيوط — إمتحان الوراثة لطلاب كليه العلـوم — الزمن: ساعتان
كلية الزراعـــة — الفرقة الثالثه ــ شعبة الحشرات — كود: ٣١٢ ش وراثة
قسم الوراثـــة — الفصل الدراسى الثانى ٢٠٠٧/٢٠٠٨ — السبت: ٢٠٠٧/٥/٣١

أجب على الأسئلة الآتيـــــــة بالترتيب:-

السؤال الأول:- [٢٦ درجة]

١- **أكتب عن أربعـة فقط مما ياتى:-** **[١٦ درجة]**

Inducer – Catabolite activator protein – Transversion mutation - Psedodominance – Nonesense-mutation -

٢- وضح دور كل مما يأتى فى عملية بناء البروتين:- **[١٠ درجات]**

Aminoacyl-synthetase – Peptidyl transferase

السؤال الثانـــــي:- **[٢٤ درجة]**

١- ما الفرق بين:- **[١٢ درجات]**

أ- الـ mRNA الذي يتكون في كل من الكائنات مميزة وغير مميزة النواه

ب- الـ promoter فى كل من الكائنات مميزة وغير مميزة النواه

٢- اذكر باختصار دور كل مما يلى فى عمليه التضاعف:- **[١٢ درجات]**

DNA poly. II – SSB protein – Helicase – Topoisomerase

السـؤال الثالـــث:- [٢٠ درجة]

١- أذكر الاثار الوراثية المترتبة على: **[١٥ درجة]**

أ- عدم انفصال كروموسوم X غن كروموسوم Y أثناء الانقسام الميوزى

ب- حدوث عبور مفرد فى منطقة انقلاب خليط لاسنترومير ى

ج- حدوث نقص لقطعة كروموسومية تحمل الجين السائد لفرد خليط لهذا الجين

٢- - اذكر فقط متطلبات الـ DNA sequencing **[٥ درجات]**

السـؤال الرابع:- [٢٠ درجة]

١- كيف يتم تضاعف الـ DNA بدون اخطاء **[٦ درجات]**

٢- ما هى الطفرات البيوكيماوية Biochemical mutations **[٦ درجات]**

٣- أذكر فقط طرز الجينومات المختلفه مع شرح احداها **[٨ درجات]**

لجنه الممتحنين:- **مع أطيب التمنيات بالتوفيق**

د/ مرفت محمـــد حشـــاد

د/ عبيـد محمـد أحمـــد

جامعة أسيوط
كلية العلوم
قسم الفزياء

امتحان الفصل الدراسي الثاني مايو ٢٠٠٨ م
مقدمة الفيزياء النووية (٣٢٢ ف)
الزمن:ساعتان

الشعبة:الفيزياء
الفيزياء والكيمياء
الفيزياء والألكترونيات

أجب عن ثلاثة أسئلة فقط مما يأتي:

١-أ- حزمة من جسيمات ألفا تسقط علي شريحة معدنية رقيقة. أحسب عدد الجسيمات التي يحتمل أن تتشتت نتيجة لهذا التصادم. ثم أستنج العوامل التي يتوقف عليها هذا الاحتمال.

ب- في أحدي تجارب رذرفورد علي تشتت حسيمات ألفا خلال شريحة رقيقة من النحاس كانت سرعة جسيمات ألفا $1,6x10^9$ سم/ثانية. فاذا كان العدد الذري للنحاس ٣٢ وكتلة جسيم ألفا $٤x١,٦٧x١٠^{-٢٤}$ جم والشحنة الألكترونية $٤,٨x١٠^{-١٠}$ و.ك.س. أوجد أقل مسافة يستطيع أن يقترب بهاجسيم ألفا من نواة ذرة النحاس.

٢-أ- باعتبار أن النواة جسم كري منتظم الشحنة والكثافة أوجد تعبيرا لنصف قطر نواة من نوع الايزوبار. ما تعليقك علي النتيجة. أعتبر ان كتلة السكون للبوزيترون هي ٠,٥١ م.أ.ف. الفرق بين كتلتي السكون للنيوترون والبروتون هي (-١,٢٩ م.أ.ف.)

ب- أحسب كثافة نواة ذرة الألمونيوم علما بان عدد الكتلة لة ٢٧ وعدده الذري ١٣ وأن كتلة البروتون $١,٦٧٢x١٠^{-٢٤}$ جم وكتلة النيوترون $١,٦٧٤x١٠^{-٢٤}$ جم وأن ثابت نصف قطر النواة $١,٤٥x١٠^{-١٣}$ سم.

٣- هل من المحتمل وجود الكترون داخل النواة؟ ماذا عن البروتون؟ اثبت.

اعتبر ان نصف قطر النواة $١٠^{-١٢}$ سم. & ثابت بلانك $٦,٧x١٠^{-٢٧}$ أرج. ثانية. & كتلة الالكترون $٩x١٠^{-٢٨}$ جرام & كتلة البروتون $٢x١٠^{-٢٤}$ جم & الالكترون فولت $١,٦x١٠^{-١٢}$ أرج.

٤-أ- قوي الربط النووية لا يمكن اعتبارها قوي تجاذب كتلي أو قوي كهربية أو مغناطيسية. وضح ذلك مع ذكر مصدر هذه القوي وأهم خواصها.

ب- ما مصدر الطاقة المتولدة في باطن الشمس. اشرح كيفية تولد هذه الطاقة.

ج- أوجد النسبة بين كتلتي الميزون والالكترون معتبرا أن كتلة الالكترون $٩x١٠^{-٢٨}$ جرام وأن ثابت بلانك $٦,٧x١٠^{-٢٧}$ أرج. ثانية. وأن نصف قطر النواة في حدود $١,٤x١٠^{-١٣}$ سم.

مع تمنياتنا بالنجاح والتوفيق

حامعة أسيوط امتحان دور مايو 2008 الزمن : ساعتان

كلية العلوم الفرقة الثالثة علوم (فيزياء + ف / كيمياء + ف /الكترونيات)

قسم الفيزياء *طرق الفيزياء الرياضية*

==========

أجب عن خمسة أسئلة فقط مما يأتي (الدرجات متساوية) :

1 – للدالة القياسية Φ والمتجه $\mathbf{A}$ اثبت أن $\Phi(\nabla \times \mathbf{A})$ لا تساوي $\nabla \times (\Phi \mathbf{A})$

حيث ∇ هي المؤثر التفاضلي

2 – مثل المتجه $\mathbf{A} = 2y\,\mathbf{i} + 4z\,\mathbf{j} + 6x\,\mathbf{k}$ في الاحداثيات الاسطوانية .

3 - اوجد مقياس متجه التدرج للدالة القياسية $\Phi(x,y,z) = 3x^3y + y^3z + 2xz^3$

عند النقطة $(2,2,2)$.

4- إذا كانت الدوال $F = x^2z - e^{y/x}$, $G = 2z^2y - xy^2$ فأوجد مقياس المتجه

$\nabla(F - 2G)$ وذلك عند النقطة $(1,-1,1)$.

5- مستخدما تعبيرات الاحداثيات المنحنية اوجد صيغة كل من $\nabla\Psi$, $\nabla . \mathbf{A}$, $\nabla^2\Psi$ في

الاحداثيات الاسطوانية حيث Ψ دالة قياسية متصلة بينما $\mathbf{A}$ دالة اتجاهية متصلة ايضا .

6- تكتسب المعادلة التفاضلية الجزئية من الرتبة الثانية $\nabla^2\Psi + K^2\Psi = 0$ أهمية كبيرة عند

دراسة العديد من الظواهر الفيزيائية . أكتب صيغة هذه المعادلة في الاحداثيات الكروية واشرح كيف

يمكن حلها باستخدام طريقة فصل المتغيرات .

********انتهت الأسئلة***مع أطيب التمنيات*** د. جلال سعد ********

جامعة أسيوط امتحان دور مايو 2008 الزمن : ساعتان

كلية العلوم تخلفات ثالثة علوم (فيزياء + ف / كيمياء + ف /الكترونيات)

قسم الفيزياء *طرق الفيزياء الرياضية*

==========

أجب عن خمسة أسئلة فقط مما يأتى :

1 – للدالة القياسية Φ والمتجه $\mathbf{A}$ اثبت أن $\nabla\Phi \cdot \mathbf{A} = \nabla \cdot (\Phi\mathbf{A}) - \Phi(\nabla \cdot \mathbf{A})$

2 – مثل المتجه $\mathbf{A} = z\,\mathbf{i} - 2\,x\,\mathbf{j} + y\,\mathbf{k}$ في الاحداثيات الاسطوانية .

3 - اوجد مقياس متجه التدرج للدالة القياسية $\Phi(x,y,z) = 3x^2y - y^3z + 2xz^2$

عند النقطة $(2,2,2)$.

4- إذا كانت الدوال $G = 2\,z^2\,y - x\,y^2$, $F = x^2z - e^{\,y/x}$ فأوجد مقياس المتجه

$\nabla(F - 2\,G)$ عند النقطة $(1,-1,1)$.

5- مستخدما الاحداثيات المنحنية اوجد صيغة كل من $\nabla\Psi$, $\nabla \cdot \mathbf{A}$ في الاحداثيات الاسطوانية حيث

Ψ دالة قياسية متصلة بينما $\mathbf{A}$ دالة اتجاهية متصلة ايضا .

6- استنتج صيغة معادلة لابلاس في الاحداثيات الكروية .

*انتهت الأسئلة*مع أطيب التمنيات** د. جلال سعد ********

بسم الله الرحمن الرحيم

Exam of the Second Semester May2008

Assiut University
Faculty of Science
Department of Physics

3rd Class Special Physics
Electromagnetism (304 Phys.)
Time: 2 hours

Answer Only Four Questions of the Following:

			Mark
1	a	State and prove Ampere's law.	10
	b	Calculate the magnetic flux density due to a current in a straight conductor using Biot-Savart law.	10
2		Find the magnetic flux density on the axis of circular conductor using:-	
	a	The magnetic scalar potential.	10
	b	The magnetic vector potential.	10
3	a	Derive the Lorentz force equation.	10
	b	Discuss the displacement current.	10
4	a	Write Maxwell's equations in the general case.	10
	b	Write Maxwell's equations in the special cases.	10
5		Explain the following:-	
	a	Propagation of the plane waves in isotropic insulating media.	10
	b	Absorption of the plane waves in the conductors.	10

Good Luck

Dr. Ashraf Yehia

Physics department
Faculty of science
Assiut university

2nd term exam 2007/2008

3rd year students: Physics | Subject: electronic circuits | Time : 2 hours

ANSWER THE FOLLOWING QUESTION

Question1

(38.5 degrees)

(a) Determine V_o for the negative logic AND gate of Fig.1.

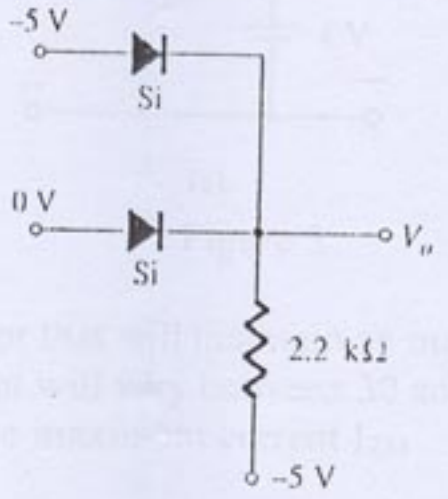
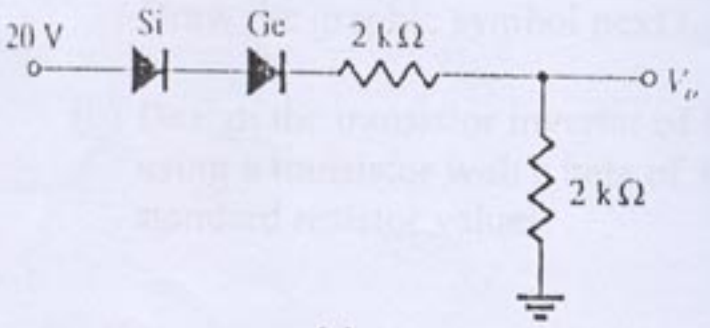
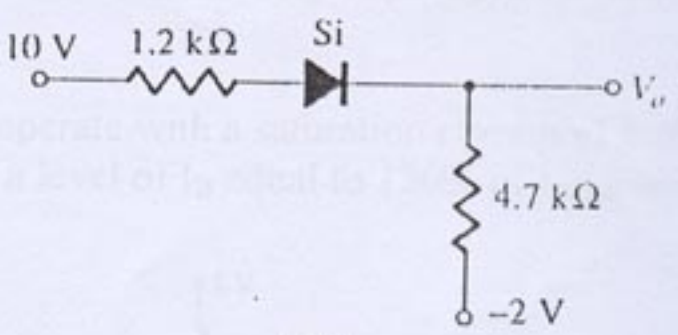


Figure 1

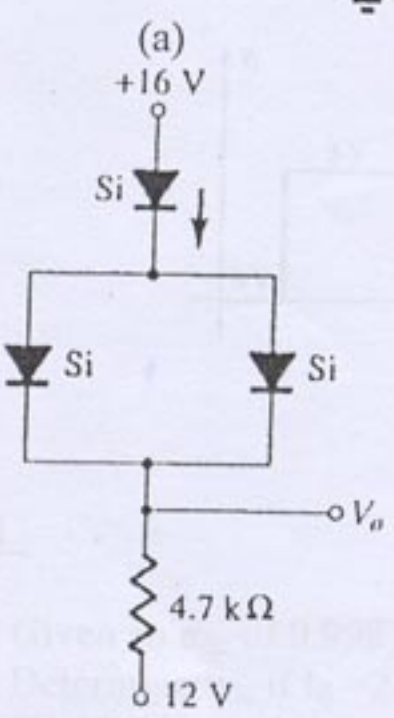
(b) Determine V_o and I for the networks of Fig.2.



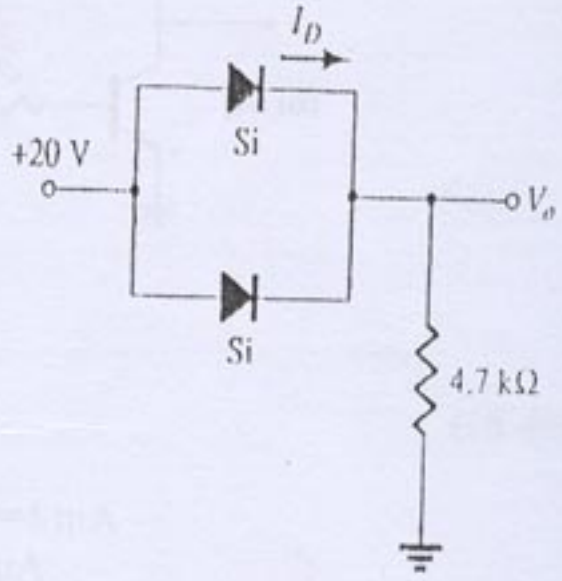
(a)



(b)



(c)



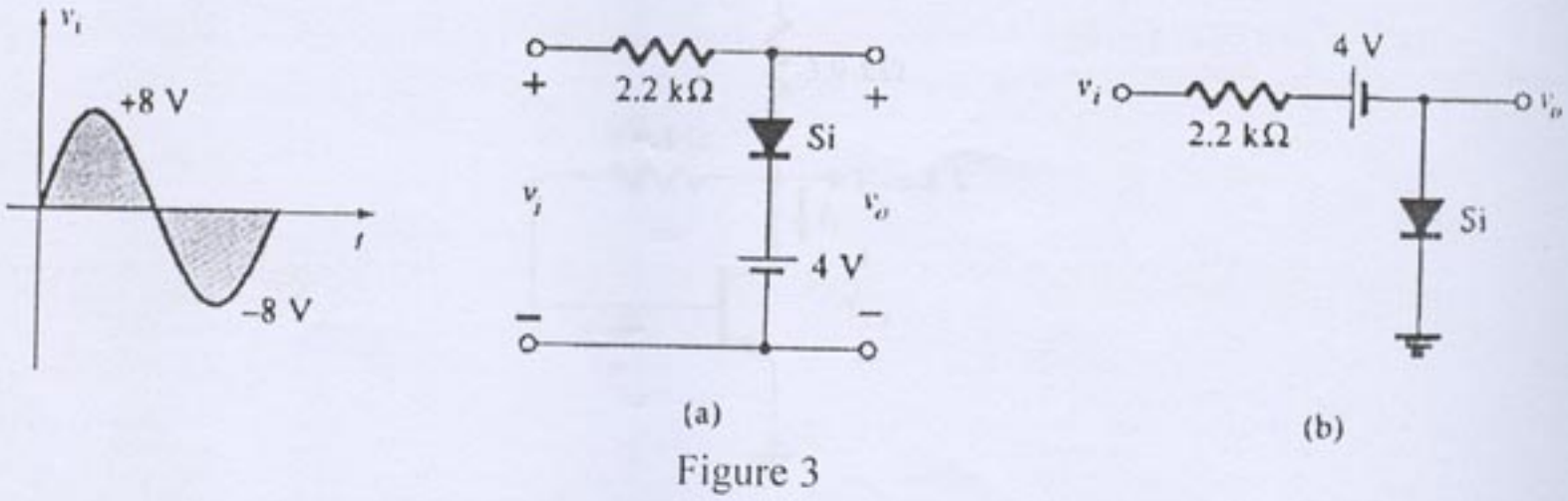
(d)

Figure 2

ANSWER ONLY THREE QUESTIONS FROM THE FOLLOWING

Question2 **(28 degrees)**

(a) Sketch V_o for each network of Fig.3 for the input shown.



(a) (b)

Figure 3

(b) Design a voltage regulator that will maintain an output voltage of 20 V across a 1-kΩ load with an input that will vary between 30 and 50 V. That is, determine the proper value of R_s and the maximum current I_{ZM}

Question3 **(28 degrees)**

(a) What names are applied to the two types of BJT transistor? Sketch the basic construction of each and label the various minority and majority carriers in each. Draw the graphic symbol next to each.

(b) Design the transistor inverter of Fig.4 to operate with a saturation current of 8 mA using a transistor with a beta of 100. Use a level of I_B equal to 120% of I_{Bmax} and standard resistor values.

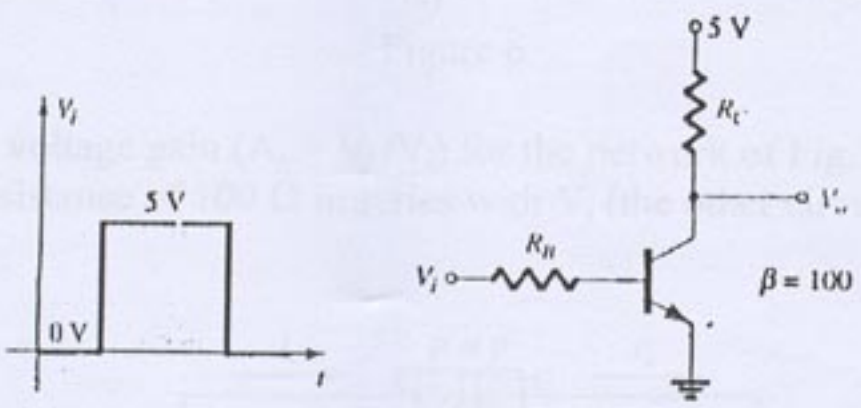


Figure 4

Question4 **(28 degrees)**

(a) (1) Given an α_{dc} of 0.998, determine I_C if I_E =4 mA
(2) Determine α_{dc} if I_E =2.8 mA and I_B= 20 μA.
(3) Find I_E if I_B =40 μA and α_{dc} is 0.98.

(b) Given $V_C = 8V$ for the network of Fig.5, determine:
I_B, I_C, V_{CE} and β

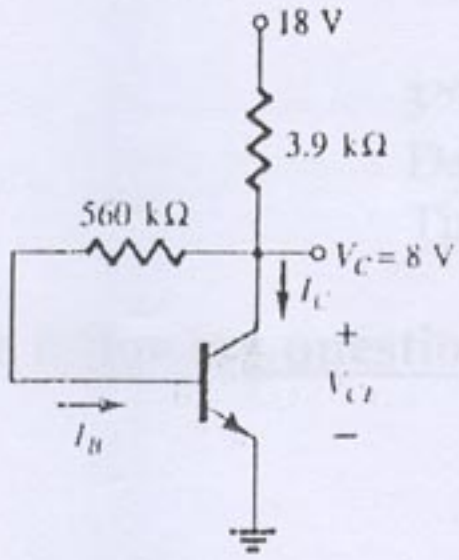


Figure 5

Question5 **(28 degrees)**

(a) Sketch V_o for each network of Fig.6 for the input shown.

