Mansoura University
Faculty of Science
Physics Department

2nd Level Exam.
January 2012
Time allowed : 2 hrs

Atomic Physics 222 ف

Answer the following questions.

1-a) Define the degenerate orbits.
Starting with the mass relativistic effect and the general equation of the total energy, show how elliptical orbits could explain the fine structure. (15 marks)

b) Discuss briefly the main concepts of the vector atom model.
Estimate the total angular momentum vector **J** of an atom where the orbital angular momentum vector **L** = 2, and the spin angular momentum vector **S** = 1. (13 marks)

2-a) Explain the main parts of mass spectrograph. Show how it can be used to study the isotopes. Clarify the function of the velocity selector. (15 marks)

b) Deduce the wavelength in A° and the energy in eV of the spectral line of the minimum wavelength of the Lyman series. (11 marks)

3-a) X-ray spectra consist of two types, continuous and characteristic. Study.
Draw the energy level diagram of characteristic X-ray. (15 marks)

b) For a monovalent element, deduce the possible j values for $\ell = 0,1,2,3$ and the type of each term. Explain the spectral series of the emission transition of sodium atom. (11 marks)

($c=3\times10^{10}$ cm/s $h=6.625\times10^{-34}$ J.s $1eV=1.6\times10^{-19}$ J $R=1.097\times10^{7}$ m^{-1})

($e=1.6\times10^{-19}$ C $m=9.11\times10^{-28}$ g)

Best Wishes

Prof. A. El-Khodary

Mansoura University Faculty of Science Physics Department		**First Term Exam.** Date: **1-1-2012** Time allowed : **2 hours** Full Mark: **80 Mark**
Subject: **Physics**		Course: **221 ف Physical Optics**

Answer the Following Questions

[1]a- Demonstrate an explanatory diagram of the optical arrangement of Young's experiment on interference. Drive the theory of interference for this experiment. **[10 Marks]**

b- Explain how you can determine the thickness of a thin sheet of transparent material using Fresnel's biprism. **[8 Marks]**

c- Good fringes were observed with Michelson interferometer with monochromatic light, when the movable mirror is shifted 0.015 mm, a shift of 50 fringes is observed. What is the wavelength of light used. **[8 Marks]**

[2] a- Discus Fraunhofer diffraction using a rectangular slit. Drive an expression for the intensity distribution of the observed diffraction pattern. **[15 Marks]**

b- A parallel beam of monochromatic light is allowed to be incident normally on a plane spectra grating having 6000 lines/cm and a second order spectral line is observed to be deviated through 30^{o} Calculated the wavelength of the spectral line. **[12 Marks]**

[3]a- Explain with the necessary theory of interference in thin films due to reflected light. **[9 Marks]**

b- How can you obtain polarized light by refraction? **[9 Marks]**

c- In a Jamin's refractometer, two evacuated tubes each of length 20 cm are placed in the two beams. A gas at a known temperature and pressure is slowly and 100 fringes cross the centre of the field of view. Calculate the refractive index of the gas. (where the used source have wavelength $\lambda = 5460\ A^{o}$). **[9 Marks]**

Good Luck

Examiners: Prof. Dr. Taha Sakkar, Prof. Dr. Eman seisa , Prof. Dr. Mohamed Kabeel

Mansoura University
Faculty of Science
Geology Department
Date: 1/1/2012

First Term Exam (Jan 2012)
Second level (Geophysics and Geology)
Subject: Geo-204
Course: Structural Geology
Time: 2 hours Full Mark: 60

Answer the following questions:

NOTE: Draw well-represented figures wherever needed to support your answer

1- Write briefly on: (5 marks for each)

a) The differences between the normal, reverse, strike-slip, diagonal and thrust faults.
b) The drag and roll-over faults.
c) The pull-apart basins and give an example from Egypt.
d) The style of structures for a hanging-wall that is cut by planar and listric faults. (5 marks)

2- Comment on each of the following: (5 marks for each)

a) Contractional and extensional strike-slip duplexes
b) The shear array in a strike-slip shear zones and show an example from Egypt.
c) Symmetrical and asymmetrical rifts.
d) The upright, overturned and inclined folds

3- Show the differences between: (2 marks for each)

a) Anticline and syncline
b) Plunging anticline and syncline folds.
c) Hinge line and fold axis.
d) Graben and half graben on planar and listric faults.
e) Transform and transcurrent faults.
f) Klippe and tectonic windows.
g) The sole and growth faults.
h) listric and planar faults
i) Synthetic and antithetic faults rifts.
j) True and apparent dips.

