أجب على الأسئلة الآتية: -

السؤال الأول: - ضع علامة صح أو علامة خطا بدون تعليل

١- صدر الإعلان العالمي لحقوق الإنسان في العاشر من ديسمبر عام ١٩٥٨.

٢- يعتبر رضاء المجني عليه سبباً لإباحة الفعل في القتل بدافع الرحمة .

٣- تعد حرية الرأي هي الحرية الأم بالنسبة لطائفة الحريات المعنوية .

٤- يعد اتخاذ الدولة ديناً رسمياً لها عائقاً أمام الحرية الدينية .

٥- حق التقاضي يمكن الشخص من اقتضاء حقه عن طريق العدالة الخاصة .

السؤال الثاني: - اكتب في موضوع واحد فقط مما يلي : -

١- تكلم عن حق التقاضي مبينا ماهيته ومصادره والضمانات اللازمة له.

٢- تكلم عن حق الإنسان في الحياة في الإسلام .

Mansoura University
Faculty of Science
Chemistry Department
Course: Chem. (121)

First Level
Date: 5/1/2016
Time Allowed: 2 hours
Full Mark: 60 Marks

**** *Answer the following questions* ****

[Q1] Put the Mark (√) for the right sentence and (X) for the wrong with writing its correction:

(15 marks)

1. The Cl-P-Cl bond angles in PCl_5 are 90° and 120°. ($_{15}P$, $_{17}Cl$)
2. The maximum number of electrons in each of subshell is ($4\ell +1$).
3. The first ionization energy of **P atom** is less than that of **S atom**. ($_{15}P$, $_{16}S$)
4. In the periodic table, the **O** element is the highest electronegative and **Ba** is the least. ($_8O$, $_{56}Ba$)
5. **$BeCl_2$** is a linear molecule whereas **H_2O** has bent molecular geometry. ($_4Be$, $_8O$, $_{17}Cl$)
6. The polarity of the covalent bond increases as follow: **C-O > C-N > C-F**
   (Electronegativities of $_6C = 2.5$, $_7N = 3$, $_8O = 3.5$, $_9F = 4$)
7. No two electrons in one atom have different set of quantum numbers.
8. The maximum number of electrons in f subshell is 14.
9. The atoms combined together to form bonds.
10. The hybridization of **B** in **BF_3** is sp^3. ($_5B$, $_9F$)

[Q2] Choose the correct answer of the following questions: *(15 marks)*

1. Which sketch represents an orbital with the quantum numbers $n = 3$, $\ell = 0$, $m_\ell = 0$?

2. Which of the following is most likely to be an ionic compound?
   a) NF_3 b) N_2 c) CO_2 d) Na_2O

3. Which of the following has the largest radius? ($_8O$, $_{11}Na$, $_{12}Mg$, $_{17}Cl$)
   a) Cl^- b) O^{2-} c) Na^+ d) Mg^{2+}

4. What is the electron configuration for copper ion, $_{29}Cu^+$?
   a) $[Ar] 4s^2 3d^9$ b) $[Ar] 4s^1 3d^{10}$ c) $[Ar] 4s^0 3d^{10}$ d) $[Ar] 4s^2 3d^8$

5. Which of the following Lewis N_2O structures is false? ($_7N$, $_8O$)

6. Which one of the following is a metal?
   a) $_5B$ b) $_6C$ c) $_{31}Ga$ d) $_{19}K$

7. Which one of the following molecular formulas is an empirical formula?
   a) $C_6H_6O_2$ b) H_2O_2 c) C_2H_6SO d) $H_2P_4O_6$

   Molecules like CO_2, NO_2 and BF_3, which one obeys octet rule? ($_5B$, $_6C$, $_7N$, $_8O$, $_9F$)
   a) All obey.   b) Only BF_3 c) CO_2 and NO_2 d) Only CO_2