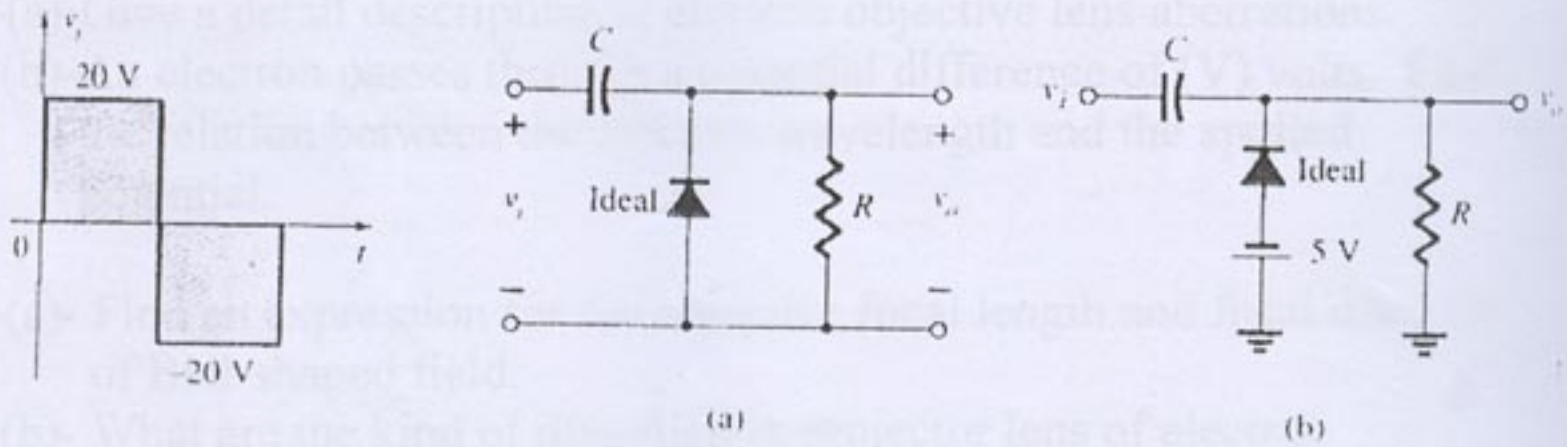


Figure 6

(b) Calculate the voltage gain ($A_v = V_L/V_i$) for the network of Fig.7 if the source has an internal resistance of 100 Ω in series with V_i (the other circuit values remain the same).

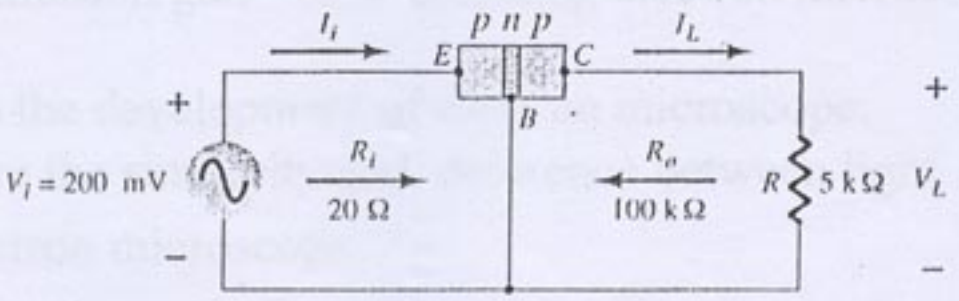


Figure 7

GOOD LUCK

Electron Optics Final Exam.

Physics Dept
Faculty of science
Assiut University

3rd Year (Phys. & chem.)
Date: 7/6/2008
Time: 2hr.

Answer four only of the following questions only, 20 degree for each:

1-(a)- Write on : 1-Electrostatic lens 2- Magnetic lenses
(b)-Discuss the advantages and disadvantages of electron lenses.

2-(a)-Give a detail description of electron objective lens aberrations.
(b)-An electron passes through a potential difference of (V) volts. Find the relation between the electron wavelength and the applied potential.

3-(a)- Find an expression for the objective focal length and focal distance of Bell-shaped field.
(b)- What are the kind of distortion in projector lens of electron microscope, Explain in detail.

4- Write a short account on:
(a)- Electron emission (b)- Magnification limits.
(c)- Field emission gun (d)- Scanning electron microscope.

5- (a)- Discuss the development of electron microscope.
(b)- What are the similarity and deference between light and electron microscope.

(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 (352) (Use of Computer for Physical Measurements)

Student: Third Year

Instructions:

1. All work must be done in the exam booklet.
2. This is a closed book exam.
3. BOOKS, NOTES, COMPUTERS and CELL PHONES are NOT ALLOWED.
4. Do **only three problems from the following four problems.**
5. You have 120 minutes to solve the problems.

problem	Maximum	Score
1	41	
2	41	
3	41	
Total	123	

Name of Examiner: Dr. Salah Aldeen Galal Abdulrhmann

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

Problem 1 (41 Degrees)

41

1. Define analog and digital quantity and explain the difference between them.

2. Give an example of a system that is analog and one that is a combination of both digital and analog. Name a system that is entirely digital.

3. What function does a microprocessor perform in a computer?

4. What are the three basic operations that a microprocessor performs?

5. What is the fastest method of analog-to-digital conversion?

6. Name two types of output errors in an ADC.

7. What does quantization mean?

8. What determines the accuracy of the quantization process?

Problem 2 (41 Degrees)

41

1. What are the four basic elements in a microprocessor?

2. What are the three types of buses in a microprocessor?

3. Name the basic elements of a microprocessor.

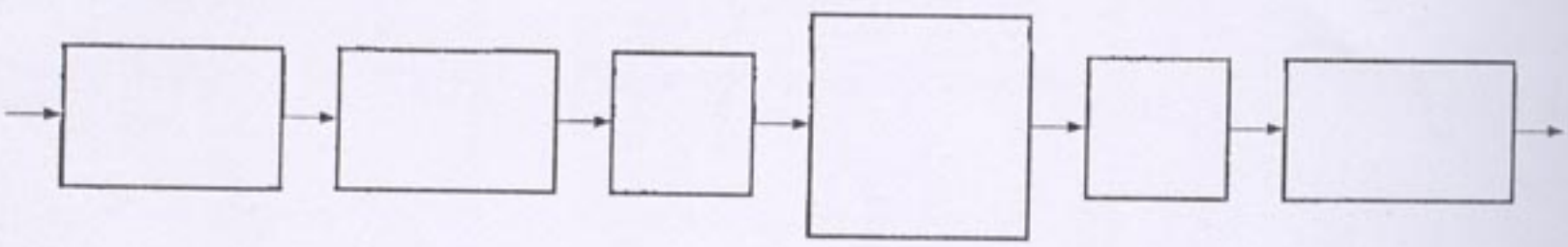
4. Name two advantages of digital data as compared to analog data.

5. Name an analog quantity other than temperature and sound.

6. What does ADC stand for?

7. What does DAC stand for?

8. Fill in the appropriate functional names for the digital signal processing system block diagram



Problem 3 (41 Degrees)

41

1. List three operations that a microprocessor performs.

2. List the three microprocessor buses.

3. What are the seven basic groups of the Pentium instruction set?

4. An analog signal is changed to a binary coded form by what circuit?

5. A binary coded signal is changed to analog form by what circuit?

6. What does sampling mean?

7. Why must you hold a sampled value?

8. If the highest frequency component in an analog signal is 20 kHz, what is the minimum sample frequency?

Problem 4 (41 Degrees)

41

Circle the right answer.

1. A quantity having continuous values is

(a) a digital quantity (b) an analog quantity

(c) a binary quantity (d) a natural quantity

2. The term bit means

(a) a small amount of data (b) a 1 or a 0 (c) binary digit (d) both (b) and (c)

3. A basic computer does not include

(a) an arithmetic logic unit (b) a control unit (c) peripheral units (d) a memory unit

4. A 20-bit address bus supports

(a) 100,000 memory addresses (b) 1,048,576 memory addresses

(c) 2.097.152 memory addresses (d) 20.000 memory addresses

5. The number of bits on the data bus in the Pentium processors is

(a) 16 (b) 24 (c) 32 (d) 64

6. An example of a peripheral unit is

(a) the address register (b) the MPU (c) the video monitor (d) the interface adapter

7. A DAC is a

(a) digital-to-analog computer (b) digital analysis calculator

(c) data accumulation converter (d) digital-to-analog converter

8. A digital signal processing system usually operates in

(a) real time (b) imaginary time (c) compressed time (d) computer time

9. According to the sampling theorem, the sampling frequency should be

(a) less than half the highest signal frequency

(b) greater than twice the highest signal frequency

(c) less than half the lowest signal frequency

(d) greater than the lowest signal frequency

10. Generally, an analog signal can be reconstructed more accurately with

(a) more quantization levels (b) fewer quantization levels

(c) a higher sampling frequency (d) a lower sampling frequency (e) (a) or (c)

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

جامعة اسيوط
كلية العلوم
قسم الفزياء

الفرقة الثالثة فيزياء تخلفات
يونيو 2008
الزمن ساعتان

302 ف مبادئ ميكانيكا الكم

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

1. Solve the schrödinger equation for a particle moving in an infinite deep linear potential well to obtain eigen values and eigen functions of the particle .

2. Obtain the wave equation for a linear harmonic oscillator and solve it to find the eigen functions and eigen values .

3. Explain the properties of operators used in quantum mechanics and show that the total energy operator is hermitian .

4. For two commuting operators show that they have the same wave function and that their associated observables can be simultaneously measured .

5. a) Find the expectation values of x , x^2 , p , p^2 , and E for a linear harmonic oscillator in its ground state .

b) For the three operators A , B and C , Show that their commutators satisfy the relation :

$[AB, C] = A[B, C] + [A, C]B$.

انتهت الاسئلة

Electron Optics Final Exam.

Physics Dept
Faculty of science
Assiut University

3rd Year (Phys. & chem.)
Date: 7/6/2008
Time: 2hr.

Answer four only of the following questions only, 20 degree for each:

1-(a)- Write on : 1-Electrostatic lens 2- Magnetic lenses
(b)-Discuss the advantages and disadvantages of electron lenses.

2-(a)-Give a detail description of electron objective lens aberrations.
(b)-An electron passes through a potential difference of (V) volts. Find the relation between the electron wavelength and the applied potential.

3-(a)- Find an expression for the objective focal length and focal distance of Bell-shaped field.
(b)- What are the kind of distortion in projector lens of electron microscope, Explain in detail.

4- Write a short account on:
(a)- Electron emission (b)- Magnification limits.
(c)- Field emission gun (d)- Scanning electron microscope.

5- (a)- Discuss the development of electron microscope.
(b)- What are the similarity and deference between light and electron microscope.

(Good Luck)

كلية العلوم قسم الرياضيات	امتحان نهائي دور مايو ٢٠٠٨م أسم المقرر : رياضيات محدوده رقم المقرر : ٤٠٣ ر الفرقة : الثالثة	تاريخ الامتحان : ٢١/٥/٢٠٠٨ الزمن : ثلاث ساعات

أجب عن خمسة أسئلة فقط مما يأتى :-

١- أ) إذا كانت α, β, γ هما جذور المعادلة $x^3 + 3px + q = 0$ أوجد قيمة

$$\begin{vmatrix} 1 & 1 & 1 \\ \alpha & \beta & \gamma \\ \alpha^2 & \beta^2 & \gamma^2 \end{vmatrix}^2$$

بدلالة p, q .

(١٦ درجة)

ب) القراءات الآتية تحقق تقريباً العلاقة $x = a + \frac{b}{y}$ أوجد قيماً مناسباً للمقدارين a, b

إذا كان

x	4	5	6	7	8
y	60.1	49.5	42.4	36.8	32.1

(١٦ درجة)

٢- أ) باستخدام الفروق الصاعدة أوجد قيمة $u(0.72), u'(0.7)$ من الجدول التالي

x	0.1	0.2	0.3	0.4	0.5	0.6	0.7
u(x)	0	8	54	198	500	1080	2058

(١٦ درجة)

ب) أوجد المعادلة التي تنقص جذورها بمقدار k عن جذور المعادلة

$x^3 - 3x^2 - 9x + 5 = 0$. ثم أوجد قيمة k بحيث يكون في المعادلة المحولة حاصل ضرب الجذور يساوي 6 .

(١٦ درجة)

3- Write true or false then explain your answer :

(i) Any Boolean algebra is a chain . (8 marks)

(ii) Any chain is a Boolean algebra . (8 marks)

(iii) If P is a finite poset and $O \in P$ and $x \vee y \in P \ \forall \ x, y \in P$ then P is a lattice contains the universal element . (8 marks)

(iv) In a Boolean algebra $x' = y' \Leftrightarrow (x' \vee y) \wedge (x \vee y') = I$.

(8 marks)

4- a) Prove that any metric lattice is distributive iff

$v(x \vee y \vee z) - v(x \wedge y \wedge z) = v(x) + v(y) + v(z) - v(x \wedge y) - v(x \wedge z) - v(y \wedge$

(16 marks)

أنظر بقية الأسئلة خلف الورقة ،،،

Let L be a modular lattice prove that :

(i) $[(x \wedge y) \vee (x \wedge z)] \wedge [(x \wedge y) \vee (y \wedge z)] = x \wedge y$. (8 marks)

(ii) $x \wedge (y \vee z) = (x \wedge y) \vee (x \wedge z)$ and $x \vee (y \wedge z) = (x \vee y) \wedge (x \vee z)$

Provided that (a) $x \leq z$. (b) $y \leq z$. (8 marks)

(i) How many cycles in $K_{2,3}$.

(ii) Draw $K_{1,2,2}$ and find its diameter , its girth and its circumference . Is it a regular graph ?

(iii) If G_1 and G_2 are bipartite , is $G_1 \times G_2$ is bipartite ? explain .

(16 marks)

) (i) If G (p , q) is a tree , show that G is connected and $p = q + 1$

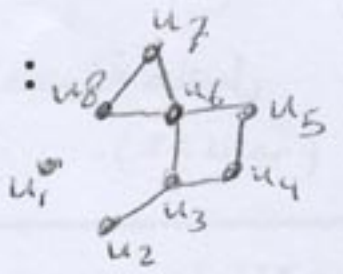
(ii) Is $P_4^4 \cong K_2[K_2]$? explain . (16 marks)

) (i) Construct a connected graph with at least one cut point , then show that $B(B(G)) \cong C(G)$.

(ii) Prove that if a graph G is not connected then $\overline{G}$ is connected . (16 marks)

) (i) In a graph G (p , q) , if G is not $K_3 \cup K_1$, $K_3 \cup K_2$, $p = q + 1$ and if any two nonadjacent points of G are joined by a line x hen G + x has exactly one cycle . Show that G is a tree .

(ii) Find the Block graph and the clique graph of :



(16 marks)

انتهت الأسئلة مع تمنياتي لك بالتوفيق ،،

لجنة الممتحنين : أ.د/ فتحي هشام خضر ، د/ نبيلة نصيف ميخائيل

كلية العلوم قسم الرياضيات	امتحان نهائي دور مايو ٢٠٠٨م	تاريخ الامتحان : ١٤ / ٦ / ٢٠٠٨م
	أسم المقرر : نظرية المرونة	
	رقم المقرر : ٣٢٤ ر الفرقة : الثالثة - رياضيات	الزمن : ثلاث ساعات

أجب عن خمسة أسئلة فقط مما يأتي :-

١- أ) استنتج علاقات الشروط السطحية لجسم مرن مجهد (١٦ درجة)

ب) إذا كانت مصفوفة الاجهادات عند نقطة في جسم مرن مجهد هي :

$$\begin{vmatrix} -8 & 6 & 10 \\ -4 & 20 & 6 \\ 10 & -4 & -8 \end{vmatrix}$$

ما هي مصفوفة الاجهادات لمجموعة الإحداثيات الناتجة عن المجموعة الأولي بدوران قدرة 45° حول المحور ox ابتداء من المحور oy (١٦ درجة)

٢- أ) بين أن سطح الإجهاد هو معادلة من الدرجة الثانية (١٦ درجة)

ب) بفرض وجود مستوي أساسي لجسم مرن مجهد كيف يمكنك تعيين القيم الثلاث للاجهادات الأساسية (١٦ درجة)

٣- أ) استنتج مركبات الانفعال (١٦ درجة)

ب) استنتج شروط المطابقة لسانت - فينان (١٦ درجة)

٤- أ) أذكر أبعاد وحدات الإجهاد (٦ درجة)

ب) إذا كانت مركبات الانفعال عند نقطة (x, y, z) هي :

$$\varepsilon_x = ay \ , \ \varepsilon_y = by \ , \ \varepsilon_z = by \ , \ e_{xy} = e_{xz} = e_{yz} = 0$$

عين مركبات متجه الإزاحة $\overline{U}$ حيث a, b ثوابت (٢٦ درجة)

٥- أ) استنتج مركبات الإجهاد ببدلالة مركبات الانفعال ومن ثم استنتج قانون هوك الحجمي (١٦ درجة)

ب) إذا كانت مركبات الإجهاد عند نقطة في جسم مرن مجهد هي :

$$\delta_x = ky^2 \ , \ \delta_y = -x^2 \ , \ \delta_z = \tau_{xy} = \tau_{yz} = \tau_{zx} = 0$$

عين مركبات متجه الإزاحة $\overline{U}$ حيث k ثابت (١٦ درجة)

٦- أ) عند نقطة ما في جسم مرن مجهد وجد أن حالة الإجهاد هي :

$$\delta_x = \delta_y = \delta \ , \ \tau_{xy} = \tau \ , \ \delta_z = \tau_{xz} = \tau_{yz} = 0$$

عين سطح كوشي للإجهاد . (١٦ درجة)

ب) ما هي بديهيات المرونة المثالية . (١٦ درجة)

انتهت الأسئلة مع تمنياتي لك بالتوفيق ،،،،

لجنة الممتحنين : أ٠د/ محمود السيد البغدادي ، د/ حسين السيد حسن حماد

Answer Five Questions only from the following

1) Solve the following problem

Maximize $Z = 10x_1 + 11x_2$

Subject to $x_1 + 2x_2 \leq 150$, $3x_1 + 4x_2 \leq 200$, $6x_1 + x_2 \leq 175$

x_1 *and* x_2 *non − negative variables*

Using

a) **Graphical method** **(16 marks)**
b) **Algebraic method** **(16 marks)**

---

2) Use Branch and Bound method to solve the following problem

Maximize $Z = 3x_1 + 4x_2$

Subject to $2x_1 + x_2 \leq 6$, $2x_1 + 3x_2 \leq 9$, $x_2 \leq 1$

x_1 *and* x_2 *non − negative and integer variables* **(32 marks)**

---

3) Use the Simplex method to solve

Maximize $Z = 10x_1 + 8x_2$

Subject to $3x_1 + 5x_2 \leq 108$, $4x_1 + 2x_2 \leq 80$

$x_1 \geq 0, x_2 \geq 0$ **(32 marks)**

٤-(أ) متغير عشوائى ثلاثى متصل (X,Y,Z) دالة كثافته الإحتمالية المشتركة هى :

$f(x,y,z) = k(2x+y)e^{-z}$ $0 \leq x \leq 1$, $0 \leq y \leq 2$, $z \geq 0$, $f(x,y,z) = 0$ *elswhere.*

عين قيمة الثابت k ثم احسب الإحتمال $P(X \leq 0.5, 1 \leq Y \leq 2, Z \geq 2)$ (١٦)

(ب) أوجد الدالة الهامشية للمتغير الثنائى (X,Y) فى السؤال (٤-أ) ثم اوجد دالة التوزيع المناظرة له . (١٦)

٥-(أ) للمتغيرات العشوائية $X_1, X_2, \ldots X_n$ أوجد $V(\sum_i a_i X_i)$ حيث $a_1, a_2 \ldots a_n$ مقادير ثابتة . (١٦)

(ب) متغير عشوائى ثنائى منفصل (X,Y) منتظم التوزيع للقيم $y = 1,2,3$, $x = 0,1$ أوجد دالة التوزيع المناظرة وقيمة الإحتمال $P(X+Y<3)$ ثم احسب $E(Y|X=0)$ موضحا العلاقة بين المركبتين X ، Y (١٦)

٦-(أ) متغير عشوائى متعدد (X_1, X_2, X_3, X_4) يخضع للتوزيع فوق الهندسى المتعدد بالبارامترات

$N = 10, n = 4, m_1 = m_2 = 3, m_3 = m_4 = 2$ إحسب الإحتمالات الآتية : $P(X_1 = X_2)$, $P(X_1 = X_2 = X_3)$ (١٦)

(ب) أوجد دالة كثافة التحويل العشوائى $Y = X^2$ إذا علم أن دالة كثافة المتغير العشوائى X هى :

Assiut University
Faculty of Science
Dept . of Math .