Best Regards

لجنة الإمتحان والتصحيح*:

البترول الثاني - جيولوجيا - (ج ٢٠٢) حكم الصفر

Mansoura University
Faculty of Science
Geology Department
Date: 20 Jan., 2012

Final Exam (January 2012)
Second Level (Geology Program)
Subject: G-203 (Petrology)
Total Marks: **60** **Time**: 2 hours

Answer the following questions:

Question ONE: Complete the following: **(15 marks)**

1- ..... deals with sharpness of edges and corners of a clastic fragment.

2- ..... is the spatial arrangement of the fragment elements.

3- Sediments are analyzed mechanically by ..... and ..... methods.

4- ..... means physical and chemical changes that happend to sediments after buried.

5- Fine sediments have ..... porosity than ..... sediments.

6- Processes by which sediment particles laid down in beds called .....

7-.....is the property of a rock which allows fluid to pass through it.

8- Sediments with mud matrix, poor sorting and angular grains are described as.....

9-.....is a measure of the relation between the 3 dimensions of an object.

10-.....is the percentage of pore spaces to the total volume of the rock.

11- Detrital minerals include .....,.....,.....,.....

12- Chemical minerals include.....,.....,.....,.....

13-Structures of sedimentary include.....,.....,.....,.....

14-..... are accessory minerals in the parent rock surviving destruction.

15- ..... deals with the manner of arrangement of the grains.

Question TWO: Give a suitable name for these rocks: **(15 marks)**

1- Indurated rock composed of rounded large fragments of volcanic origin.

2- Lithified non-laminated clays containing angular and rounded rock fragments polished and striated.

3- Formed due to movement that occurs along fault surface.

4- Immature deposits, vary in composition and consist of several kinds of metastable rock fragments.

5- Sandstone with feldspar grains exceed 25%.

6- Sandstone with matrix more than 75%.

7- Sandstone with matrix less than 15%.

8- Non-laminated rock whose particles have size less than 1/16 mm.

9- Semi friable mixtures of clay materials and lime carbonate.

10- A rock composed mainly of 95%or more quartz

11- Pure organic mud rock rich with bitumen and kerogen..

12- Biochemical deposits formed by constructive activity of organisms.

13- Evaporitic carbonate, impure soils formed in situ in semiarid region.

14- Unconsolidated porous silt of special character, buff in color and highly calcareous.

15- Limestones formed by evaporation of spring and river waters.

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***Question THREE:* Complete the following:**

- Dunite is an ...(1)... rock, composed mainly of ...(2)... mineral, and its metamorphism is yielded ...(3)... rock.
- Volcanic rocks are characterized by ...(4)..., ...(5)... and ...(6).... textures.
- Fine-grained foliated rock is define as ...(7)... rock, while medium-grained foliated rock is defined as ...(8)...
- Metamorphic agents of orogenic metamorphism include ...(9)..., ...(10)... and ...(11)...
- Quartizite is a metamorphic equivalent of ...(12)..., while marble is a metamorphic equivalent of ...(13)...
- Plutonic equivalent of basalt is ...(14)..., which are composed of ...(15)... and ...(16)...minerals.
- According to mode of occurrence, batholiths are ...(17)..., lava flows are ...(18)..., while sills are ...(19)...
- Quartz is essential mineral in ...(20)... igneous rock, while Ca-rich plagioclase is only formed the ...(21)...rock.
- The early-formed mafic igneous mineral is .....(22)..., while the latest-formed mineral is ....(23)....
- Obsidian characterizes by ...(24)...texture, while texture of granite is ...(25)..., pegmatite is ...(26)... and gneisse is ...(27)....
- The magma is composed of ...(28)..., ...(29)..., and ...(30)... phases.

Question Four: ***(15 Marks)***

a) Choose the correct answer from the following: ***(6 Marks)***

1- The main agent of contact metamorphism is (T - P - P&T – P,T & active fluids).

2- Low-grade metamorphism of shale is (amphibolite – gneiss – marble – slate).

3- Andesite is the volcanic equivalent of (diorite – gabbro – granite – granodiorite).

4- Crystallization of volatile-rich magma gives (rhyolite - dacite – pegmatite - anorthosite).