8. Which one of the following is the correct orbital diagram for ground state oxygen ($_8O$)?

9. Which of the following elements has the most negative electron affinity?
   a) $_{10}Ne$ b) $_9F$ c) $_8O$ d) $_6C$

Please turn over ➤

[Q3] Complete the following _statements_: *(15 marks)*

1. Pauli Exclusion Principle states that ……………..
2. The four quantum numbers of the last electron in $3d^3$ are ……..
3. ……………….. concluded that it is impossible to simultaneously know both the position and momentum of an object as small as an electron.
4. In Lyman series of H spectrum, the third line represents the movement of electron from the …….. energy level to the ………..
5. The atomic size of Li is …… than that of O and the atomic size of Be is …... than that of Ba.
    ($_3$Li, $_8$O, $_4$Be, $_{56}$Ba)
6. Down the group, the first ionization energy ……….. and the electron affinity ………..
7. s-s overlap produce …… bonding molecular orbital and …… antibonding molecular orbital.
8. Ionic bond results from attraction between ions of different charges and ……….. bond results from sharing of electrons from two atoms but ……….. bond results from sharing pair of electrons in which both electrons come from the same atom.
9. 80% of known elements on the earth are ………..
10. Bonding M.O. possess ……….. energy than of atomic orbitals.

[Q4] a- On the basis of (M.O.T), answer the following: *(15 marks)*

1. Which molecule is more stable O_2 or O_2^- ?
2. Which molecule is paramagnetic N_2 or O_2?

 b- 12 gram of zinc and 6.5 gram of sulfur react to form zinc sulphide (**ZnS**), a substance used in phosphor that coat the inner surfaces of TV picture tubes and computer screens; the equation of the reaction is

$$Zn + S \rightarrow ZnS$$

1. Which is the limiting reactant?
2. How many grams of ZnS can be formed? (The atomic weights of Zn= 65.4, S=32).

 c) Magnesium reacts with chlorine to form $MgCl_2$, draw Born-Haber cycle of the formation of $MgCl_2$?

***** Best Wishes *****

Prof. Nagwa Nawar and Prof. Ola El Gamal

المستوى : الأول		دور: يناير 2016
المادة : جبر وهندسة	كلية العلوم – قسم الرياضيات	الزمن : ساعتان
كود المادة : (ر111)		التاريخ : 9 /1 /2016

البرامج: كيمياء-الكيمياء الحيوية- كيمياء وحيوان- ميكروبيولوجى- كيمياء ونبات-علوم بيئة- جيولوجيا- جيوفيزيقا

أجب عن الأسئلة الآتية: الدرجة الكلية : 80 درجة

السؤال الأول:

أ –استخدم مبدأ الاستنتاج الرياضي فى اثبات أنه لاى عدد طبيعى $n \in N$ فان:

(10 درجات)

$$\frac{1}{1 \times 3} + \frac{1}{3 \times 5} + \ldots + \frac{1}{(2n-1)(2n+1)} = \frac{n}{(2n+1)}$$

ب – اوجد نقطة تقاطع المستقيمين $2x + y + 5 = 0$, $x + y + 2 = 0$ والزاوية بينهما
ثم اوجد معادلة المستقيم الذي يمر بنقطة التقاطع وعمودى على المستقيم $2x + 3y + 7 = 0$

(10 درجات)

لسؤال الثاني:

أ – اختار الاجابة الصحيحة مع الرسم وتوضيح جميع البيانات على الرسم

المعادلة $y^2 - 4y + x - 8 = 0$ تمثل: ا) قطع ناقص, ب) دائرة , جـ) قطع مكافىء

(10 درجات)

ب – اوجد المقياس والسعة للعدد المركب $z = \frac{2 - 2i}{1 + i}$ ثم اوجد $z^{\frac{4}{3}}$.

(10 درجات)

السؤال الثالث:

أ– باستخدام طريقة كرامر اوجد حل المعادلات الخطية الآتية:

(10 درجات)

$$3x + y + 2z = 11 \quad , \quad x + 2y - z = 2 \quad , \quad 2x - 3y + z = -1$$

ب– اوجد معادلة القطع الناقص الذى مركزه عند النقطة(2 , 3 -) و احدى بؤرتيه (2 , 3)
واحدى رؤوسه عند النقطة (8 , 2) موضحا جميع المعلومات الخاصة به مع الرسم .

(10 درجات)

السؤال الرابع :

أ–حلل الكسر الآتى إلى كسوره الجزيئية   (10 درجات)

$$\frac{3x^2 + x + 4}{x^3 + 4x}$$

ب – أوجد معادلة المنحنى $x^2 + y^2 - 12x - 8y + 50 = 0$ عند نقل المحاور
موازية لنفسها إلى النقطة $o'(6,4)$ وحدد نوع المنحنى .