Date : may 2008
time : 3 hours

Second Semester Final Examination

Subject : Course No : 306 Numerical Analysis
Students : 3 Year

Answer five questions only : -

1 – a) Obtain the following estimate for the absolute error in the Lagrange Interpolation formula :

$$|f(x) - L_n(x)| \le \frac{M_{n+1}}{(n+1)!} |\pi_{n+1}(x)| \quad \text{Where}$$

$$M_{n+1} = \max_{a \le x \le b} |f^{(n+1)}(x)| \quad \text{and}$$

$$\pi_{n+1}(x) = (x - x_0)(x - x_1) \ldots\ldots (x - x_n)$$

(20 Degree)

b) To what degree of accuracy can we calculate $3\sqrt{23}$ by means of Lagrange 's interpolation polynomial for the function $y = \sqrt[3]{x}$ if we choose: $x_0 = 1$, $x_1 = 8$ and $x_2 = 27$ (12 Degree)

---

2 – a) Define a Fixed point for a given function g , if $g \in C[a, b]$ for all $x \in [a, b]$, prove that g has a Fixed point $[a, b]$. If $g'(x)$ exists on (a, b) and there exists a positive constant $K < 1$ with $|g'(x)| < K$ for all $x \in (a, b)$ then prove that the Fixed Point in $[a, b]$ is unique . (20 Degree)

b) Find the root of $f(x) = x^2 + 2.1x - 1 = 0$ lying between (0 , 1) using Aitken's method taking $x_0 = 0.5$ (12 Degree)

3- Solve the following system :

$$x_1 + 0.2x_2 + 0.1x_3 = 1.7$$
$$0.4x_1 + x_2 - 0.2x_3 = 1.8$$
$$0.3x_1 - 0.2x_2 + x_3 = 2.9$$

by the method of iteration . Show that the process of iteration converges for the above system . What is the maximum error after applying 7 iterations ? (32 Degree)

P.T.O

Romberg integration for approximating $\int_0^1 f(x)\,dx$ gives

$T_0(1)=4$ and $T_1(1)=5$ find $f(\frac{1}{2})$ (16 Degree)

Solve the differential equation $y'=3x+y$, $y(0)=1$ from $x=o$ to $x=0.2$ by using Runge - Kutta method of order 4 $(h=0.1)$ (16 Degree)

---

a) Discuss the convergence of Simpson's method taking $f(x)=e^x$, $x_\circ=0$ and $x_n=x$ (16 Degree)

b) Determine the value of n and h required to approximate $\int_0^1 \frac{1}{x+3}\,dx$ to within 10^{-7} by using Trapezoidal rule. (16 Degree)

---

a) Find the degree of the polynomial interpolate the following data

x	-2	-1	0	1	2	3
f(x)	-3	2	1	0	5	22

(16 Degree)

Find $f(-1.5)$

b) If α and β are the roots of $x^2+ax+b=0$, show that the iteration $x_{n+1}=-\frac{ax_n+b}{x_n}$ will converge near $x=\alpha$ if $|\alpha|>|\beta|$ (16 Degree)

Good Luck

me of Examiners : 1- Dr . Aballa El - Safty
2- Prof. Dr . Salah El – Gendi

جامعة اسيوط – كلية العلوم
قسم الرياضيات
الفرقة: ثالثة فيزياء+فيزياء اليكترونيات

امتحان الفصل الدراسى الثانى عام ٢٠٠٧/٢٠٠٨
المادة: دوال خاصة
الزمن : ساعتين

اجب عن اربعة فقط من الاسئلة الاتية

1. Prove the following relations **(٢٠ درجة)**

i- $F(\frac{1}{2},1;\frac{3}{2};x^2)=\frac{1}{2x}\log\frac{1+x}{1-x}$

ii- $J_{-\frac{1}{2}}(x)=\sqrt{\frac{2}{\pi x}}\cos x$

iii- $L_n(x)={}_1F_1(-n;1;x)$

2- Complete and Prove the following: **(٢٠ درجة)**

i- $F(a,b;c;x)=(1-x)^{-a}\ldots..,\ when|\,x\,|<1,\left|\frac{x}{1-x}\right|<1$

ii- $\frac{d}{dx}(x^{-n}I_n(x)=\ldots..$

iii- $H_n(x)=(-1)^n\exp(x^2)D^n\ldots..,D=\frac{d}{dx}$

---

3. Prove that **(٢٠ درجة)**

i. $e^{-x}\ {}_1F_1(a;b;x)=\sum_{n=0}^{\infty}\frac{(b-a)_n}{(b)_n n!}(-x)^n$

ii. $2J_n'(x)=J_{n-1}(x)-J_{n+1}(x)$

iii. $P_n(x)=(-1)^n\ {}_2F_1(-n,n+1;1;\frac{1+x}{2})$

4- Correct and Prove the following: **(٢٠ درجة)**

i- $xL_n'(x)=nL_{n+1}(x)+nL_{n-1}(x)$

ii- $P_n(x)=\frac{(2n)!}{2^n(n!)^2}F(-\frac{n}{2},\frac{1-n}{2};\frac{1}{2}-n;x^{-2})$

انظر خلفه

iii- $H_{2n}(0) = \frac{n!}{(2n)!}, \quad H_{2n+1}(0) = 1$

5- Show that (٢٠ درجة)

i- $x(1-x)w'' + [c-(a+b+1)x]w' - abw = 0, w = F(a,b;c;x)$

ii- $\int_{-\infty}^{\infty} e^{-x^2} H_n(x) H_m(x) dx = 0, \quad m \neq n$

iii- $\Gamma(2x) = \frac{2^{2x-1}}{\sqrt{\pi}} \Gamma(x)\Gamma(x+\frac{1}{2})$

لجنة المتحنين : أ.د.كامل احمد محمد سيد

د. محمد صالح متولى

انتهت الاسئلة

Assiut University **Date: June, 14,2008**
Facuity of Science **Time: 3hours**
Depantment of Botany **Academic year :The third, Chemistry /Microbiolo**

Second Semester Final Examination

Course: Enzymes and Virology (302B)

Section (B) :Virology

Please Answer the Following Questions :-

1- (a) Are viral infections be resembled in animals and plants ?(10 Marks).

(b) Is it necessary, members of a virus complex to be similar serologically and in host range ?(6 Marhs) .

(c) Is really ,symbols of cryptogram are useful with abbreviated names of viruses?(10 Marks).

2- (a) Define three only: Gibbs concept – Viroids –Poly A-Endocellular cordons - Plasmalemmasomes (3 Marks /each).

(b) Explain dependent transmission of either persistent or semipersistent aphid — borne viruses(10 Marks).

(c) " Plant leaves are drastically and obviously affected by viral infections " Discuss how in 10 points (15 Marks).

3- (a) Give reason for three items only (3 Marks/each).
- virus infected plants may produce nothing .
- variability of virus symptoms.
- plant conditions to success transmission by contact.
- Apical meristem and inhibitors in controlling virus infections.

(b) Are there at least 4 kinds of virus - like symptoms but with other causes ? (6 Marks).

(c) Mention other components rather than nucleic acid and protein may found- in virus particle(7 Marks).

Good luck

Examiner: Prof Dr. Sameh .k.Hemida

Assiut University
Faculty of Science
Botany Department

Date: June, 14, 2008
Course: Enzymes and Virology (302B)
Time: 3 hours
Academic Year: 3rd Chemistery/Microbiology

Second Semester Final Examination
Section (A) Enzymes

Answer **three** questions **only** out of the following:

I) Define **six only** from the following terms: (27.5 Mark)
The active site, Turnover number, Motif, Inducible enzymes, K_m, Operon, Cofactors, Isoelectric point, suicide inhibitors.

II) Write briefly on **three only** out of the following: (27.5 Mark)

a) Competitive inhibition
b) Proenzyme and Bt
c) Temperature as a factor affecting enzymes
d) The general principles of enzymes classification and the meaning of EC four numbers

III) Choose the correct answer: (27.5 Mark)

1) In the noncompetitive inhibition inhibitors bind to .....
a) Enzyme b) Emzyme substrate complex c) a or b

2) Detection of protein by using antibodies is called ..... blot.
a) Southern Blot b) Western Blot c) Northern Blot

3) Free ribosomes translate a group of proteins those get their destination to the .....
a) secretory pathway b) chloroplast c) mitochondria D) b and c

4) In the second step in two dimensional gel electrophoresis the detected proteins appear as a .....
a) Spots b) Bands c) Smear

5) ..... is a cluster of genes grouped together they all needed to complete a task and controlled by single sequence of DNA.
a) Operator b) Operon c) Promoter

IV) Suppose that you are working in a medical diagnostic laboratory and you have received a sample that might be infected with a specific disease that results in the presence of a particular protein, now explain how you can check this sample, (keep in your consideration that you have the antibody for this protein). (27.5 Mark)

With best wishes *Dr. Mostafa Kouth*

" بسم الله الرحمن الرحيم "

Assiut University		June 2008
Faculty of Science	Quantum Mechanics	Third Year Phys.
Physics Department		Time : 2 hrs.

ANSWER ONLY FOUR QUESTIONS.

1 - Determine the energy levels and the corresponding eigenfunctions of a particle of mass (m) in a one-dimensional potential well of the form:-

$$V(x) = \begin{cases} 0 & for \quad -a < x < a \\ \infty & for \quad x \leq -a, x \geq a \end{cases}$$

2-Use the overlap integral to derive the uncertainty principle if

$$\psi(x) = e^{-x^2/2\Delta_x^2} \qquad [Hint: \int_{-\infty}^{\infty} e^{-\frac{1}{2}y^2} dy = 2.5488]$$

3- Consider a potential step $V(x) = \begin{cases} 0 & at \; x < 0 \\ V_0 & at \; x > 0 \end{cases}$

Show that for $E < V_0$ the relative probability for finding the particle in classically forbidden region, $x > 0$ is

$$\int_{U_R}(x) = \frac{4k_0^2}{k_0^2 + K^2} \exp.(-2Kx)$$

4 - Define the normalized annihilation and creation operators :-

$$\hat{\alpha} = \sqrt{\frac{\hbar\omega}{2}}\left(y + \frac{\partial}{\partial y}\right), \quad \hat{\alpha}^+ = \sqrt{\frac{\hbar\omega}{2}}\left(y - \frac{\partial}{\partial y}\right)$$

Use the creation operator to derive the eigenstate U_2 (y) for a harmonic oscillator and show that $[\hat{\alpha}, \hat{\alpha}^+] = \hbar\omega$

$$[Hint: \; U_0(y) = A \exp.(-y^2/2)]$$

5- Prove that if there are two solutions of $\hat{H}\psi = E\psi$ for different values of energy E, E' then:

$$\int_{-\infty}^{\infty} \psi^*(r, E)\, \psi(r, E')\, d\tau = 0$$

Good Luck

" بسم الله الرحمن الرحيم "

Assiut University		June 2008
Faculty of Science Physics Department	Quantum Mechanics	Third Year Phys. Time : 2 hrs.

ANSWER ONLY FOUR QUESTIONS.

1 - Determine the energy levels and the corresponding eigenfunctions of a particle of mass (m) in a one-dimensional potential well of the form:-

$$V(x)=\begin{cases}0 & for \quad -a<x<a\\ \infty & for \quad x\le -a,\ x\ge a\end{cases}$$

2-Use the overlap integral to derive the uncertainty principle if

$$\psi(x)=e^{-x^2/2\Delta_x^2} \qquad \left[Hint:\int_{-\infty}^{\infty} e^{-\frac{1}{2}y^2}dy=2.5488\right]$$

3- Consider a potential step $V(x)=\begin{cases}0 & at\ x<0\\ V_0 & at\ x>0\end{cases}$

Show that for $E<V_0$ the relative probability for finding the particle in classically forbidden region, $x>0$ is

$$\int_{U_R}(x)=\frac{4k_0^2}{k_0^2+K^2}\exp.(-2Kx)$$

4 - Define the normalized annihilation and creation operators:-

$$\hat{a}=\sqrt{\frac{\hbar\omega}{2}}\left(y+\frac{\partial}{\partial y}\right),\quad \hat{a}^{+}=\sqrt{\frac{\hbar\omega}{2}}\left(y-\frac{\partial}{\partial y}\right)$$

Use the creation operator to derive the eigenstate $U_2(y)$ for a harmonic oscillator and show that $[\hat{a},\hat{a}^{+}]=\hbar\omega$

$$[Hint:\ U_0(y)=A\exp.(-y^2/2)]$$

5- Prove that if there are two solutions of $\hat{H}\psi=E\psi$ for different values of energy E, E' then:

$$\int_{-\infty}^{\infty}\psi^{*}(r,E)\,\psi(r,E')\,d\tau=0$$

Good Luck

جامعة اسيوط
كلية العلوم
قسم الفزياء

الفرقة الثالثة فيزياء تخلفات
يونيو 2008
الزمن ساعتان

302 ف مبادئ ميكانيكا الكم

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

1. Solve the schrödinger equation for a particle moving in an infinite deep linear potential well to obtain eigen values and eigen functions of the particle .

2. Obtain the wave equation for a linear harmonic oscillator and solve it to find the eigen functions and eigen values .

3. Explain the properties of operators used in quantum mechanics and show that the total energy operator is hermitian .

4. For two commuting operators show that they have the same wave function and that their associated observables can be simultaneously measured .

5. a) Find the expectation values of x , x^2 , p , p^2 , and E for a linear harmonic oscillator in its ground state .

b) For the three operators A , B and C , Show that their commutators satisfy the relation :

$[AB, C] = A[B, C] + [A, C]B$.

انتهت الاسئلة

قسم علم الحيوان
كلية العلوم – جامعة أسيوط
امتحان الفصل الدراسي الثاني ٢٠٠٧/٢٠٠٨

المادة:خلية وأنسجة وتقنية مجهرية(٣٠٢ ش)
الفرقة:الثالثة علوم شعبة الحشرات
الزمن: ثلاث ساعات

الاجابة فى ثلاث صفحات

Part I: Cytology and Histochemistry

Answer two questions only:

1- Write short notes on: (45 marks)

a- Some applications of histochemistry and cytochemistry. (15 marks)

b- Smooth endoplasmic reticulum. (15 marks)

c- Classification and identification of mucopolysaccharides. (15 marks)

2- Give an account on: (45 marks)

a- Requirements of chemical nature for a histochemical method. (15 marks)

b- Mitochondria. (15 marks)

c- Physical methods for identification of lipid. (15 marks)

3- Write on: (45 marks)

a- Immunocytochemistry. (15 marks)

b- Golgi complex. (15 marks)

c- Cytoplasmic pigments. (15 marks)

Part II: Microtechnique

I- Answer the following question:

A- Choose ONE correct answer for each question of the following: **(20 marks)**

1- To deal with extremely friable tissue, you must impregnate tissue in:

a- Paraffin wax **b- Nitrocellulose.**
c- Gelatin. **d- Water-soluble wax.**

2- Formaldehyde and glutaraldhyde can be used alone as fixatives.

a- True. **b- False.**

3-. Osmium tetroxide as a fixative might be stored in cool and dark places.

a- True. **b- False.**

4- The excellent f(45 marks)ixative for mucin is:

a- Mercuric chloride **b- Osmium tetroxide** **c- Cromium trioxide**

5- You want to cut 4 µm histological sections thus you will choose [(60-68°C) - (50-52°C) - (56-58°C)] paraffin wax for impregnation.

6- The best light microscope that has:
a- Higher magnification power with higher limit of resolution.
b- Higher magnification power with lower limit of resolution.
c- Lower magnification power with higher limit of resolution.
d- Lower magnification power with lower limit of resolution.

7- When you are doing clearing an insect hind gut it is better to use:
a- Xylene. b- Benzene. c- Terpinol. d- Aniline.

8- In Electrophoretic sizing of proteins, β-mercaptoethanol is used to uniform the polypeptide negative charge.
a- True b- False.

9- Transferring proteins from a polyacrylamide gel to a membrane is called:
a- Western Blotting b- Southern Blotting. c- Northern Blotting

10- For large whole mount preparations you can use cover slides with a thickness of:
a- About 0.15 mm. b- About 0.2 mm. c- About 0.30- 0.35 mm.

B- Choose TWO correct answers for each question of the following: (20 marks)

1- To separate macromolecules according to their charge you can use:
a- Ion exchange chromatography. b- SDS-PAGE.
c- Affinity chromatography. d- Isoelectric focusing.

2- Glacial acetic acid is an important component of many fixing solutions because:
a- It is the best choice in fixing Golgi complex and mitochondria.
b- It penetrates rapidly, thus has efficient fixing action on the nucleus.
c- It does not harden the tissue.
d- It allows cell parts to be selectively and clearly visible.

3- While you do sectioning, sections fail to form ribbons, this is due to:
a- Decreasing tilt of the knife, so increase tilt of knife.
b- Increasing tilt of the knife, so decrease tilt of knife and clean the edge.
c- Paraffin is too soft, re-embed in harder paraffin.
d- You are using harder paraffin than you should use, so use softer paraffin.

4- In ion exchange chromatography, molecules are bound to ion exchange column at:
a- Low ionic strength.
b- Low pH of the mobile phase (pH 2.7).
c- pH that maximizes their charge.
d- High ionic strength.

5- Isopropyl alcohol is the best substitution for ethyl alcohol in dehydration, Except for:
a- Most dyes aren't soluble in it, thus can't be used during staining process.
b- It causes difficulties in subsequent impregnation in paraffin.
c- It produces tissue shrinkage more than any other alcohol.
d- It can't be used with tissues that will be embedded in nitrocellulose.

II- Answer *TWO* questions only of the following:

1- Explain with illustrative diagram the separation of polypeptides by gel electrophoresis according to their molecular mass. (25 marks)

2- Explain with illustrative diagram the thin-layer chromatography as a method for separation of biological molecules. (25 marks)

3-In a table, show the advantages and disadvantages of the following chemicals as fixatives:
Mercuric chloride – Picric acid – Potassium dichromate. (25 marks)

Best wishes, Good Luck ,,,,,,

Assiut University
Department of Zoology
Course no. (304)

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

Economic insects and insects as transmitter of plant diseases

---

Economic insects

Answer the following questions:

1-Write short notes on Two only of the following: (45 degrees)

a- Damage caused by the infestation with stored product insects.

b- Define five only: Economic threshold – Economic injury level-plant host range – trapcrops – leafminers – insect pheromones – integrated control.

c- Write on the relationship between insect mouthparts and their plant damage.

2- Discuss two only of the following (45 degrees)

a- Healthy methods for the storage of grains and legumes.

b- Insect biochemical adaptation to plant chemical defense.

c- Methods for the assessment of the levels of infestation with stored product insect.

3-Write on Two only of the following: (45 degerrs)

a- Factors enhancing the spread of insects within stores products.

b-Applied control otherthan pestcides.

c-When a pest can be controlled.?

نقل الحشرات لأمراض النبات

١ــ السؤال الأول : أكتب بإيجاز في ثلاثة مما يأتي:ــ (٤٥ درجة)

١ــ الرتب الحشرية الناقلة للأمراض الفيروسية. ٢ــ الحموضة.

٣ــ الورم النباتي. ٤ــ مرض احتراق أوراق البطاطس بواسطة نطاط الأوراق.

٥ــ وسائل أنتشار الفيروسات.

٢ــ السؤال الثاني: تكلم بأختصار في ثلاثة مما يأتي:ــ (٤٥ درجة)

١ــ المنافع الغذائية التي تعود علي الحشرات في المعاشرة.

٢ــ أحداث المرض النباتي بطريقة مباشرة مع التمثيل .

٣ــ مرض اللفحة النارية في الفواكه.

٤ــ قارن بين الأمراض التي تحدثها الحشرات المولدة للسموم والأمراض الفيروسية.

إنتهت الأسئلة مع تمنياتنا بالنجاح والتوفيق

د/ سيمحه جادالله عزب

د/ مصطفي حلمي شافع

Faculty of Science
Botany Department
Chemistry & Botany

Fungi & Industrial Microbiology
May 2008 - Three Hours
Third Year

Section I : Fungi (82.5 marks)

Answer the following questions

1- Discuss three only of the following :- (41.25 marks).

a) Types of life cycle in yeasts.
b) The different genera of family Mucoraceae.
c) Dimorphism and zoosporangial proliferation in *Saprolegnia.*
d) Types of mycelium in Basidiomycotina.

2- Explain three only of the following :- (41.25 marks).

a) Different types of oospores with regard to ooplast in Saprolegniaceae.
b) Indirect development of ascus .
c) The differentiation between the different genera causing powdery mildew diseases.
d) Successive stages in the development of a holobasidium.

Prof. Dr.: M. M. K. Bagy

Section II : Industrial Microbiology (82.5 marks)

Answer the following questions

1- Give an account of THREE ONLY of the following: (41.25 marks)

a) The different types of baker's yeast with a description of the production of fresh baker's yeast from molasses ?
b) Production of hormones (Steroid Transformation) on large scale by submerged culture ; with explains the medicinal importance of the formed products?
c) Economic importance and uses of citric acid; equations which showing the mechanism and metabolic pathway production occurs by fermentation?
d) Give the advantages and disadvantage of the different type of fermentation process ?

2- Write about THREE ONLY of the following: (41.25 marks)

a) General methods for production of antibiotics and their classification according to their mode of action .
b) Bio-production of ethanol .
c) Factors affecting vinegar production and their quality?
d) Different kinds of bioreactors and their characters.

Good Luck

Assistant Prof. Dr: Eman M. M.

ية العـــلوم الرياضيات	امتحان نهائي دور مايو ٢٠٠٨م أسم المقرر : إحصاء حيوي رقم المقرر : ٣٣٠ر الفرقـــــة : الثالثة علوم بيولوجي	تاريخ الامتحان : ٢٠٠٨/٦/١٨م الزمن : ساعتان

ب عن أربعة أسئلة فقط مما يأتي :-

سؤال الأول ٢٠ درجة(كل فقرة ١٠ درجات): إذا كان عدد البكتريا y في وحدة الحجوم في
رعة للبكتريا بعد x من الساعات مبينا في الجدول التالي:

x	1	2	3	4	5
y	10	14	17	20	22

وفق علاقة على الصورة $y = \alpha\, x^{\beta}$ لتقريب هذه البيانات .
) أوجد معامل الارتباط غير الخطي r ، وكذلك النسبة المئوية للتغير المفسر للانحدار .

سؤال الثاني ٢٠ درجة(كل فقرة ١٠ درجات): أ) قذفت زهرة نرد متزنة مرتان متتاليتان ،
كان الحادث A يمثل الحصول على الرقم 2 في المرة الأولى ، والحادث B يمثل الحصول على
رقم 4 في المرة الثانية . وضح ما إذا كان الحادثان A, B مستقلان أم لا .
) إذا كان توزيع الدرجات X في مادة معينة يتبع التوزيع الطبيعي بمتوسط 72 درجة ، وانحراف
عياري 8 درجات .
لا : أوجد الدرجة التي يحصل 20% من الطلاب على درجة أكبر منها .
نيا : إذا أخذنا عينة من 100 طالب فما احتمال أن يكون متوسط درجاتهم أقل من 73 درجة .

سؤال الثالث ٢٠ درجة(كل فقرة ١٠ درجات): أ) إذا علم أن أحد مصانع الأغذية المعلبة ينتج
لبا فاسدة باحتمال قدره 0.01 ، وأخذت عينة عشوائية من 30 علبة من إنتاج هذا المصنع . أوجد
لا : احتمال أن يوجد من بينها 5 علب فاسدة .
نيا : احتمال أن يكون عدد العلب الفاسدة أقل من 3 .