5- Calcite-rich metamorphic rock is generated from (shale – granite – basalt – limestone)

6- Pumice is (felsic – mafic – ultramafic – intermediate) igneous rock.

b- Describe the mineral composition, texture, mode of generation, color of the following rocks: ***(6 Marks)***

1- Diorite 2- Pyroxenite 3- Basalt

c- Compare between the characters of igneous and metamorphic rocks? ***(3 Marks)***

---------- With our best wishes

Examiners: Prof. Dr. Amin Geith Prof. Dr. Mahrous Abu El-Enen

المستوى الثانى - جيولوجيا - بصريات المعادن والصخور المكونة للصخور ج٢٠٢
جيوفيزيا

Mansoura University
Faculty of Science
Geology Department

Final Theoritical Exam
1st Term 2011/2012

Date: 22 / 01 / 2011
Time Allowed: Two Hours
Full Mark: 60 Marks

نظام :-- الساعات المعتمدة الفرقة :-- المستوي الثاني برنامج :-- الجيولوجيا + الجيوفيزياء

الورقة الامتحانية :-- ج ٢٠٢ المقرر:-- بصريات المعادن والمعادن المكونة للصخور

Optical Mineralogy + Rock-Forming Minerals

Answer Three Questions from the Followings:- (20 Marks each question - 5 Marks each part)

1- Draw the followings :--
   - A- Sheet silicate structures.
   - B- Behaviour of light in the microscope.
   - C- Double and chain silicate structures.
   - D- Nicol prism.

2- Compare between the following pairs :--
   - A- Gypsum plate and quartz wedge.
   - B- Colours of 1st and 2nd orders.
   - C- Micas and Feldspars.
   - D- double refraction and twinkling.

3- Describe in detail the followings :--
   - A- Pleochroism.
   - B- Relief.
   - C- Controlling factors on refractive index.
   - D- Amphiboles and pyroxenes.

4- Write short notes on the followings :--
   - A- Factors affecting interference colours.
   - B- Extinction.
   - C- Ring silicate structures.
   - D- Optic axis.

GOOD LUCK & BEST WISHES

لجنة التصحيح :- أ.د. عمر حجاب – د. شعبان مشعل*

الترم الثاني - جيولوجيا - (ع ا ب) أحافير لافقاريه كبيرة

Mansoura University
Faculty of Science
Department of Geology
Date: January, 13, 2012

Subject: Invertebrate Palaeontology
Total marks: 60
Level: G 201

Answer the following questions:

I. Write short notes on the following: **(20 marks)**

a. Graptolites (5 marks)

b. Classification of phylum Porifera (5 marks)

c. Order Tetracoralla (5 marks)

d. Shapes of Gastropod shells (5 marks)

II. Draw and write on the stratigraphic importance of the following: (20 marks)

a. *Calceola sandalina* (5 marks)

b. *Exogyra overwegi* (5 marks)

c. *Lucina thebaica* (5 marks)

d. *Turritella pharaonica* (5 marks)

III. **(20 marks)**

a- Compare between inarticulate and articulate brachiopods. (10 marks)

b- Explain the favorable environment for the growth of coral reefs. (10 marks)

Examiners: Prof. Mohamed Abed*, Prof. Mahmoud Kora, Prof. Salah El Beialy and Prof. Hosni Hamama

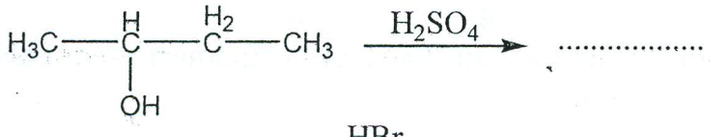
Mansoura University
Faculty of Science
Chemistry Department
Subject: Organic Chemistry

First Term
2nd year: Biology & Biophysics Student
Date: Jan 2012
Time Allowed: 2 h
Full Marks: 60 Marks
Code: 235

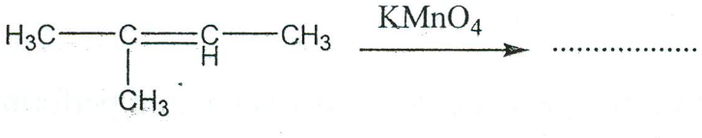
Answer the following questions:

Q1- Complete the following equations: [20 marks]

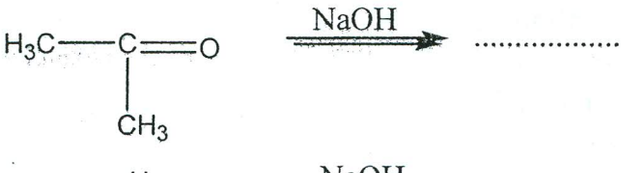
i- $2\ CH_3\text{-}Cl \xrightarrow{Na}$ .....

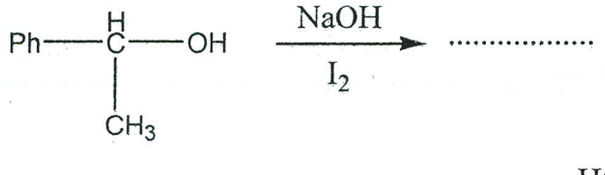
ii-  .....

iii-  .....

iv-  .....

v- $CH_3\text{-}CHO + NH_2\text{-}OH \longrightarrow$ .....

vi-  .....

vii-  .....

viii- $CH_3\text{-}Br + Mg \longrightarrow$ ..... $\xrightarrow{HCHO}$ .....

ix- $HC\equiv CH \xrightarrow[2\text{- }CH_3\text{-}Cl]{1\text{- Na}}$ ..... $\xrightarrow[H^+]{HOH}$ .....