) أخذت عينة من 400 نخلة ولقحت بطريقة جديدة ، فكان عدد أشجار النخيل التي تم تلقيحها
جاح هو 300 شجرة . أوجد 95% فترة ثقة لتقدير نسبة التلقيح الناجح p .

باقي الأســـــئلة في الخلف

السؤال الرابع ٢٠ درجة (كل فقرة ١٠ درجات):أ) في تجربة لمقارنة تآكل نوعين من المواد
أخذت عينتان الأولى مؤلفة من 12 قطعة من المادة الأولى والثانية مؤلفة من 10 قطع من الما
الثانية . وتم قياس التآكل لمادة كلا من العينتين ، ووجد أن متوسط تآكل مادة العينة الأولى 85 وح
، وانحرافها المعياري 4 وأن متوسط تآكل مادة العينة الثانية 81 وحدة وانحرافها المعياري 5
فهل هناك فرق في متوسط التآكل لمجتمعي المادتين ، عند مستوى معنوية $\alpha = 0.10$.

ب) سحبت ثلاثة كروت من مجموعة أوراق اللعب المكونة من 52 كرت ومخلوطة جيدا . احسب
احتمال أن تكون الكروت الثلاثة تحمل الرقم 5 . اعتبر حالتي السحب بالإرجاع وبدون إرجاع .

السؤال الخامس ٢٠ درجة (كل فقرة ١٠ درجات):أ) إذا كان X متغير عشوائي يمثل عد
الأولاد في العائلات المكونة من 4 أطفال . كون جدول التوزيع الاحتمالي للمتغير X . وكذلك أوج
متوسط وتباين التوزيع .

ب) إذا كان عمر نوع من البطاريات يخضع للتوزيع الطبيعي بانحراف معياري مقداره واحد سنة
وأخذنا عينة حجمها 10 بطاريات من هذا النوع . فأوجد :
أولا : احتمال أن يزيد تباين العينة عن سنتين.
ثانيا : احتمال أن يكون تباين العينة بين سنتين وثلاث سنوات .

استخدم ما يلزم من القيم التالية:

$$P(0 < z < 1.25) = 0.394,\ P(0 < z < 0.84) = 0.30,\ Z_{0.975} = 1.96$$

$$Z_{0.95} = 1.65,\ \chi^2[0.975; 9] = 18, \chi^2[0.995; 9] = 27,\ T[0.95; 20]$$

انتهى مع تمنياتنا لك بالتوفيق

لجنة الممتحنين: أ. د / هانم محمد مصطفى
د/ صابرين جاد الحق

كلية العلوم - قسم النبات

3 rd year Chemist.Microbiol.
Second Semester,June 2008
Time allowed 3 hours

332 B Ecology of Algae & Physiology of Algae

Section A : Ecology of Algae

Answer TWO only of the following questions: (41.25 marks)

Give short notes on 7 only of the following terms

1- Phytoplankton buoyancy
2- Estuarine
3- Neuston
4- Secchi disk
5- Algal-animal symbiosis
6- Saprophytism in algae
7- Kryoflora
8- Eutrophication
9- Parasitism in algae

(5.893 marks each)

II Answer and comment on TWO only of the following: (41.25 marks)

1- Methods available to concentrate phytoplankton. (13.75 marks)
2- Algae elevate the pH of bathing solution during photosynthesis accordingly promote precipitation, explain this status giving a schematic representation.(13.75marks)
3- Productivity and diversity are affected by factors such as light,temperature and grazing, discuss. (13.75 marks)

Section B : Physiology of Algae

Answer TWO only of the following questions :

1- Compare between each of the following:- (41.25 Marks)

a- Cyclic and non-cyclic photophosphorylation. (20.625 marks)
b- Krebs cycle and glyoxylate cycle (20.625 marks)

2- Write on each of the following:- (41.25 Marks)

a- Symbiotic nitrogen Fixation. (13.75 marks)
b- Respiratory chain. (13.75 marks)
c- Nitrate reductase enzyme (13.75 marks)

3- Follow the biosynthesis of each of the following : (41.25 Marks)

a- Fructose 1,6 diphosphate (13.75 marks)
b- Butyryl Co A (13.75 marks)
c- Amino acid alanine (13.75 marks)

	امتحان نهائي دور مايو ٢٠٠٨م	تاريخ الامتحان : ٢٠٠٨/٦/١٨م
العلوم	أسم المقرر : إحصاء عام	
م ضيات	رقم المقرر : ٣٣٢ر الفرقة : الثالثة جيولوجيا وكيمياء	الزمن : ساعتان

ن للطلاب الاستعانة بالقيم الجدولية الآتيـة

$t(0.975, 9) = 2.26$ - $f(0.99, 2, 12) = 6.93$ - $\chi^2(0.99, 4) = 7.78$ - $Z_{0.90} = 1.29$ -
$p(0 < z < 2.57) = 0.49$ $Z_{0.975} = 1.96$ - $p(0 < z < 2.83) = 0.497$ - $t(0.95, 9) = 1.8$

ب عن أربعة فقط مما يأتي :- :-

١ (أ) ما المقصود بكل مما يأتي (٦ درجات)

اء العينة - المتغير العشوائي - المجتمع الإحصائي - الفرضية الإحصائية - فرض العدم - اختبار من طرفين

(ب) في دراسة أجريت لأطباء المخ والأعصاب علي التبغ ومدي تأثيرة علي المخ من أصابات لإحتوائة ي مواد ضارة مثل النيكوتين والزرنيخ ، قام الفريق بأخذ عينة من المرضي من 500 (١٤ درجة)
فص لمعرفة ما إن كانت هناك علاقة بين نوع التبغ ودرجة الإصابة في المخ فكانت النتائج كالتالي :

نوع التبغ / درجة الإصابـة	A	B	C
بسيطـة	70	80	90
متوسطـة	60	60	40
شـديدة	30	30	40

لمطلوب معرفة ما إذا كان هناك دليل واضح علي وجود علاقة عند مستوي 1%

---

٢ (أ) يعتقد أحد المهندسين الزراعيين أن نوعاً مهجناً من النباتات أكثر مقاومة لأحد الأمراض من نوع آخر ولتأكد من هذا الأعتقاد قام بزراعة مائة نبات من كل من هذين النوعين وقام بتعداد النباتات المصابة في كل من النوعين فوجدها 52 , 46 نبات أختبر صحة هذا الأعتقاد عند مستوي معنوية 10%
(٨ درجات)

(ب) قام فريق من الجيولوجيين بعمل مسح جيولوجي عن كمية الهيدروجين المتواجدة في الغازات المقذوفة من بركان معين والجدول التالي يمثل البيانات التي تم جمعها في عامي 1995 ، 1996
لهذا الغرض والمطلوب معرفة ما إذا كان هناك فرق معنوي في تركيب الغازات المقذوفة من الإنفجارين عند مستوي معنوية 5% (١٢ درجة)

1995	35	45	32	50	39	37
1996	42	57	42	54	35	

---

٣ (أ) لمقارنة تأثير فاعلية نوعين A , B من المحاليل الكيميانية المضادة للبعوض استخدمت غرفتان من نفس الحجم تحتوي كل منها علي 500 بعوضة وعولجت إحدي الغرفتين بكمية من المحلول A وعولجت الآخري بنفس الكمية من المحلول B وقد وجد أن المحلول A قد أهلك 420
بعوضة في حين أهلك المحلول B 390 بعوضة والمطلوب تقدير فترة الثقة للفرق بين قدرتي المحلولين علي إبادة البعوض عند مستوي معنوية 5% . (١٢ درجة)

أنظر باقي الأسئلة خلف الورقـة ،،،،،،

ب) إذا كانت أوزان مجموعة من الأطفال المعاقين تتبع التوزيع الطبيعي بوسط حسابي 45 كجم وإنحراف معياري 7 كجم أخذت عينة من 36 طفلاً معاقاً بأحدي المستشفيات أوجد احتمال أن يكون متوسط أزانهم أقل من 42 كجم ٠ (٨ درجات)

س٤ (أ) أخترنا لقاحاً ضد الذكام وقد أعطي القاح لمئتي شخص تمت مراقبتهم بالنسبة لإصابتهم بالزكام لمد عام ، وقد نجا منهم 120 شخصاً من الإصابة ٠ فإذا غرضنا أن احتمال عدم الإصابة بالزكام بصورة طبيعية دون استخدام أي لقاح هي 0.5 ، فما هي النتيجة التي يمكن استخلاصها من هذ التجربة حول فعالية القاح ٠ (٨ درجات)

(ب) في دراسة لمعرفة متوسط الزمن لتخثر الدم من جراء تناول مشروب معين حيث قام أحد الباحثين بتسجيل الزمن (بالثواني) قبل وبعد تناول هذا المشروب علي عينة من 10 أشخاص فكانت كما يلي

قبل تناول المشروب	124	117	112	129	126	136	124	120	118	115
بعد تناول المشروب	80	90	55	86	61	99	91	88	106	78

والمطلوب معرفة تأثير هذا المشروب علي تخثر الدم عند مستوي معنوية 5% ٠ (١٢ درجة)

س٥ (أ) إذا كان مستوي التلوث في أحدي المدن الصناعية (طبقاً لمقياس معين) يخضع للتوزيع الطبيعي بمتوسط 49 ، فإذا استعملت طريقة جديدة لمكافحة التلوث علي مدار 10 أسابيع وسجلت النتائج التالية عن مستوي التلوث

مستوي التلوث : 48 - 44 - 45 - 43 - 45 - 50 - 49 - 41 - 53 - 40

فهل تعطي هذه النتائج الجديدة تغيراً مختلفاً عند مستوي 5% (١٠ درجات)

(ب) استخدمت ثلاث طرق تعليمية مختلفة لتعليم مجموعات متشابهة ولمعرفة أيها أفضل عمل امتحان نهائي للمجموعات وكانت درجات الامتحان النهائي كالتالي :-

A	49	48	46	45	48
B	48	40	49	47	49
C	40	46	47	42	44

أختبر إن كان هناك فرق معنوي بين الطرق المختلفة عند مستوي 1% (١٠ درجات)

انتهت الأسئلة مع تمنياتي لكم بالتوفيق

لجنة الممتحنين :- أ٠د/ خلف الضبع أحمد ، د/ هانم محمد مصطفي

Assiut University
Faculty of Science
Chemistry Department

Physical Chemistry 324 Ch
May 2008

Time 3hrs
Marks 210

Answer Four Questions from The Following:

(I) Write SEVEN equations ONLY from the following with the definitions of the content: (52. 5 marks) , each 7.5

a- Schrödinger wave equation in the Cartesian coordinates. 7.5
b- Schrödinger wave equation in the spherical coordinates. 7.5
c- Schrödinger wave equation of a rigid rotator. 7.5
d- Angular momentum operator in the Cartesian coordinates. 7.5
e- Translational Hamiltonian operator of tiny particles in 3-dimensions. 7.5
f- Eigenvalue of rotational motion of a rigid rotator. 7.5
g- Radial Eigenfunction. 7.5
h- Associated Legender function. 7.5
i- Spherical Eigenfunction of 2p orbital. 7.5

****

(II) Answer THREE Only from the following: (52. 5 marks)

a- Derive the Hamiltonian operator of a vibrating diatomic molecule in 3-dimensions. (17.5 marks)
b- Oxygen molecule absorbed a light quantum of wavelength λ 500 nm, calculate the De-Broglie associated wavelength with oxygen molecule comparing this wavelength with the average distance between the molecules at 27 °C. (17.5 marks)
c- What is the bond length of NO molecule which absorbs radar wave length 1.468 mm to be promoted between J=1 and J=2 rotational energy levels. (N=14, O=16) (17.5 marks)
d- Calculate the ionization potential energies of the 1s and 4s electrons in K (Z=19) if the effective nuclear charges of them are 18.7 and 2.2 respectively. - Derive the spherical eigenfunction of 4s orbitals. (17.5 marks)

****

$h = 6.626 \times 10^{-34}$ Js $N = 6.02 \times 10^{23}$ mol^{-1} $c = 3 \times 10^{8}$ cms^{-1}

$k = 1.38 \times 10^{-23}$ J K^{-1}

Prof Dr Anwar El-Shahawy

3) Third Question: Answer Only Three from the following: (52.5 Marks)

a) Discuss briefly the theoretical principles of molecular electronic spectra. (17.5 Marks)

b) Explain briefly the following: (17.5 Marks)

(i) The energy level of nuclei in magnetic field.

(ii) The rotation spectrum of linear molecule gives a set of absorption with approximately a constant spacing.

c) (i) What are the various applications of vibration spectra? (7.5 Marks)

(ii) The force constant for the HI molecule is 290 N m^{-1}, calculate the frequency of radiation for the transition from $\nu = 0$ to $\nu = 1$ and zero point energy. (10 Marks)

d) (i) Write short note on : Photoelectron spectroscopy. (7.5 Marks)

(ii) Taking HBr as an example where its bond length is 1.414 A°, prove that the molecules will be distributed throughout many of the lower allowed rotational level at 27°C . (10 Marks)

($h = 6.62 \times 10^{-34}$ JS , $k = 1.38 \times 10^{-23}$ J deg^{-1}, $N = 6.0 \times 10^{23}$, $C = 3.0 \times 10^{10}$ cmS^{-1}, atomic mass of hydrogen = 1.008, bromine = 79.909, iodine = 126.904).

4) Fourth Question : Answer the following: (52.5 Marks)

a) When a saturated calomel electrode is coupled with Pt sheet immersed in acid solution of quinine (0.1 N) – hydroquinone (0.01 N) mixture, gives 0.02 V. Calculate the pH value of the solution at 25°C. (17.5 Marks)

$E°_{Q/HQ} = 0.699$ V $\quad E°_{Hg/Hg_2Cl_2/Cl^-} = -0.24$ V

b) Discuss briefly Three Only from the following : (18 Marks)

(i) Glass electrode (ii) Origin of electrode potential

(iii) Chemical cells with transference .

(iv) The application of metal-metal oxide electrode for measurement of pH value.

c) Consider the following redox couples and the corresponding standard reduction potential : (17 Marks)

$Fe^{+3} + e \longrightarrow Fe^{+2}$ $\quad E° = 0.77$ V

$Pb^{+2} + 2e \longrightarrow Pb$ $\quad E° = -0.13$ V

$Cd^{+2} + 2e \longrightarrow Cd$ $\quad E° = -0.31$ V

Explain which of the following statements is true and why?

(i) Pb is a stronger oxidizing agent than Cd.

(ii) Fe^{+3} is a stronger reducing agent than Cd^{+2}.

(iii) Cd is a stronger reducing agent than Pb .

(iv) Pb^{+2} is a stronger oxidizing agent than Fe^{+3}.

(v) Pb^{+2} spontaneously reacts with Fe^{+2} .

Good Luck

بسم الله الرحمن الرحيم

Assiut University **Faculty of Science** **Physics Department**	**Term** : Second Term May 2008 **Branch**: (Chm/Phys +Phys/Elc +Phys) **Subject**: Introduction to Solid State **Physics (Phys 312)** **Date** : 11 / 6 / 2008 **Time** : 2 Hours (9 – 11 am) **Examiner** : ***Prof. Dr. Amer El-Korashy***

(Note: You have a Bonus questions in the end of Exam questions)

PART (I)
Answer the following questions

(i) Mark the following sentences with (√) or (×) and give a reason why? (15 points)

1- A solid is said to be a crystal, if the atoms are arranged exactly periodic and the distances between all atoms are the same. [ ]

.....

.....

.....

2- At T > 0 K one can have perfect real crystal. [ ]

.....

.....

.....

3- In the Non Bravais lattice, lattice points are not equivalent. [ ]

.....

.....

.....

4- The choice of unit cell is unique, while the choice of basis vectors is not unique [ ]

.....

.....

.....

5- We can not construct a two dimensional lattice whose unite cell is a regular pentagon. [ ]

.....

.....

.....

6- The unit cell for all simple and non simple lattices is non primitive. [ ]

.....

.....

.....

7- There is no rotational axis of rank greater than n = 6. [ ]

.....

.....

.....

8- There are 32 different point groups and 72 different space groups. [ ]

.....

.....

.....

9- In the cubic Cell the six nonparallel directions denoted as [100]. [ ]

.....

.....

.....

10- The metallic bond is weaker than ionic and covalent ones. [ ]

.....

.....

.....

==========

(ii) Chose the correct answer: (10 points)

1- In the body-centered cubic (bcc) number of atoms per unit cell is:

(a) 2 (b) 1 (c) 3 (d) 4

2- The Packing Fraction for simple cubic is:

(a) $4\pi r^3/3a^3$ (b) $2\pi r^3/3a^3$ (c) $2\pi^2 r^3/3a^3$ (d) $4\pi r^2/3a^2$

3- X-rays are Electro magnetic waves with a wavelength λ :

(a) Greater than 1 A^o (b) Equal to 10 A^o (c) In the range of 100 - 200 A^o
(d) Equal to 10^{-10} m.

4- According to Bragg's Law the diffraction is possible only for :

(a) $\lambda = 2d$ (b) $\lambda > 2d$ (c) $\lambda = d$ (c) $\lambda < 2d$

5- The rotating – crystal method is used to determine:

(a) Unit cell of the crystal. (b) The inter-planar spacing *d* of the crystal.
(c) Only the morphology of the crystal. (d) None of these.

6- The wavelength λ of Elastic wave propagate inside the solid:

(a) less than the lattice parameters. (b) greater than the lattice parameters.
(c) Much greater than the lattice parameters.
(d) Have no dependence on lattice parameters.

7- The classical model predicts a constant value of the specific heat for all solids as:

(a) $C_v = KT$ (b) $C_v = 3KT$ (c) $C_v \approx 3RT$ (d) $C_v \approx 3R$

8- The dispersion relation is a sinusoid, in q space, with a period equal to:

(a) $4\pi / a$ (b) π / a (c) $2\pi / a$ (d) $\pm \pi / a$

9- The forbidden gap is the space:

(a) Between the top of acoustic branch and the bottom of optical branch
(b) In the top of optical branch
(c) In the bottom of acoustic branch
(d) At $q = 2\pi$

10- Physically Debye temperature θ_D could be defined as:

(a) Depends on the elastic constant Y and atomic mass M
(b) Depends on the lattice constants a, b and c.
(c) Depends on the velocity of light c.
(d) Depends on the KT value only.

==========

(iii) Give a physical expression of the following sentences: (10 points)

1-An atom near the surface of solid have less neighbors atoms than these deep inside.

.....

2- The position vector R of any point in the lattice.

.....

3- All cubic faces

.....

4- The fraction of the total volume of the unit cell that is occupied by atoms

.....

5- A method used to study polycrystalline materials

.....

==========

(iv) <u>Defined</u> and state formula for the following physical expressions (10 points)

1- Density of states of a lattice g(ω)

***Definition*:**

.....

.....

***Formula*:**

.....

.....

2- Elastic waves:

Definition:

.....

.....

Number of phonons of a mode ($\bar{n}$):

.....

.....

.....

3- Cutoff frequency ω_D (in Debye model)

Definition:

.....

.....

Formula:

.....

.....

4- Inter-atomic force F(R)

Definition:

.....

.....

Formula:

.....

.....

.....

5- Density fraction of unit cell

Definition:

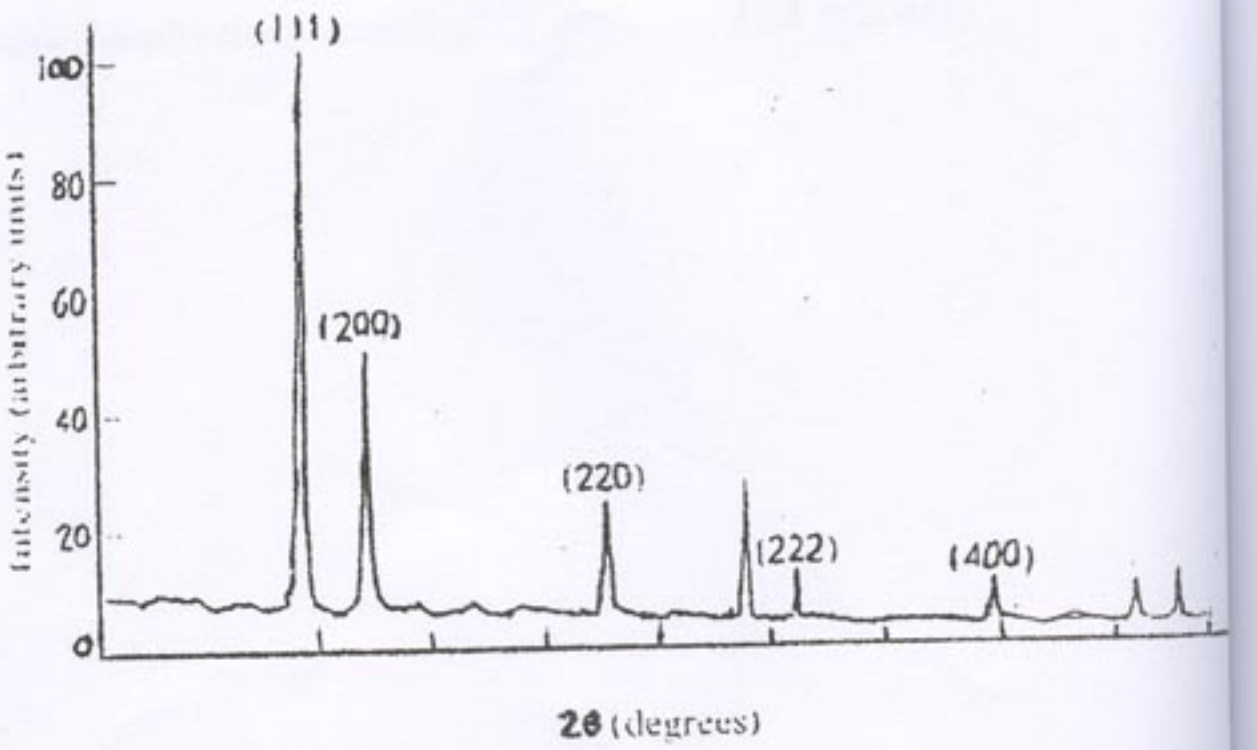
.....

Formula:

.....

(17 points)

(vi) Calculate the diffraction angles (2θ) for the reflections indicated in XRD pattern of Aluminum shown in the Figure.
Al is an fcc metal of lattice constant a = 4.04 A° and CuK_α radiation wavelength λ = 1.542 A°



PART (II)
Answer the following questions

Q(1) Using Einstein model, found an expression for specific heat C_v for solids at low temperature. **(20 points)**

Q(2) For the one – dimensional diatomic lattice (with two atoms of mass M_1 and M_2) and lattice constant 2a, calculate the two possible dispersion relations and then draw and discuss the physical meaning? **(22 points)**

Bonus questions: (Its extra general and basic questions you have more points if you simply answer) (2 point each)

1- What is the physical meaning of π ?

.....

.....

.....

.....

2- If Debye's temperature of metal is 450 K , what is Debye's frequency?

.....

.....

.....

.....

3- Compare between the time needed to heat a mass of Sand and the same mass of water.

.....

.....

.....

.....

4- What simply the reasons which causes Ozone hole?

.....

.....

.....

.....

5- When does rainbow appear?

.....

.....

.....

.....

6- Which color of rainbow has the lowest frequency?

.....

.....

.....

.....

Assiut University
Faculty of Science
Chemistry Department

تخلفات

May 2008

Time : 3 hrs.

Physical Chemistry Examination for Third Year Students (Special Group C 322)

Answer the following questions:

1) First Question : (52.5 Marks)

a) Write the cell reaction and calculate the cell potential for the following cell at 25°C : (17.5 Marks)

$$I_2 / I^-_{(0.1\ N)} \ // \ Fe^{+3}_{(0.01\ N)} \ , \ Fe^{+2}_{(0.1\ N)} / Pt$$

Where

$$E^\circ_{I_2/I^-} = 0.533\ V \qquad E^\circ_{Fe^{+3}/Fe^{+2}} = 0.77\ V$$

b) What is the concept of reversible cells? Give an example and write the cell reaction. (17 Marks)

c) Discuss briefly two only from the following: (18 Marks)

(i) Application of quinine-hydroquinone electrode for pH measurement.
(ii) Origin of electrode potential .
(iii) Concentration cells with junction potential .

2) Second Question : Answer Only Three from the following : (61.25 Marks)

a) Discuss briefly the theoretical principles of molecular electronic spectra. (20.5 Marks)

b) Explain briefly the following: (20.5 Marks)

(i) The energy level of nuclei in magnetic field.
(ii) The rotation spectrum of linear molecule gives a set of absorption with approximately a constant spacing.

c) (i) What are the various applications of vibration spectra? (8 Marks)

(ii) The force constant for the HI molecule is 290 N m^{-1}, calculate the frequency of radiation for the transition from $\nu = 0$ to $\nu = 1$ and zero point energy. (12.5 Marks)

d) (i) Write short note on : Photoelectron spectroscopy. (8 Marks)

(ii) Taking HBr as an example where its bond length is 1.414 A°, prove that the molecules will be distributed throughout many of the lower allowed rotational level at 27°C . (12.5 Marks)

($h = 6.62 \times 10^{-34}$ JS , $k = 1.38 \times 10^{-23}$ J deg^{-1}, $N = 6.0 \times 10^{23}$, $C = 3.0 \times 10^{10}$ cmS^{-1}, atomic mass of hydrogen = 1.008, bromine = 79.909, iodine = 126.904).

انظر خلفه باقى الأسئلة

Third question (61.25 Marks)

Answer only four from the following:

a) **State the Bohr postulates and derive the total energy of an electron revolving around the nucleus.** **(15.5 Marks)**

b) **Derive Legendre polynomial if** $\ell = 3$, $p_\ell(x) = \frac{1}{2^\ell \ell!}\frac{d^\ell (x^2-1)^\ell}{dx^\ell}$ **(15.25 Marks)**

c) **The experimental ionization energies for 1s and 3s electrons in sodium atom (Z = 11) is known to be 1.39 x 10^5 kJmol^{-1} and 4.95 x 10^2 kJmol^{-1}, respectively. Calculate the effective nuclear charge for each electron and discuss the distribution probability of them under the scope of the radial functions.** **(15.25 Marks)**

d) **What is the commutator factor for two operators** $\hat{A} = \hat{x}$ *and* $\hat{B} = \partial / \partial x$ **? Are the two operators commutative or not?** **(15.25 Marks)**

e) **Calculate the work function in eV for electrons emitted from surface of metal using 200 nm photons with velocity equals to 7.42 x 10^7 cms^{-1}.** **(15.25 Marks)**

Fourth Question (61.25 Marks)

Answer only four from the following:

a) **Derive the Schrödinger equation from simple harmonic motion.** **(15.5 Marks)**

b) **Derive the radial function of 2S orbit.**

$$R_{n,\ell} = e^{-zr/na_o}\left(\frac{2zr}{na_o}\right)^\ell \sqrt{\left(\frac{2z}{na_o}\right)^3 \frac{(n-\ell-1)!}{2n\{(n+\ell)!\}^3}}\, L_k^p(x),\ L_k^p(x) = \frac{d^p e^x}{dx^p}\frac{d^k x^k e^{-x}}{dx^k},\ \mathbf{k = n+\ell,\ P = 2\ell + 1.}$$

(15.25 Marks)

c) **In vibrational motion, confirm that K =** $4\pi^2 \nu^2$ **m, where K is force constant.** **(15.25 Marks)**

d) **Calculate the degeneracy of the most probable energy level for a Helium atom at 350 K and 1 bar pressure, assuming that the atom is a moving particle in a cube of side-length 1 m.** **(15.25 Marks)**

e) **Calculate the rotational energy required to promote the transition J = 0 → 1 for one mole of polar CO molecule of bond length 1.13 Å and calculate the angular momenta L and L_z for the state J = 1.** **(15.25 Marks)**

---

eV = 1.602 x 10^{-19} J, m_e = 9.11 x 10^{-31} kg, c = 3 x 10^8 ms^{-1}, R = 0.083 bar L deg^{-1}, N = 6.02 x 10^{23} mol^{-1}, h = 6.626 x 10^{-34} Js, e = 1.602 x 10^{-19} C, k = 1.38 x 10^{-23} JK^{-1}

Good Luck

Prof. Maher M. A. Hamed
Prof. Mohammed Th. Makhlouf
Dr. AbdelRahman A. Dahy

Assiut University
Faculty of Science
Chemistry Department

May 2008

Time : 3 hrs.

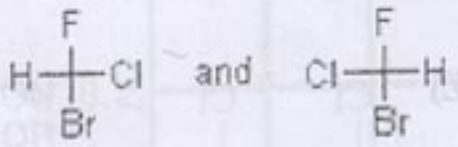
Final Chem. 344 for Third Year Chemistry Students

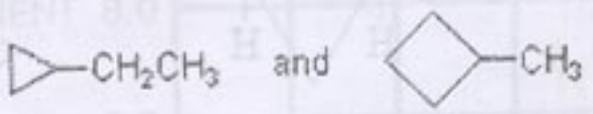
Section (A): Stereochemistry :

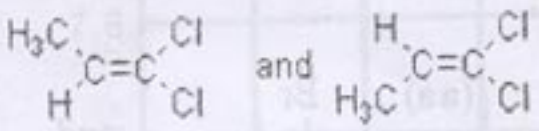
1) An optically pure compound (A) gave $[\alpha]_D$ + 20° . A mixture of (A) and its enantiomer (B) gave $[\alpha]_D$ + 10° . What is the ratio of (A) to (B) in the mixture ? (4 Marks)

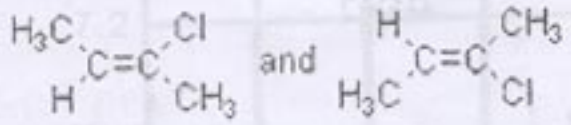
2) Indicate relationship between pairs of the following compounds as graphically represented below: (shows 18 only) (36 Marks)

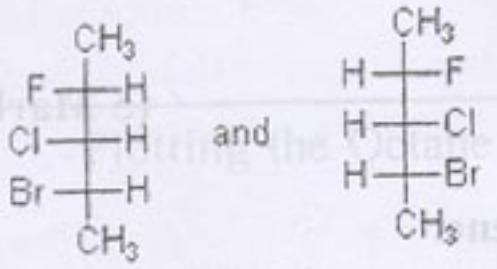
* Constitutional isomers (CON);
* Diastereomers (DIA) ;
* Enantiomers (ENT);
* Identical compounds (ID)

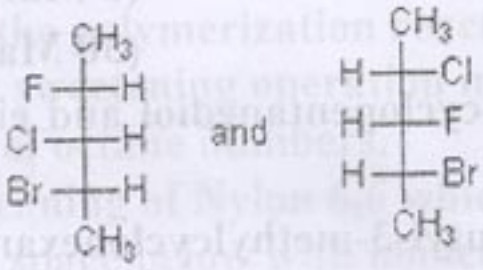
(A)  and

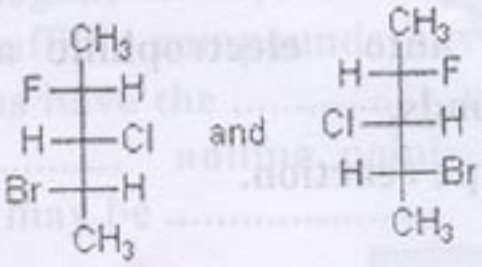
(B) 

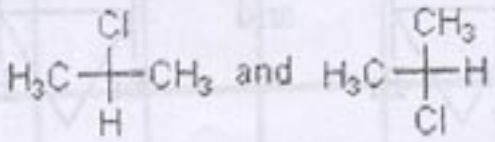
(C) 

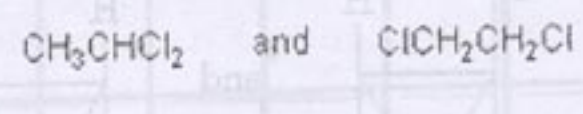
(D) 

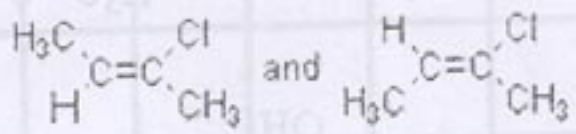
(E) 

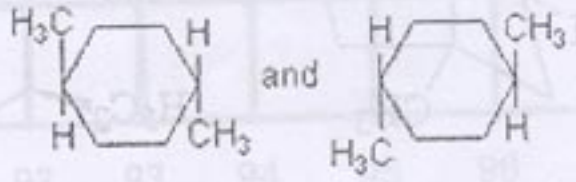
(F) 

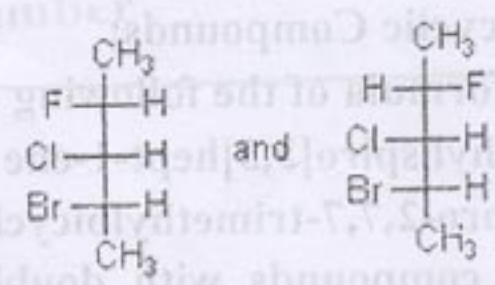
(G) 

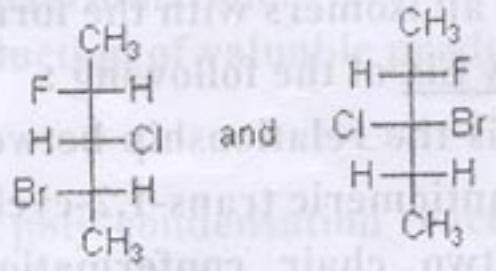
(H) 

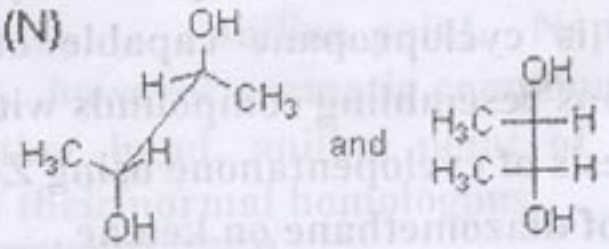
(I) 

(J) 

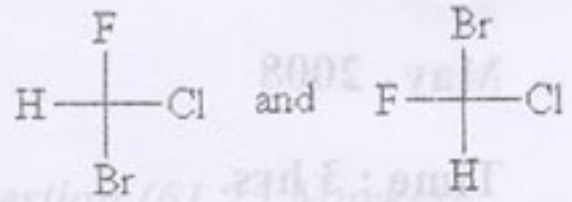
(K) 

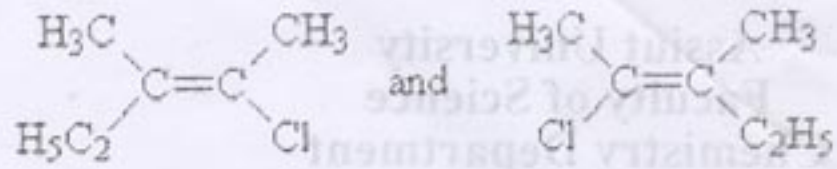
(L) 

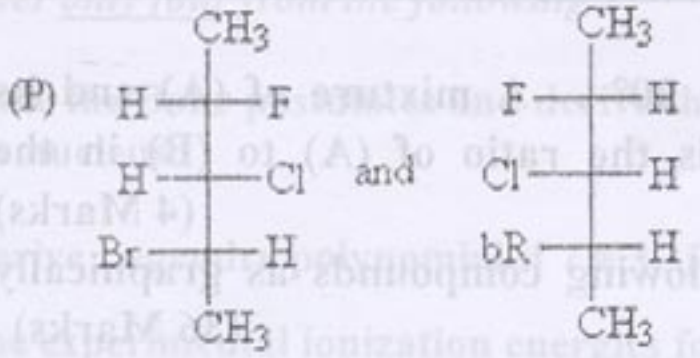
(M) 

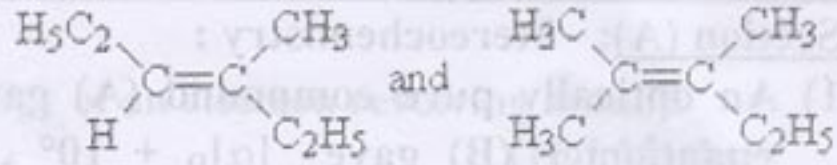
(N) 

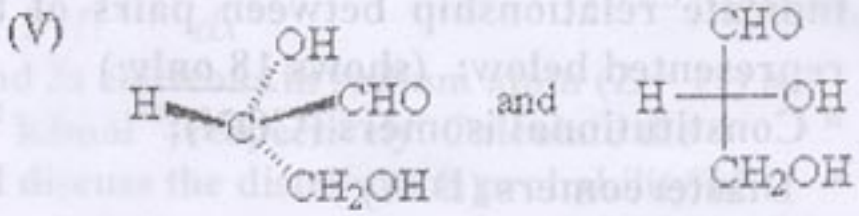
انظر خلفه باقى الأسئلة

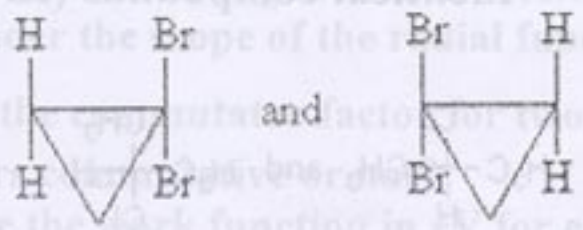
(O) 

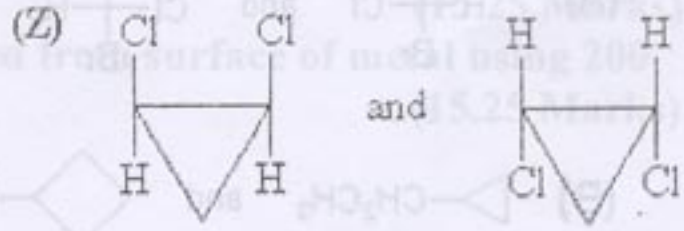
(W) 

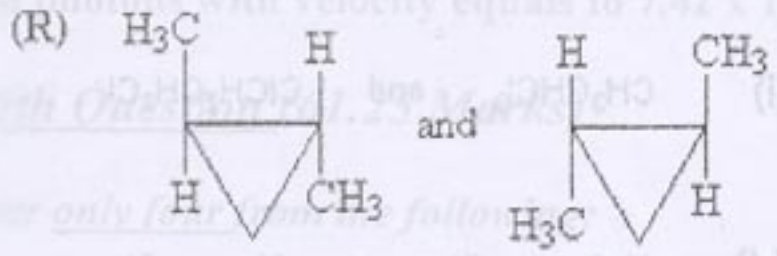
(P) 

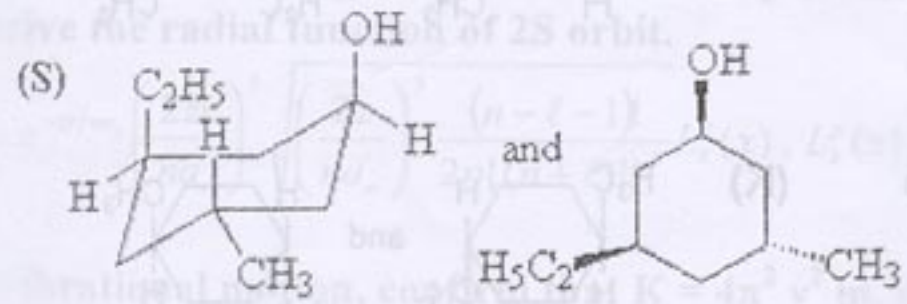
(Y) 

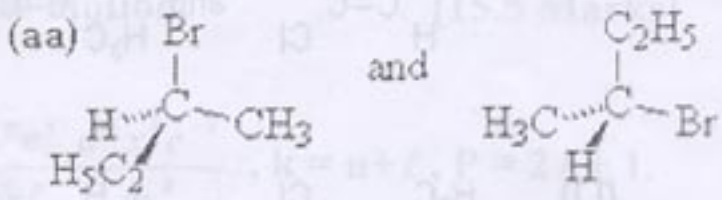
(V) 

(Q) 

(Z) 

(R) 

(S) 

(aa) 

Section (B): Alicyclic Compounds:

1) a) Draw the formula of the following compounds: (5 Marks)

(i) 2-Methyl spiro[3,3]hept-1-ene .

(ii) 1-Chloro-2,7,7-trimethylbicyclo[2.2.1]hept-2-ene.

b) Ignoring compounds with double bonds, write structural formula and give names for all isomers with the formula C_5H_{10} . (5 Marks)

2) Answer Only Six of the following : (30 Marks)

(i) What is the relationship between meso cis-1,2-cyclopentanediol and either of the enantiomeric trans-1,2-cyclopentanediols.

(ii) Write two chair conformations of cis 1-t-butyl-3-methylcyclohexane and designate which one would be more stable.

(iii) If large rings are stable why are they difficult to synthesize .

(iv) Why is cyclopropane capable of entering into electrophilic addition reactions resembling compounds with double bonds.

(v) Synthesis of cyclopentanone using Zeigler-Thorpe reaction.

(vi) Effect of diazomethane on ketene .

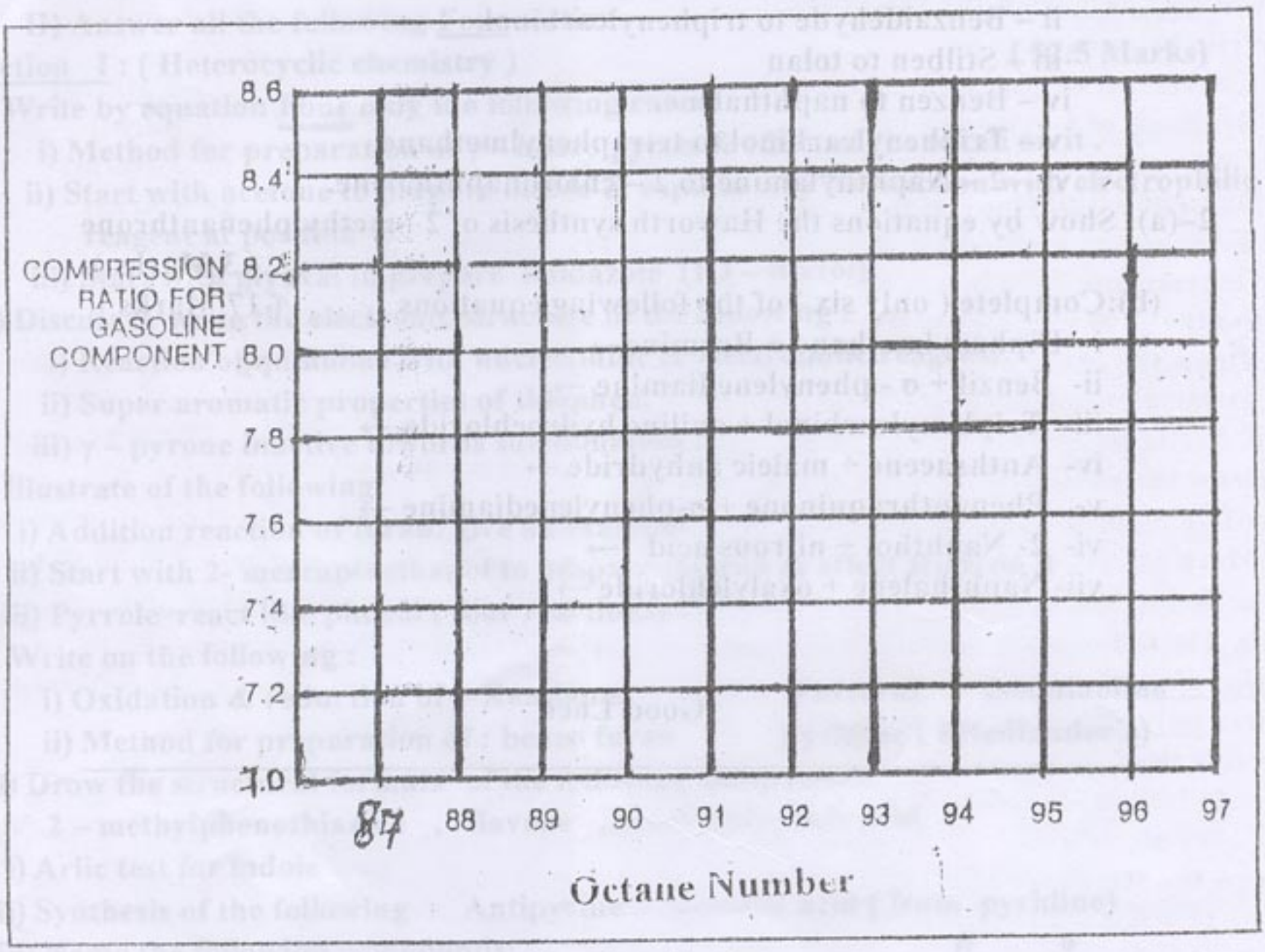
(vii) Synthesis of 1-methylcyclopentanol from 6-iodo-2-hexanone.