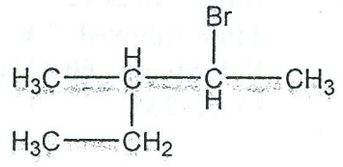
x- $Ph\text{-}CHO + HCN \longrightarrow$ .....

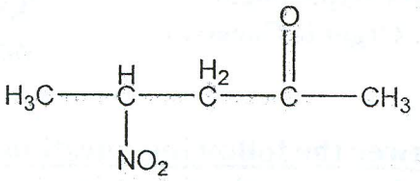
Q2- Illustrate the following: [20 marks]

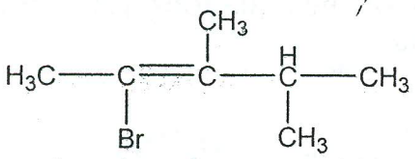
a) Draw the chemical structure of the following compounds:
i- 3-methyl-1-butanol.
ii- neohexylchloride.
iii- 2-buten-1-ol.

P.T.O ⟶

b) Write the IUPAC name of the following:

i- 

ii- 

iii- 

c) Draw all isomers and assign the type of isomerism in each of the following compounds:

i- 1,2-dichloroethylene.
ii- $C_4H_{10}O$.
iii- 2,3-dibromo-1-butanol.

Q3- Using the chemical equations, show how you could perform the following conversions. [20 marks]

i- Ethylene to acetone.
ii- Methyl chloride to ethanol.
iii- 1-propanol to 2-propanol.
iv- Ethanol to crotonaldehyde.
v- Acetylene to acetone.

With our best Wishes

Examiners:

Prof. A.A. Fadda, Dr. M. Monier, Dr. D.M. Ayad and Dr. M. Elsayed

المستوى الثانى - جيولوجيا + مجموعة البيولوجى - كيمياء العناصر الممثلة (كم ١٢١)

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s):Inorganic Chemistry, Chem 221	كلية العلوم جامعة المنصورة	First Term 2rd Level (Geology, Microbiology, Botany, Environmental, Zoology/ Chem) Date : Jan. 2012 Time Allowed: 2 hours Full Mark: 80 Marks

Answer the Following Questions

1- Comment on (10 only) of the following: (30 Mark)

1. **Liquid hydrogen is used as fuel in large booster rockets.**
2. **BF_3 is Lewis acid**
3. **White phosphorous should never be allowed to come in contact with the skin.**
4. **Lithium is similar to magnesium.**
5. **Group II elements are heavily hydrated than group I elements.**
6. **Calcium dihydrogen phosphate is used in food industry.**
7. **Nitrogen oxides are poluttants.**
8. **The great reactivity of F_2.**
9. **Photochromic eye glass is made by adding a small amount of AgCl.**
10. **H_3PO_2 is a strong reducing agent.**
11. **Aqueous solutions of Be(II) salts are acidic.**
12. **Cs^+ conducts electricity more than Li^+ in aqueous solution.**
13. **Malathion has a great effect on insects rather than human.**

P.T.O

2. Complete <u>10 only</u> of the following equations: <u>(30 mark)</u>

1. $CH_4 + H_2O_{(g)} \rightarrow$
2. $2NaCl$ (electrolysis /$CaCl_2$)$\rightarrow$
2. $CoO + B_2O_3 \rightarrow$
3. $Na_2O_2 + CO_2 \rightarrow$
4. $HF + SiO_2 \rightarrow$
5. $CaCN_2 + 5H_2O \rightarrow$
6. $CuO + NaH \rightarrow$
7. $2KClO_3 + MnO_2$ + heat $\rightarrow$
8. $CaF_2 + H_2SO_{4\ Conc.} -$ ....
9. $NaCl_{(aq)} + CO_{2(g)} + NH_{3(g)} \rightarrow$ .....
10. $H_3BO_3 + H_2O \rightarrow$
11. $B_2O_3 + P_2O_5 \rightarrow$

3. Try on <u>(4 only)</u> of the following: <u>(20 Mark)</u>

a. Contact process for production of H_2SO_4

b. Structure of B_2H_6.

c. Ostwald process for the production of HNO_3.

d. Allotropy of Carbon

e. Ortho- and para hydrogen.

f. Isolation of silicon in pure form