((أنظر باقي الأسئلة بالصفحات التالية))

Section (C): Petroleum/Petrochemicals (40 Marks)

Answer the following questions:

1) Determine the octane number of the tested gasoline component using the following:
   (i) On a test engine a gasoline component Knock's at compression ratio of 8.1.
   (ii) Two test blends are made up, one with 88% iso-octane (Knock's at compression ratio 7.2), the other with 96% iso-octane (Knock's at compression ratio 8.4).
   (iii) Using the given chart below, determine the octane number of the tested gasoline.



-Plotting the Octane Number Test

2) Define four of the following:
   a) Types of Asphalts and the tests used for there determination.
   b) Using the polymerization reactions for the production of valuable products.
   c) Doctor sweetening operation method.
   d) Types of octane numbers.
   e) The meaning of Nylon 6,6 which produced by a poly-condensation reaction.

3) Fill in the space below with nomenclature from the following:
   "increase, highest , intermediate , lowest and higher".

In a homologous series, the aniline point increases with molecular weight ..... While paraffinic compounds have the ..... aniline point. Naphthenes and olefins have the ..... aniline point, however aromatic compounds have the ..... aniline point. On the other hand, aniline point of the iso-paraffins may be ..... than that of their normal homologous.

أنظر باقى الأسئلة بالصفحة التالية

Section (D) : Polycyclic Aromatic Hydrocarbons (40 Marks)

Answer the following questions:-

1 – (a): Heating of α – tetralone with 1:1 mixture of NaOH – KOH at $220^{\circ}C$ gave naphthalene. Explain the mechanism of reaction. (5 Marks)

(b): Explain by equations how you can carry out the following conversions (answer only five): (15 Marks)

i – Phenanthraquinone to diphenic acid.
ii – Benzaldehyde to triphenylcarbinol.
iii – Stilben to tolan
iv – Benzen to naphthalene.
v – Triphenylcarbinol to tetraphenylmethane.
vi - 2 – Naphthylamine to 2 – chloronaphthalene.

2–(a): Show by equations the Haworth synthesis of 2 –methylphenanthrone (3 Marks).

(b):Complete (only six) of the following equations (17 Marks):

i- Diphenylmethane + Bromine→
ii- Benzil + σ - phenylenediamine →
iii- Triphenylcarbinol + aniline hydrochloride →
iv- Anthracene + maleic anhydride →
v- Phenanthraquinone + σ-phenylenediamine →
vi- 2- Naphthol + nitrous acid →
vii- Naphthalene + oxalylchloride → .

Good Luck

Assiut University — May , 2008
Faculty of Science — Time: 3 hrs.
. Chemistry Department

Second semester Final Examination of Organic Chemistry for Third Year Scie
Students (Chem./Geology, Phys.,Microbiol , Bot.)

N.B I) Illustrate your answer by equations when ever possible
II) Answer all the following Four sections

Section I : (Heterocyclic chemistry) (52.5 Marks

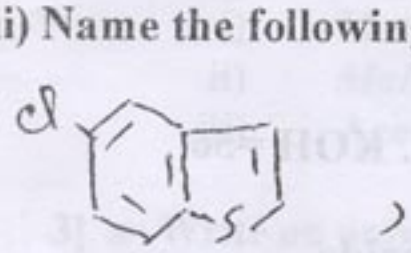
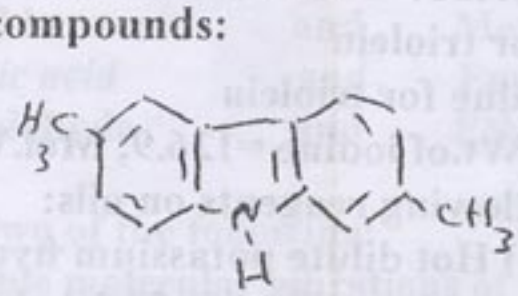
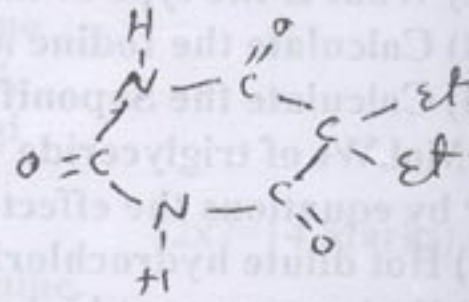
a) Write by equation Four only the following cases :
i) Method for preparation of γ – benzo pyron & effect of the alkali on it .
ii) Start with acetone to prepare indole & explain why its reaction with electrop reagent at position -3 .
iii) Start with glyoxal to prepare imidazole (1,3 – diazol).

b) Discuss & write the electronic structure of the following :
i) Reaction of quinoline with nucleophilic & electrophlic reagent.
ii) Super aromatic properties of thiophen.
iii) γ – pyrone inactive towords sulphonation .

c) Illustrate of the following:
i) Addition reaction of furan. give an example
ii) Start with 2- mercaptoethanol to prepare thiaran & effect H_2O_2 on it
iii) Pyrrole react like phenol (four reactions)

d) Write on the following :
i) Oxidation & reduction of : Xanthone - Furfural - Isoquinoline
ii) Method for preparation of : benzo furan - pyridine (Friedlander`s)
iii) Drow the structural formula of the following compounds:
2 – methylphenothiazine , flavone , 4-ethylpicolinic acid

e) i) Arlic test for indole
ii) Synthesis of the following : Antipyrine – Nicotinic acid (from pyridine)
iii) Name the following compounds:

Section II, (Polycyclic Aromatic Hydrocarbons) (52.5 Marks)

1. a) Shaw by equations the Haworth synthesis of 2-Metylphenathrone. (5 Marks
b) Complete only Five of the following equations (22.5 Mar
i. Diphenylmeythane + Bromine ⟶ ?
ii. Benzil + *o*-phenylenediamine ⟶ ?
iii. Triphenycarbinol + Aniline . HCl ⟶ ?
iv. Anthracene + Maliec anhydride ⟶ ?
v. Phenanthraquinone + *o*-phenylenediamine ⟶ ?
vi. 2-Naphthol + Nitrous acid ⟶ ?

أنظر خلفه باقى الأسئلة

2. Explain by equations how can you carry out Only Five on the following conversions: (25 Marks)

i. Phenanthraquinone to Diphenic acid. ii - Benzaldehyde to Triphenylcarbinole.

iii-2-Naphthylamine to 2-Chloronaphthalene iv- Benzene to Naphthalene.

v- Triphenylcarbinole to Tetraphenyl methane.. vi- Stilbene to Tolan.

Section III: (Biochemistry I) (52.5 Marks)

Answer five only from the following:

♦ Write by equations on:

1. i. Conversion of glucose to glucose phenyl osotriazole . (5 .5 Marks)
   ii. Synthesis of L-Ascorbic from L-xylose (5 Marks)
2. i. Conversion of Glucose to Mannose. (5 .5 Marks)
   ii. Dunn and Smart method for the preparation of Methionine. (5 Marks)
3. i. Erlenmeyer method for the preparation of Tryptophan. (5 .5 Marks)
   ii. Conversion of D-glucose to D- arabinose using Whol method. (5 Marks)
4. i. Synthesis of glucuronic from Glucose illustrating its biological importance. (5 .5 Marks)
   ii. Draw the cyclic structure of Maltose illustrating the glycosidic linkage? (5 Marks)
5. i. Determination accurately the position of glycoside linkage and ring size in lactose?
   ii. Write on Zwitterions of amino acids? (10.5 Marks)
6. i. Draw the structure formula of the following:
   α-D-Fructofuranose, Sucrose, α-D- Glucopyranose, L-Ribose and Amylose. (5 .5 Marks)
   ii. Mark (√) or(X) to indicate whether the following sentences are correct or false.(5 Marks)
   a. Reduction of fructose using Na amalgam/H_2SO_4 afforded Sorbitol or Mannitol.
   b. The full name of Lactose is β-D-galactopyranosyl-(1→ 4)-α-D-glucopyranose.

Section IV : (Biochemistry II) (52.5 Marks)

Answer only five questions from the following:

1- Define the following terms:

1) Iodine number 2) Saponification value 3) Rancidity
4) Fats and oil 5) Acid value

2- Draw the structure of triolein

1) What is the type of this triglyceride?
2) Calculate the Iodine number for triolein
3) Calculate the Saponification value for triolein

[Mol.Wt of triglyceride = 884; A.Wt.of iodine =126.9; Mol.Wt. KOH =56

3- Show by equations the effect of the following reagents on oils:

a) Hot dilute hydrochloric acid. b) Hot dilute potassium hydroxide.
c) Hydrogen gas at high pressure and in presence of Nickel as a catalyst.
d) Iodine solution.

4- Write the chemical structure of the following:

a) Palmitic acid. b) Stearic acid. c) Oleic acid.
d) Linoleic acid. e) 2`-Deoxy adenosine.

5- Compare between the following pairs:

1) DNA and RNA. 2) Waxes and Fats & oils.

6 -Write short notes on:

a) Disadvantage of soap. b) Hazards of rancid fats.
c) Disadvantage of hydrogenated oils.

Good Luck

Faculty of Science
Assiut University
Chemistry Department

May 2008
Time: 3 hrs

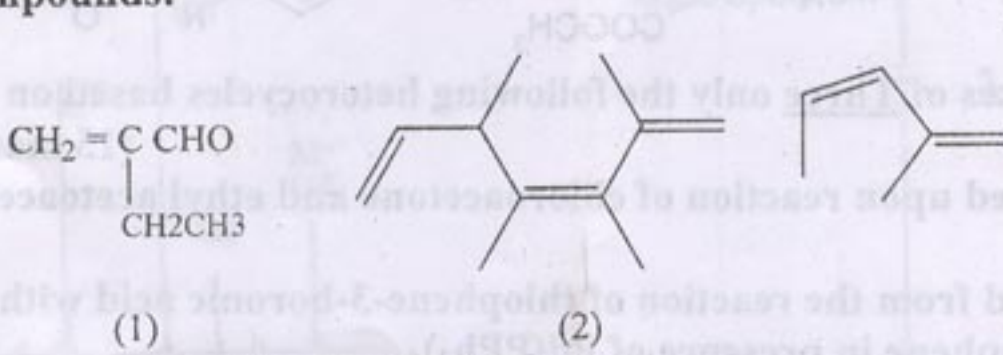
Organic Chemistry Examination For 3rd Year Students(Chemistry Major)
(342C : Spectroscopic Analysis and Heterocyclic Chemistry)

Answer the Following Questions of Sections A & B :

Section A : Spectroscopic Analysis: **(122.5 Marks)**

Answer on the following questions:

1] a- Calculate the λ_{max} of only Two of the following compounds: **(2x7=14 Marks)**



(1) (2) (3)

b-Give an explanation for the following: **(2x8=16 Marks)**

i) Alkyl substitution on the benzene ring produces a Bathochromic shift of the B band (U.V.).

ii) Acetylene protons have ,unexpectedly, NMR absorption at δ ~ 2.5 ppm while Ethylene protons at δ ~ 5 ppm.

c – Account briefly on only Two of the following: **(2x7=14 Marks)**

j) The possible Mac Lafferty rearrangements in the M.S. of Ethyl butyrate.

ii) Application of I.R. and NMR spectroscopy in the determination of the relative amounts of the Keto & Enol forms of Acetyl acetone.

iii) Isotope Labeling in the NMR spectrum of 2-hydroxypropionic acid.

2] a- Describe the main parts of the NMR Spectrometer. **(10.5 Marks)**

b- Using IR, ^{1}H NMR & Mass spectra, discuss how can you differentiate between only Two of the following pairs: **(2x12=24 Marks)**

i)	Methyl benzoate	and	Methylbenzene
ii)	*Malonic acid*	and	Fumaric acid.
iii)	Acetaldehyde	and	Ethanoic Acid

3] a- Write on only Two of the following: **(2x7=14 Marks)**

i) The possible molecular vibrations of Benzyl amine.

ii) The significance of the finger print region in IR spectra .

iii) The Mass and ^{13}C NMR spectra of Methyl Phenyl sulfone.

b- Identify the organic compound [$C_{10}H_{12}O$] whose spectra are available in Fig.(1). Explain your answer in details. **(30 Marks)**

ملحوظة هامة: الأسئلة ثلاث صفحات + صفحتان جداول

Section B (Heterocyclic Chemistry) **(122.5 marks)**

Answer the following questions

1] a- Draw the structural formulae of Three only of the following heterocycles: (15 marks)

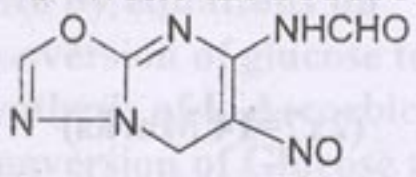
i- 3-Amino-2-benzoyl-6-*S*-methyl-4-phenylfuro[2,3-d]Pyrimidine.

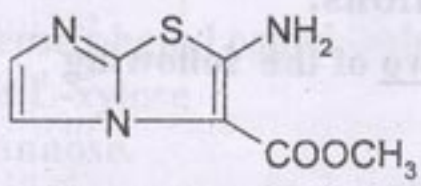
ii- 1-Acetylamino-2-phenyl-2-azirine.

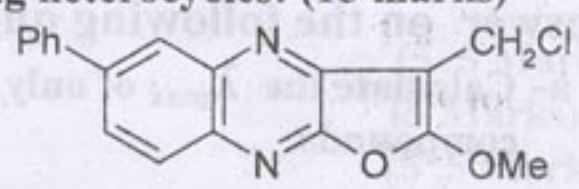
iii- 2,3-Dinitroquinoxaline.

iv- 2-Cyanomethyl-4-aminoindole.

b- Write the IUPAC name for each of the following heterocycles: (15 marks)







c- Deduce the structures of Three only the following heterocycles based on the clues provided. (15 marks)

i-($C_9H_{13}NO_2$) Formed upon reaction of chloroacetone and ethyl acetoacetate in aq. ammonia.

ii- ($C_{12}H_8S_3$) Derived from the reaction of thiophene-3-boronic acid with 2,5-dibromothiophene in presence of $Pd(PPh_3)_4$.

iii- ($C_7H_9F_3O_2$) From the reaction of trifluoroacetone and ethoxyacetylene at – 78 °C.

iv-($C_9H_{13}NO_3S$) Derived from the reaction of methoxy acetone, ethyl cyanoacetate and sulfur in presence of base.

2- a) Formulate the products from the Fischer indole syntheses starting from the following reactants: (20 marks)

i- *p*-Methoxyphenylhydrazine and 1,3-cyclohexandione.

ii- *o*-Bromophenylhydrazine and phenyl acetaldehyde.

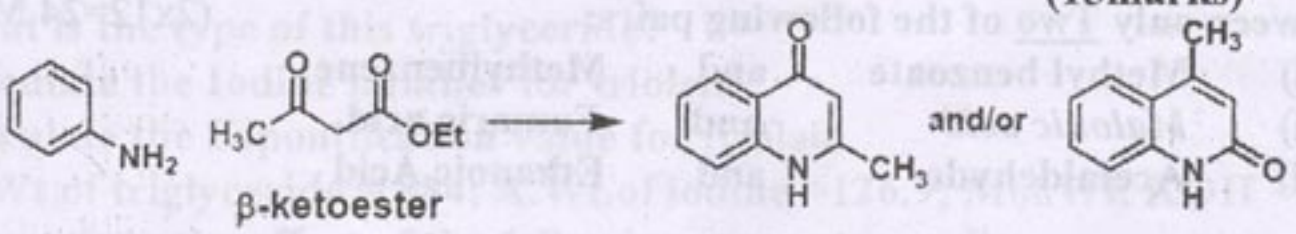
b) Write short notes on only Three of the following, give examples. (30 marks)

i) Suzuki coupling **ii) Stille cross coupling**

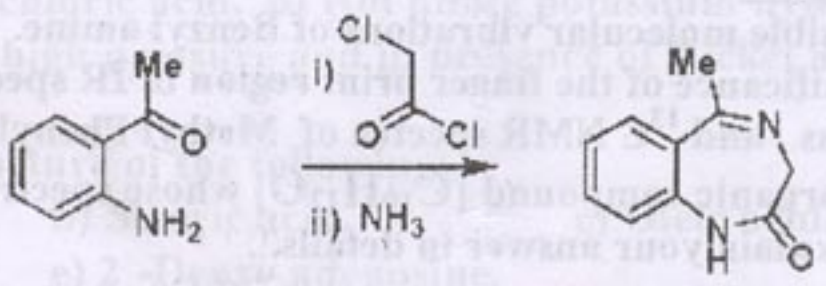
iii) Sonogashira coupling. **iv) Guraeschi synthesis.**

3- Suggest detailed mechanism for the following reactions:

a) **(15marks)**

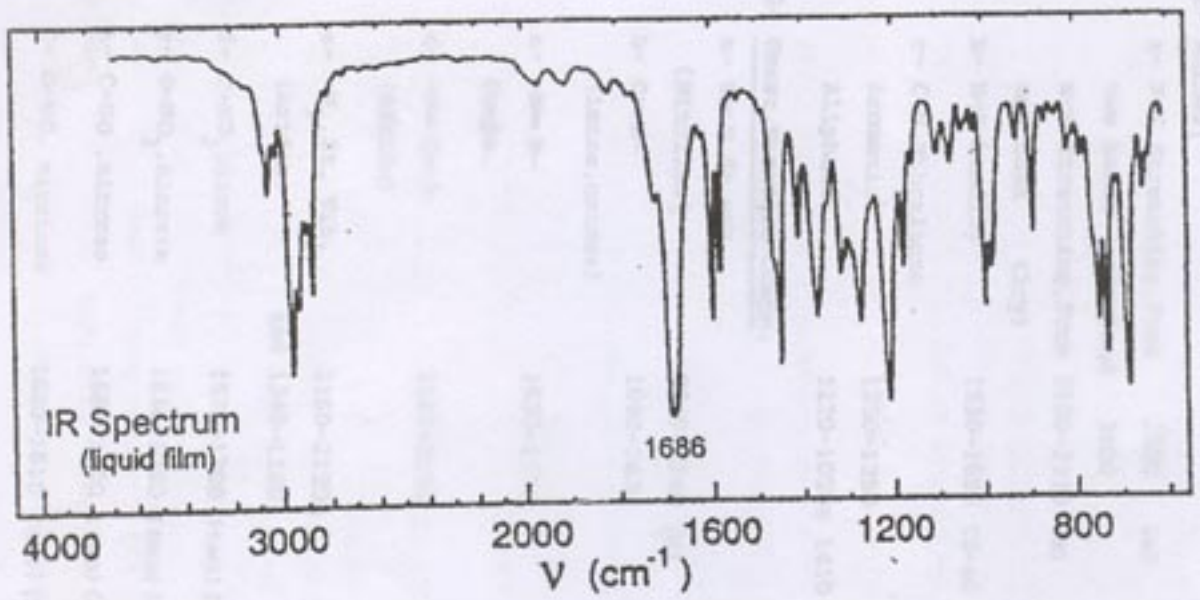


b) **(12.5 points)**

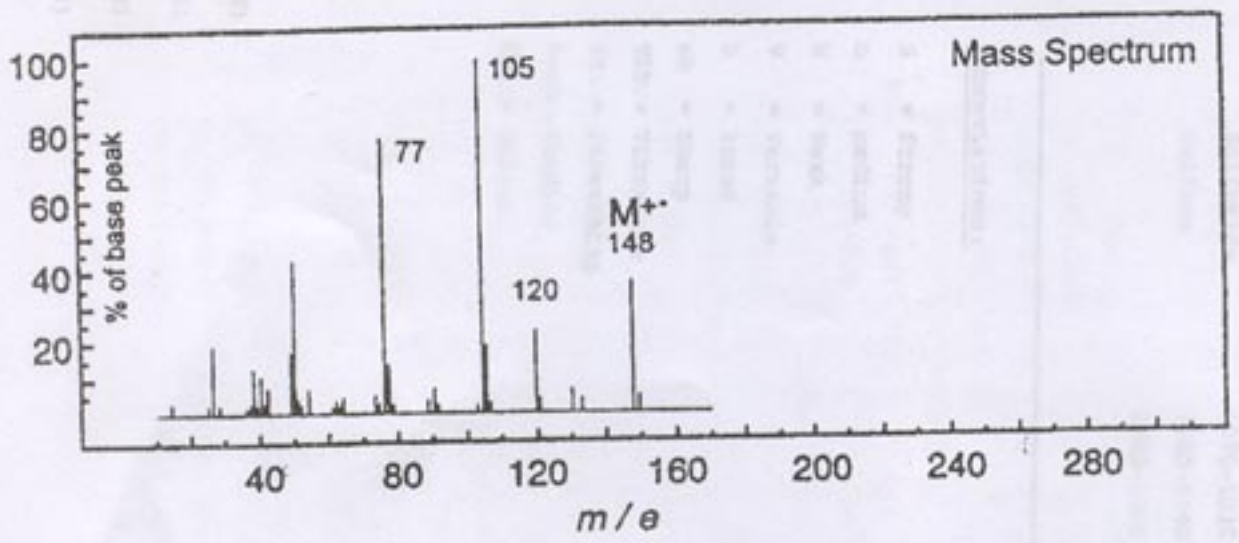


---------- **Good Luck** ----------

Prof. Dr. Aboel-Magd A. Abdel-Wahab & Prof. Dr. Ahmed A. Geies



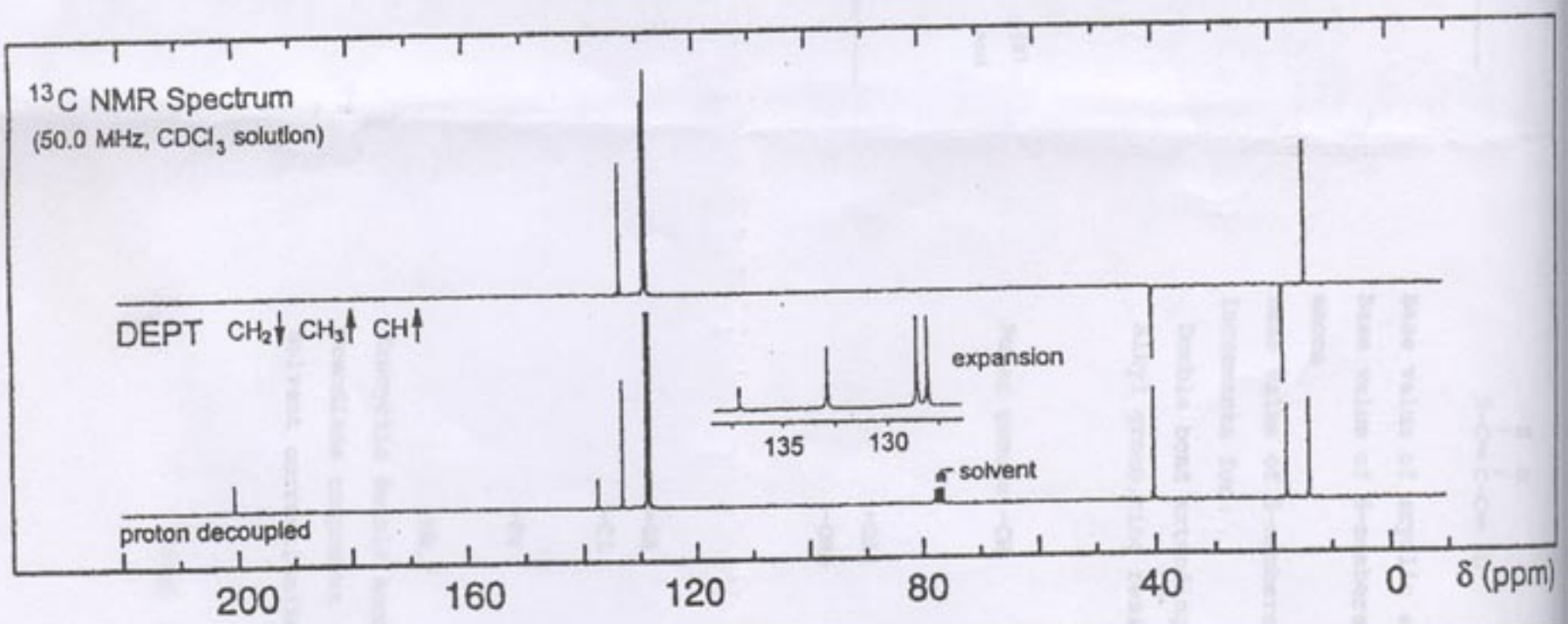
$C_{10}H_{12}O$

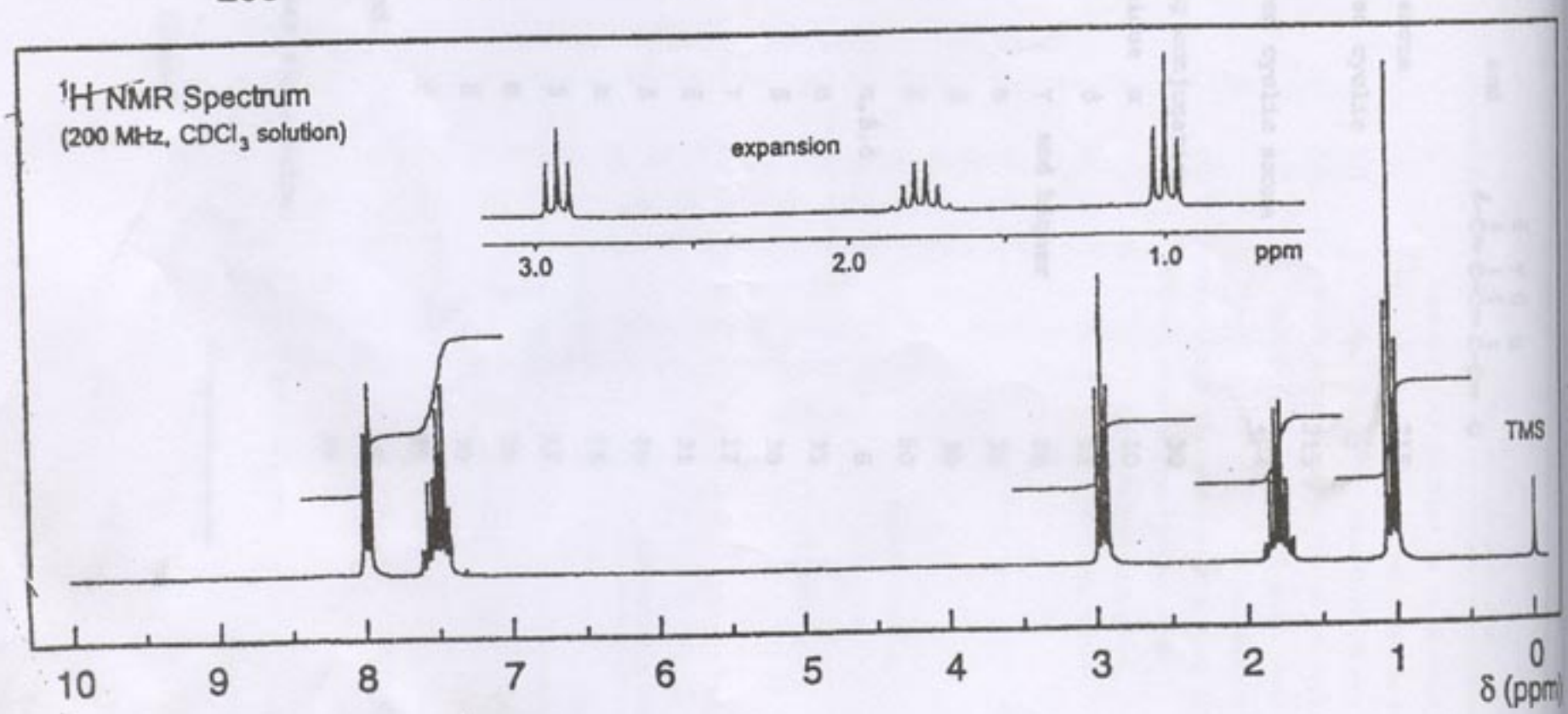


UV Spectrum

λ_{max} 241 nm ($\log_{10}\varepsilon$ 4.1)

solvent : methanol





3- Miscellaneous Chromophoric Groups:

1- Alcohols and Phenols:

a- O-H Stretching		
Free OH	3650-3590	(V,Sh)
(change on dil)		
Bonded OH	3500-3200	(S,b)
(no change on dil.)		
chlate compounds	3200-2500	(W,b)
b- O-H bend.and C-O St.Vib.	1050&1350	

2- Amines:

a- N-H Stretching,Free two bands (1ry)and	3500	(m)
	3400	
N-H Stretching,Free one band (2ry)	3500-3310	(m)
b- N-H bending	1550-1650	(S-m)
c- C-N Vibrations		
Aromatic	1250-1350	
Aliphatic	1220-1020& 1410	

3- Unsat.Nitrogen Comps:

a- C≡N St.vib. (Nitriles)	2260-2240	(m)
b- C=N- (imine,oximes)	1690-1630	
c- -N=N- Comps.	1630-1575	
d- -N=C=N- (diimide)	2155-2130	
e- $-N_3$,St. Vib. (Arides)	2160-2120& and 1340-1180	
f- $C-NO_2$,nitro	1570-1300	(two)(S)
g- $O-NO_2$,nitrate	1650-1250	(two)(S)
h- C-NO ,nitroso	1680-1500	(two)(S)
I- O-NO, nitrites	1680-1610	(two)(S)

4- Haloqen Comp's:

C-X. Stretching

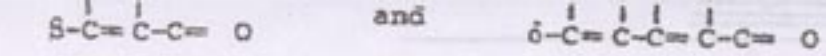
a- C-F	1400-1000
b- C-Cl	800-600
c- C-Br	600-500
d- C-I	500

5- Sulfur Comp's :

a- S-H St.Vib.	2600-2550	
b- C=S,St.Vib.	1200-1050	
c- S=O St.Vib.		
Sulfoxide	1070-1030	(S)
Sulfone	1160-1140 and 1350-1300	

Abbreviations:

S = Strong
m = Medium
W = Weak
V = Variable
b = broad
sh = Sharp
Vib.= Vibration
St. = Stretching
Bend.=Bending
Dil.= Dilute.



Base value of acyclic enone 215

Base value of 6-membered cyclic enone 215

Base value of 5-membered cyclic enone 202

Increments for:

Double bond extending conjugation			30
Alkyl group,ring residue	α		10
	β		12
	γ	and higher	18
Polar groups:-OH	α		35
	β		30
	δ		50
-OAc	α,β,δ		6
-OMe	α		35
	β		30
	γ		17
	δ		31
-SR	β		85
-CL	α		15
	β		12
-Br	α		25
	β		30
-NR,	β		95
Exocyclic double bond			5
Homodiene component			39
Solvent correction(See table below)			.....

Total (λcalc) nm

Rules of Diene Absorption:

Base Value of Acyclic Conjugated Dienes or Non fused cyclic con.diene(6-memb. ring).....	217
Base value for heteroannular diene	214
Base value for homoannular diene	253
Increments for	
Double bond extending conjuagation	30
Alkyl substituent or ring residue	5
Exocyclic double bond	5
Polar grouping: OAc	0
OR	6
SR	30
Cl,Br	5
$N(R)_2$	60
Solvent correction	0
Total(λcalc)	nm

SOLVENT CORRECTIONS:

SOLVENT	CORRECTION (nm)
Ethanol	0
Methanol	0
Dioxane	+5
Chloroform	+1
Ether	+7
Water	-8
Hexane	+11
Cyclohexane	+11

Characteristic Infrared Absorption of Functional Groups:

Group	ν	
A-Hydrocarbon Chromophore:		
1-C-H Stretching:		
a- Alkane	2962-2853	(m-S)
b - Alkene		
-monosubstituted (vinyl) } -disubstituted (Cis or Trans)	3040-3010	(m)
c - Alkyne	3300	(S)
d - Aromatic	3030	(V)
2- C-H Bending:		
a - Alkane, C-H	1340	(W)
,, , $-CH_2$	1465-1445	(m)
,, , $-CH_3$	1470-1430&	(m)
and	1380-1370	(S)
,, ,gem-dimethy	1385-1370&	(S)
and	1375-1365	
b - Alkene.	995-985	(S)
monosubstituted		
	915-905	(S)
and	1420-1410	(S)
c - Alkyne	630	(S)
d - Aromatic		
Substitution type:	700-820	(S,V)
Five -adj.H.Atom	750& 700	(S,V)
Four -,, ,, ,,	750	(S,V)
Three-,, ,, ,,	780	(S,V)
Two -,, ,, ,,	830	(V,W)
One -,, ,, ,,	880	
3- C-C Multiple Bond Stretching:		
Alkene	1680-1620	(V)
Alkyne	2140-2100	(m)
Aromatic	1600-1450	(V)

Group	ν	
B-Carbonyl Chromophore:		
1-ketone Stretching:		
a- Sat.acyclic	1725-1705	(S)
b- ,, cyclic(6,5,4)	1775-1705	(S)
2-Aldehydes:		
a- Carbonyl Stretching	1740-1720	(S)
b- C-H stretching	2900-2820&	(W)
and	2775-2700	(W)
3-Ester Stretching:		
a- acyclic	1750-1735	(S)
b- cyclic	1820-1720	(S)
4-Carboxylic Acids:		
a-Carbonyl St.Vib.	1725-1700	(S)
b-Hydroxyl St.Vib.	2700-2500 (Several bands)	(W)
c-Carboxylate anion Stretching and	1616-1550 1400-1300	(S)
5-Acid Anhydrides:		
a-Sat.,acyclic	1850-1800	
b-unsat,aryl.,acyclic	1830-1740	
6-Acyl Halide:		
a- Ac F	1850	(S)
b- Ac Cl	1795	(S)
c- Ac Br	1810	(S)
7-Amides:		
a- Carbonyl St.Vib.	1650	
b- N-H St. Vib.		
1ry-free,two bands	3500& 3400	(two,s
1ry-bonded,two bands	3350& 3150	(two,s
2ry-free,one band	3340	(one,s
2ry-bonded,one band	3220	(one,s
c-N-H Bending Vib.		
Primary	1620-1590	
Secondary	1550-1510	

Assiut University
Faculty of Science
Chemistry Department

Date: 26. May. 2008
Time allowed: 2 hours

- **Second Semester Final Exam of Organic Chemistry 366c (Petroleum, Petrochemicals, Biochemistry and Spectra) For 3rd year students Geology& Geophysics**

- Answer **four questions** from the following:

1st question:-

a. Write briefly on the carbide theory and discuss the objection against it?
b. Explain in details the Doctor sweetening process?
c. Draw only the cyclic structure of Maltose and Sucrose?

(30.5 Marks)

2nd question:-

a. Discuss the effect of sulphur compounds upon petroleum products?
b. Describe the catalytic cracking in petroleum refinery?
c. Show by equations the conversion of glucose to the mannose?

(30.5 Marks)

3rd question:-

a. Explain the difference between naphthenic and paraffinic base oils?
b. Write on the types of non-hydrocarbons in crude petroleum?
c. Write by equations on Kiliani cyanohydrin synthesis?

(30.5 Marks)

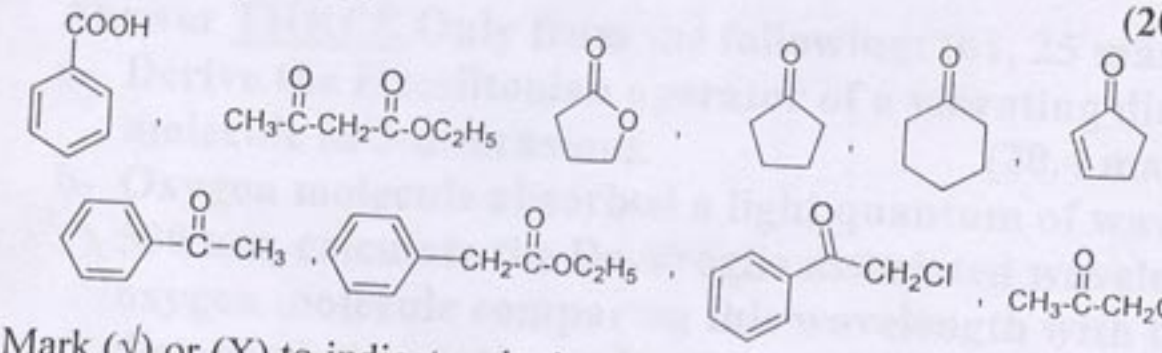
4th question:-

a. Show by equations the conversion of Fructose to Glucose?
b. Write on the H_2SO_4 extraction in petroleum industry and its problems?
c. Show how the sulphur content could be reduced in the petroleum refinery?

(30.5 Marks)

5th question:-

a. Calculate the ν **cm**$^{-1}$ of the absorption band for the carbonyl groups of the following compounds:-



(20 Marks)

b. Mark (√) or (X) to indicate whether the following sentences are correct or false.

1. The percentage of disulfides increases as the boiling point of the fraction increases.
2. The aniline point increases with the aromaticity decreases.
3. In catalytic cracking the elemental carbon produced is deposited at the surface of catalyst.
4. The concentration 85-90 % of H_2SO_4 could remove the compounds in which sulfur is attached to two aliphatic carbon atoms.
5. The anomers are compounds differ in configuration and are mirror images to each other.
6. The C1 atom in the cyclic structure of glucose is called anomeric carbon.
7. Glucose & Fructose and Mannose gave the same ozazone.

(10.5 Marks)

Examiners: 1. Prof. Dr.Kamal I. Aly, *2. Dr. Abdel-Rahman Farghaly*

Assiut University
Faculty of Science
Chemistry Department

Date: 26. May. 2008
Time allowed: 2 hours

- **Second Semester Final Exam of Organic Chemistry 366c (Petroleum, Petrochemicals, Biochemistry and Spectra) For 3rd year students Geology& Geophysics**

- Answer **four questions** from the following:

1st question:-

a. Write briefly on the carbide theory and discuss the objection against it?
b. Explain in details the Doctor sweetening process?
c. Draw only the cyclic structure of Maltose and Sucrose?

(30.5 Marks)

2nd question:-

a. Discuss the effect of sulphur compounds upon petroleum products?
b. Describe the catalytic cracking in petroleum refinery?
c. Show by equations the conversion of glucose to the mannose?

(30.5 Marks)

3rd question:-

a. Explain the difference between naphthenic and paraffinic base oils?
b. Write on the types of non-hydrocarbons in crude petroleum?
c. Write by equations on Kiliani cyanohydrin synthesis?

(30.5 Marks)

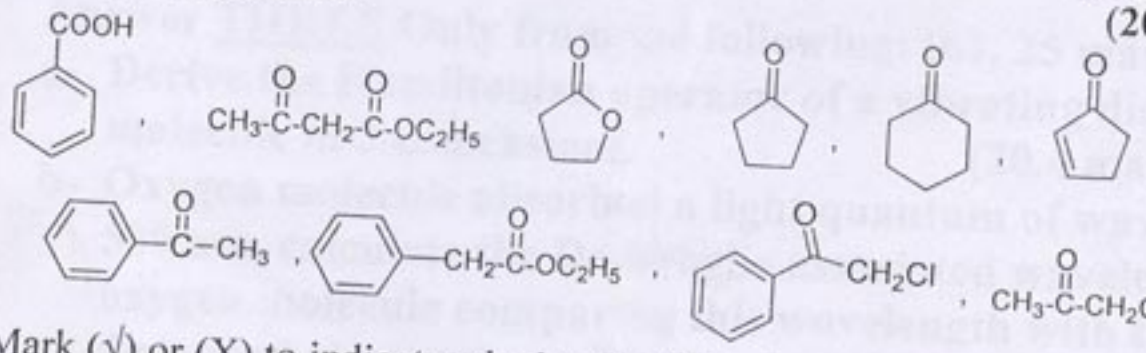
4th question:-

a. Show by equations the conversion of Fructose to Glucose?
b. Write on the H_2SO_4 extraction in petroleum industry and its problems?
c. Show how the sulphur content could be reduced in the petroleum refinery?

(30.5 Marks)

5th question:-

a. Calculate the ν **cm**$^{-1}$ of the absorption band for the carbonyl groups of the following compounds:-



(20 Marks)

b. Mark (√) or (X) to indicate whether the following sentences are correct or false.

(10.5 Marks)

1. The percentage of disulfides increases as the boiling point of the fraction increases.
2. The aniline point increases with the aromaticity decreases.
3. In catalytic cracking the elemental carbon produced is deposited at the surface of catalyst.
4. The concentration 85-90 % of H_2SO_4 could remove the compounds in which sulfur is attached to two aliphatic carbon atoms.
5. The anomers are compounds differ in configuration and are mirror images to each other.
6. The C1 atom in the cyclic structure of glucose is called anomeric carbon.
7. Glucose & Fructose and Mannose gave the same ozazone.

Examiners: 1. Prof. Dr.Kamal I. Aly, 2. Dr. Abdel-Rahman Farghaly

Assiut University
Faculty of Science
Chemistry Department

Physical Chemistry 322 Ch **Time 3hrs**
May 2008 **Marks 245**

Answer Four Questions from The Following:

(I) Write SEVEN equations ONLY from the following with the definitions of the content: (61. 25 marks) , each 8.75

a- Schrödinger wave equation in the Cartesian coordinates. 8.75
b- Schrödinger wave equation in the spherical coordinates. 8.75
c- Schrödinger wave equation of a rigid rotator. 7.5
d- Angular momentum operator in the Cartesian coordinates.8.75
e- Translational Hamiltonian operator of tiny particles in 3-dimensions. 8.75
f- Eigenvalue of rotational motion of a rigid rotator. 8.75
g- Radial Eigenfunction. 8.75
h- Associated Legender function. 8.75
i- Spherical Eigenfunction of 2p orbital. 8.75

****

(II) Answer THREE Only from the following: (61. 25 marks)

a- Derive the Hamiltonian operator of a vibrating diatomic molecule in 3-dimensions. (20.4 marks)
b- Oxygen molecule absorbed a light quantum of wavelength λ 500 nm, calculate the De-Broglie associated wavelength with oxygen molecule comparing this wavelength with the average distance between the molecules at 27 °C. (20.4 marks)
c- What is the bond length of NO molecule which absorbs radar wave length 1.468 mm to be promoted between J=1 and J=2 rotational energy levels. (N=14, O=16) (20.4 marks)
d- Calculate the ionization potential energies of the 1s and 4s electrons in K (Z=19) if the effective nuclear charges of them are 18.7 and 2.2 respectively. - Derive the spherical eigenfunction of 4s orbitals. (20.4 marks)

****

$h = 6.626 \times 10^{-34}$ Js $N = 6.02 \times 10^{23}$ mol^{-1} $c = 3 \times 10^{8}$ cms^{-1}

$k = 1.38 \times 10^{-23}$ J K^{-1}

Prof Dr Anwar El-Shahawy

3) Third Question: Answer <u>Only Three</u> from the following: (61.25 Marks)

a) Discuss briefly the theoretical principles of molecular electronic spectra. (20.5 Marks)

b) Explain briefly the following: (20.5 Marks)

(i) The energy level of nuclei in magnetic field.

(ii) The rotation spectrum of linear molecule gives a set of absorption with approximately a constant spacing.

c) (i) What are the various applications of vibration spectra? (8 Marks)

(ii) The force constant for the HI molecule is 290 N m^{-1}, calculate the frequency of radiation for the transition from $\nu = 0$ to $\nu = 1$ and zero point energy. (12.5 Marks)

d) (i) Write short note on : Photoelectron spectroscopy. (8 Marks)

(ii) Taking HBr as an example where its bond length is 1.414 A°, prove that the molecules will be distributed throughout many of the lower allowed rotational level at 27°C. (12.5 Marks)

($h = 6.62 \times 10^{-34}$ JS , $k = 1.38 \times 10^{-23}$ J deg^{-1}, $N = 6.0 \times 10^{23}$, $C = 3.0 \times 10^{10}$ cmS^{-1}, atomic mass of hydrogen = 1.008, bromine = 79.909, iodine = 126.904).

4) Fourth Question : Answer the following: (61.25 Marks)

a) When a saturated calomel electrode is coupled with Pt sheet immersed in acid solution of quinine (0.1 N) – hydroquinone (0.01 N) mixture, gives 0.02 V. Calculate the pH value of the solution at 25°C. (20 Marks)

$E^\circ_{Q/HQ} = 0.699$ V $\qquad E^\circ_{Hg/Hg_2Cl_2/Cl^-} = -0.24$ V

b) Discuss briefly <u>Three Only</u> from the following : (21 Marks)

(i) Glass electrode (ii) Origin of electrode potential

(iii) Chemical cells with transference .

(iv) The application of metal-metal oxide electrode for measurement of pH value.

c) Consider the following redox couples and the corresponding standard reduction potential : (20.25 Marks)

$Fe^{+3} + e \longrightarrow Fe^{+2} \qquad E^\circ = 0.77$ V

$Pb^{+2} + 2e \longrightarrow Pb \qquad E^\circ = -0.13$ V

$Cd^{+2} + 2e \longrightarrow Cd \qquad E^\circ = -0.31$ V

Explain which of the following statements is true and why?

(i) Pb is a stronger oxidizing agent than Cd.

(ii) Fe^{+3} is a stronger reducing agent than Cd^{+2}.

(iii) Cd is a stronger reducing agent than Pb .

(iv) Pb^{+2} is a stronger oxidizing agent than Fe^{+3}.

(v) Pb^{+2} spontaneously reacts with Fe^{+2}.

Good Luck

بسم الله الرحمن الرحيم

Geology Department
Faculty of Science
Assiut University

قسم الجيولوجيا - كلية العلوم
جامعة أسـيوط

إمتحان الفرقة الثالثة علوم شعبة: جيولوجيا

الفصل الدراسى الثانى مايو ٢٠٠٨	المادة: Diagenesis and Special Course (Trace Fossils) (G320)	الدرجة: ١٠٥ درجة	الزمن: ساعتان

PART I: Diagenesis (52.5 Marks)

Answer the First Question and only ONE of the others:

I- The First Question (إجبارى) (26 Marks)

Put (√) or (X) in front of the following sentences and correct the mistaken one:

1) Telogenesis stage comprises the diagenetic processes during deep burial ( ).
2) In recrystallization diagenetic process the crystal fabric of unstable minerals changes, but the mineralogy is unaltered ( ).
3) Quartz overgrowth cements precipitate from acid solutions when pH > 7 ( ).
4) Sutured contacts between grains occur if they are of a similar solubility / hardness ( ).
5) Pressure dissolution at grain contacts is maximum if the sediment is cemented early before deep burial ( ).
6) The early quartz cementation in sandstones are able to withstand better the effects of compaction and pressure dissolution during later burial ( ).
7) Poikilotopic calcite crystals are small crystals filling the pore spaces between grains ( ).
8) For authigenic feldspar precipitation, acidic pore waters are necessary ( ).
9) The precipitation of clay rims around the sand grains usually represents the first diagenetic event, often pre-dating quartz overgrowths or calcite cementation ( ).
10) In reducing conditions the more soluble ferrous state iron will impart a red colour to the sediments ( ).
11) At slightly higher temperatures and greater depths, illite is replaced by kaolinite and chlorite ( ).
12) The somewhat more irregular pattern of smectite abundance in the geological column may be related to the intermittent orogenic periods ( ).
13) In the dedolomitization process, the dolomitic rocks are changed to limestones ( ).

II- The Second Question (26.5 Marks)

Discuss the following:

a) The major diagnetic processes in carbonate rocks.
b) Clay mineral authigenesis in sandstones.

III- The First Question (26.5 Marks)

Write on the following:

a) Carbonate cementation in sandstones.
b) Hematite cementation and pigmentation in sandstones.

تابع الامتحان بالورقه التالية ←

بسم الله الرحمن الرحيم

Geology Department
Faculty of Science
Assiut University

قسم الجيولوجيا - كلية العلوم
جامعة أسـيوط

إمتحان الفرقة الثالثة علوم شعبة: جيولوجيا

الفصل الدراسى الثانى مايو ٢٠٠٨	المادة: Diagenesis and Special Course (Trace Fossils) (G320)	الدرجة: ١٠٥ درجة	الزمن: ساعتان

PART: II
Special Course (Trace Fossils) (52.5 Marks)

أجب عن الأسئلة الأتية:

(1) Write on اكتب عن: (10.5 Marks)
- A- Prerequisites for trace fossil preservation. (3.5 Marks)
- B- Activities traces. (3.5 Marks)
- C- Synonames of ichnology. (3.5 Marks)

(2) What is the difference between: (10.5 Marks)
- A- Burrows & Borings. (3.5 Marks)
- B- Paleoichnology & Neoichnology. (3.5 Marks)
- C- Coprolites & faecal pellets. (3.5 Marks)

(3) Write on the following: (10.5 Marks)
- A- Morphological classification of trace fossils. (5.5 Marks)
- B- Type of fossil occurrences in sediments. (5 Marks)

(4) Correct *three only* of the following sentences: (10.5 Marks)
- A- A tunnel of traces is a print made by a foot.
- B- Complete *Lebensspuren* become imprinted on the surface of the sediment.
- C- A track is a continuous groove or prints made during locomotion.
- D- Unfavorable consistency, slow solidification and nonburial of the sediment are the main prerequisites for trace fossil preservation.

(5) Define *three only* of the following scientific terms: (10.5 Marks)
- A- Ichnofacies
- B- Vestigiofossil.
- C- Lebensspuren.
- D- Ichnolites.

إنتهى الإمتحان والله الموفق،

أ.د./ أحمد سالم كساب
د./ محمود احمد عيسى

جامعة أسيوط
كلية العلوم - قسم الجيولوجيا

بسم الله الرحمن الرحيم

امتحان الفرقة الثالثة بكلية العلوم شعبة الجيولوجيا
المادة: الجيولوجيا التاريخية Historical Geology (G 324)
دور يونيو ٢٠٠٨م الدرجة: ١٠٥ درجة
الزمن: ساعاتان

Answer the following questions

The first question: Choose the correct answer (10 marks)

1- The appearance of flowering plants (Angiosperms) was during ..... Period
(a) Cretaceous (b) Paleogene (c) Silurian (d) Carboniferous

2- The Chronostratigraphic Unit Series can be subdivided into:
(a) System (b) stage (c) Age (d) Period

3- The geologic age of Mesohippus is .....
(a) Pleistocene (b) Miocene (c) Oligocene (d) Eocene

4- Mesozoic dominated by ..... climate
(a) cool (b) warm (c) temperate (d) dry

5- Plant associations mean.....
(a) Fauna (b) biota (C) flora (d) Phyla

6- The age of the Ediacaran fossils is .....
(a) late Archean (b) late Paleozoic (c) early Proterozoic (d) late Proterozoic

7- Paleozoic Era marked by ..... glaciation episodes.
(a) two (b) three (c) four (d) five

8- Hadean rocks contain .....
(a) some fossils (b) rare fossils (d) abundant fossils (c) no fossils

9- Fossils are remains of .....
(a)Plant (b) invertebrate (c) vertebrate (d) all of the previous

10- The geologic age of the eurypterids is .....
(a) Silurian (b) Permian (c) Triassic (d) Jurassic

The second question: Complete the following sentences (15 mark)

1- Archean atmosphere was rich in ..... and thus a greenhouse effect...
2- Extreme volcanism took place during the Precambrian help to form small ..... and aided in the out-gassing process to form the .....
3- The most commonly known supercontinent in the late Paleozoic was called.....
4- During the Mesozoic South America separated from ..... forming .....
5- During the Cretaceous ..... separated from Gondwana forming the .....
6- Shocked quartz grains and enrichment of iridium are evidences of .....at the K/T boundary.
7- During the Paleogene ..... closes due to the .....

The third question (20 marks)

- Tabulate the Geologic-Time Units of the Cenozoic Era, and discuss the derivation of each unit.

لاحظ باقى الأسئلة فى ظهر الورقة.

Assiut University
Faculty of Science
Dept. of Geology

Date: 16 June 2008
Time allowed: 2 hours

Second Semester Final Examination
Subject: Special Course -Geology of Africa (352 G)
Student: Forth Year

Answer FOUR questions of the following:

1. Write about:
   a. Cartons: Define and draw a map showing this distribution in Africa. (10 degrees)
   b. Greenstone belts and ophiolites. (10 degrees)

2. Write about:
   a. Atlas and Antiatlas mountains. (10 degrees)
   b. Paleothysis and Neothysis. How and when did the Neothysis open? (10 degrees)

3. Write about the different formations of the Karoo series in South Africa. (20 degrees)

4. Write About the different Phanerozoic rift systems in Africa, with reference to trend and age. (20 degrees)

5. Write about the mechanism and age of opening the Atlantic Ocean bordering Africa from the west. (20 degrees)

6. Write about:
   a. The Paleozoic intercontinental marine basin in North Africa and their economic importance. (10 degrees)
   b. The migration of Africa past the South Pole during the Paleozoic. (10 degrees)

BEST WISHS

Name of Examiner: Prof. Dr. / S. El-Gaby

كلية العلوم – قسم الجيولوجيا

المادة : حفريات نباتية 322 ج

امتحان الفصل الدراسى الثانى للعام الجامعى 2007-2008

الفرقة الثالثة (شعبة العلوم الجيولوجية)

دور مايو 2008

الزمن : ساعتان

أجب عن **سبعة** أسئلة فقط مما يلى على أن يكون **الأول** منهم :
(15 درجة عن السؤال):

1- Describe a non-acid method used to extract palynomorphs from consolidated sediments.
2- Write on paleoecologicl/paleoclimatic applications of dinoflagellates.
3- What are the main types of palynomorphs.
4- Illustrate with drawings the main types of ornamentation of spore and pollen walls.
5- What is the influence of river transport on distribution of palynomorph associations on the bottom sediments of Lake Maracaibo.
6- Write on morphology and structure of spores.
7- Describe the Kofoidian system of tabulation/paratabulation in dinoflagellates.
8- Write on the influence of acid environments on palynomorph preservation.
9- What are the main morphological differences between spores and pollen grains.
10- Write short notes on the life cycle of dinoflagellates.

أنتهت الأسئلة

بسم الله الرحمن الرحيم

Geology Department
Faculty of Science
Assiut University

قسم الجيولوجيا
كلية العلوم
جامعة أسيوط

Second Semester: Third Year Examination

الزمن : ساعتان	الدرجة : ١٠٥ درجة	Hydrogeology and Petroleum Geology (346G)	الفصل الدراسي الثاني مايو ٢٠٠٨

PART ONE: PETROLEUM GEOLOGY

(52.5 marks)

Answer the following question: **(26.5 *marks*)**

1. A) Write short notes on seals and cap rocks in the Gulf of Suez and North Western Desert? (13.5 *marks*)

B) Complete the following: - (13 *marks*)

a)The main causes of petroleum migration are:

i)..... ii) ..... iii) ..... vi) ..... V) .....

b)The arguments against petroleum migration :

i)..... ii) ..... iii) ..... vi) ..... V) .....

c)The main characteristics of a petroleum reservoir:

i)..... ii) ..... iii) ..... vi) ..... V) .....

Answer only <u>ONE</u> of the following questions: **(26 *marks*)**

2. a) Discuss briefly the different types of stratigraphic traps? (illustrating your answer with drawings as possible). (16 *marks*)

b) Put true (√) or false (X) with corrections: (10 *marks*)

i) The source bed always lies near the oil reservoir rock. ( )

ii) The source organisms constitute mainly of continental fauna. ( )

iii) Sealing materials are necessary for further petroleum migration. ( )

iv) Porosity of oil reservoir rock is an indication of oil potentiality. ( )

v) The porphyrine substances are evidence supporting the organic origin of petroleum. ( )

3. a) Discuss briefly the different theories of inorganic origin of petroleum? (16 *marks*)

باقي الامتحان بالصفحة الثانية ←

بسم الله الرحمن الرحيم

Geology Department
Faculty of Science
Assiut University

قسم الجيولوجيا
كلية العلوم
جامعة أسيوط

Second Semester: Third Year Examination

الزمن : ساعتان	الدرجة : ١٠٥ درجة	**Hydrogeology and Petroleum Geology (346G)**	الفصل الدراسي الثاني مايو ٢٠٠٨

b. Put true (√) or false (X) with corrections: (10 *marks*)

i) The syngentic oil was formed after the deposition of source materials and before the consolidation of source bed ( )

ii) The geochemical exploration method is useful only for reconnaissance survey. ( )

iii) The natural gases are mainly consist of hydrocarbons. ( )

iv) The primary migration is the movement of oil through out the reservoir rock until trapping. ( )

v) Presence of oil in nonorganic rocks is an evidence of petroleum migration. ( )

PART TWO: HYDROGEOLOGY

(52.5 marks)

*Answer only **TWO** of the following questions:*

1. Write short notes on: *(26.5 marks)*
   a. Specific yield and retention.
   b. Water-bearing formations.
   c. Agricultural uses of groundwater.
2. Discuss briefly: *(26.5 marks)*
   a. The differences between the saturated and unsaturated zones.
   b. The different types of groundwater aquifers.
   c. The major and minor dissolved constituents in groundwater.
3. Write short notes on: *(26 marks)*
   a. The hydraulic conductivity.
   b. The hydrologic cycle.
   c. The physical properties of groundwater.

الممتحنون : ١ –ا.د /حمزه احمد إبراهيم ٢ – ا.د/ السيد محمد أبوالعلا

GOOD LUCK

Assiut University
Faculty of Science
Geology Department

Date: 31 May, 2008
Time allowed: 2 hours.

Second Semester Final Examination

Subject: Geophysics 2 (342G)
Students: Third Year Geophysics Students

Answer the following question: (27 mark)

Answer ONLY TOW of the following questions:-

A-Write about velocity gradient and estimate its relation to the raypath parameter (P) in vertically anisotropic medium. (13.5 mark)

B- Write about characteristics of the ray path in anisotropic media. (13.5 mark)

C-Explain the method for ellipses for constructing the reflection boundaries. (13.5 mark)

Answer ONLY THREE of the following questions:

1- Write briefly on the following: (26 mark)

A- Distortions of vertical electrical resistivity sounding field curves. (8 mark)

B- Gravitational field above V. cylinder and the solution of reverse problem. (9 mark)

C- Variation with time of the earth's magnetic field. (9 mark)

2-Discuss briefly: (26 mark)

A- Four layer vertical electrical resistivity sounding curve types. (8 mark)

B- Gravitational field above H. cylinder and the solution of reverse problem. (9 mark)

C- Reduction of magnetic field measurements. (9 mark)

3- Write briefly on: (26 mark)

A- Qualitative interpretation of electrical resistivity data. (8 mark)

B- Ariy s theory of isostasy. (9 mark)

C- Magnetic effect of spherical causative bodies. (9 mark)

4- Explain briefly: (26 mark)

A- Interpretation of multilayer vertical electrical resistivity sounding curves. (8 mark)

B- Qualitative interpretation of gravity data. (9 mark)

C- Peter's slope method for causative body's depth determination. (9 mark)

Name of Examiners: 1- Prof. Dr. Abudeif A. Bakheit
2- Dr. Assem E. El Haddad

GOOD LUCK

Assiut University
Faculty of Science
Department of Geology

Date: May, 2008
Time allowed: 2 hours

Second Semester Final Examination

Subject: Course No. G 318 Metamorphic Rocks
Students: 3rd Year Geology

Answer **THREE** questions only from the following with drawing as much as you can:

1. **A-** Write on the most important mineralogical changes occur when the metamorphic conditions change from low to medium-grade of metamorphism. (**15** mark)

   B- Write on the metamorphic facies of contact metamorphism and give an informative example on contact metamorphism of pelitic rock. (**20** mark)

2. **A-** A granitic intrusion intruded into previously unmetamorphosed calcareous and pelitic sediments. By drawing show the various metamorphic zones. (**20** mark)

   B- Mark with (√) on the correct answer and with (×) on the false one, and correct the false answer: (**15** mark)

   i- The upper greenschist facies limit is identified by the appearance of actinolite instead of hornblende in basic rocks. ( )
   ii- The paragenesis clinopyroxene + garnet is characteristic of the upper amphibolite facies. ( )
   iii- Granulite facies is well developed in the Precambrian terrains. ( )
   iv- In hydrothermal metamorphism the most important factor of metamorphism is the hot ion rich fluids circulate through fissures and cracks that develop in a rock. ( )
   v- Several metamorphic environments exist at divergent plate boundaries. ( )
   vi- The greenschist facies is the most common facies in the regional metamorphic belts; it covers a temperature range from 200 to 300° C at intermediate pressure. ( )

3. **A-** Define the following: (**15** mark)
   Metamorphic facies, Metamorphic isograde, Metamorphic zone, Phase rule, ACF diagram and Paired metamorphic belts.

   B- Considering basic and acidic magma intruded at pressure 1500 bars, where the temperature of the country rocks 150° C. At this depth show the beginning of metamorphic grades at different distances. (**20** mark)

(Continue in the next page)

4. **A-** Explain the following sentence: Most metamorphism occurs along subduction zones at convergent boundaries. (**20** mark)

B- Write on the reasons that responsible for the variation of metamorphic rocks – give examples. (**15** mark)

Name of Examiners: 1- Prof. Dr. Hussien A. Hegazy
2- Dr. Hisham A. Gahlan

Good Luck

Assiut University
Faculty of Science
Department of Geology

Date: 11 May 2008
Time allowed: 3 hours

2nd Semester Final Examination

Subject : Sedimentary Petrology & Sedimentary Processes (316G)

Students: 3rd Year- Geology Department

The first part: Sedimentary Petrology (52.5 Marks)

1- On the light of your study, write on four of the following (40 Marks):
   a- Mineralogy of iron-bearing sediments (10 Marks).
   b- Depositional environments of evaporates (10 Marks).
   c- Origin of Egyptian phosphorites (10 Marks).
   d- Classification of terrigenous sandstones (10 Marks).
   e- Origin of cherts (10 Marks).
2- Write on the main differences between (12.5 Marks):
   a- Petromict and oligomict conglomerates (2.5 Marks).
   b- Siliceous phosphorudite and calcareous phosphoarenites (2.5 Marks).
   c-Biomicrudite and intrasparite (2.5 Marks).
   d- Lignite and anthracite (2.5 Marks).
   e- Residual and transported soils (2.5 Marks).

The second part: Sedimentary Processes (52.5 Marks)

Answer only four questions:

1- Write short notes on the following (13.1 Marks):
   a- Hjulstrom effect (6.6 marks).
   b- Mechanism of particle movement through a fluid (6.5 Marks).
2- Trapping and baffling of sedimentary particles by organisms (13.1 Marks).
3- Write short notes on the following (13.1 Marks):
   a- Pelletization (6.5 Marks).
   b- Slide or slump (6.6 Marks).
4- Dissolution of CaCo3 as a function of pH (13.1 Marks).
5- Write short notes on the following (13.1 Marks):
   a- Aeolian sedimentation from suspension (6.6 Marks).
   b- Mechanism of glacial transport and decomposition (6.5 Marks).

Name of examiners:

1- Prof. Dr. Hassan H. Mansour.
2- Dr. Abdalla M. El Ayyat.

Good luck