(10 درجات)

مع أطيب التمنيات بالتوفيق: اسرة التدريس

Answer The following *Five* Questions: Each Questions (15) Marks

[1]

A) i- Two charged particles, **Q1** and **Q2**, are a distance **r** apart with **Q2 = 5Q1**. Compare the forces they exert on one another when **F1** is the force **Q2** exerts on **Q1** and **F2** is the force **Q1** exerts on **Q2**.

    a. $\bar{F}2 = 5\bar{F}1$.   **b.** $\bar{F}2 = -5\bar{F}1$ **c.** $\bar{F}2 = \bar{F}1$ **d.** $\bar{F}2 = -\bar{F}1$

ii- Two concentric imaginary spherical surfaces of radius **R** and **2R** respectively surround a positive point charge **Q** located at the center of the two surfaces. When compared to the electric flux $\Phi 1$ through the surface of radius **R**, the electric flux $\Phi 2$ through the surface of radius **2R** is:

    a. $\Phi 2 = \frac{1}{4} \Phi 1$ **b.** $\Phi 2 = \frac{1}{2} \Phi 1$ **c.** $\Phi 2 = \Phi 1$ **d.** $\Phi 2 = 2 \Phi 1$

iii- When a positive charge is released and moves along an electric field line, it moves to a position of
    a. Lower potential and Lower potential energy.   **b.** Lower potential and higher potential energy
    c. higher potential and Lower potential energy.   **d.** higher potential and higher potential energy.

iv- Which of the following is ***not*** a capacitance?
    a. $\varepsilon_o A /d$ **b.** $k \varepsilon_0 A /d$ **c.** Q/V   **d.** $k_e \varepsilon_0 A /d$

v- According to Einstein's theory, the energy of a photon is:
    a. proportional to its wavelength.   **b.** proportional to its frequency.
    c. constant, since the speed of light is a constant. **d.** proportional to the square of the frequency

vi- One reason why we know that magnetic fields are not the same as electric fields is because the force exerted on a charge **+q**
    a. Is in opposite directions in electric and magnetic fields.
    b. Is in the same direction in electric and magnetic fields.
    c. Is parallel to a magnetic field and perpendicular to an electric field.
    d. Is parallel to an electric field and perpendicular to a magnetic field.   **[12] Marks**

B) A cooper cable is to be designed to carry a current of **300 A** with a power loss of only **2 watts** per meter. What is the required radius of the cooper cable?
    The resistivity of cooper is **1.7 x 10^{-8} Ω.m**   **[3] Marks**

[2] a- Define the following terms:
    i- Equipotential surface.   **ii-** electric potential   **iii-** Capacitance
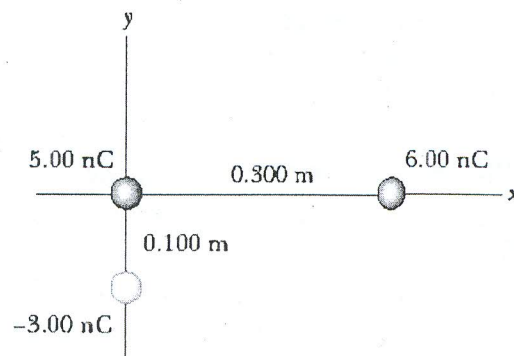   **iv-** Electric current   **v-** Index of refraction   **[10] Marks**

[2]   b- Three point charges are arranged as shown in Figure.
      (i) Find the vector electric field that the **6 nC** and **–3 nC**
      charges together create at the origin.
      (ii) Find the vector force on the **5 nC** charge

$k_e = 9 \times 10^9$ N.m^2/C^2 **[5] Marks**

5.00 nC   0.300 m   6.00 nC

0.100 m

–3.00 nC

[3] **a** An *insulating* solid sphere of radius R has a uniform volume charge density ρ and carries a total
    positive charge **Q**. Calculate the magnitude of the electric field at a point inside the sphere at
    distance **r** where **r < R** . Using Gauss's low   **[7] Marks**

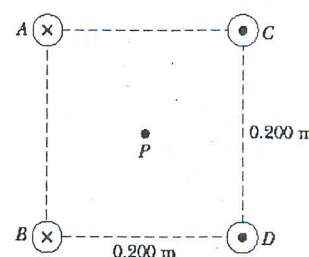**b-** Four long, parallel conductors carry equal currents of *I* = 5 A.
    the figure is an end view of the conductors The current direction
    is into the page at points **A** and **B** and out of the page at
    C and **D**. Calculate the magnitude and direction of the magnetic field
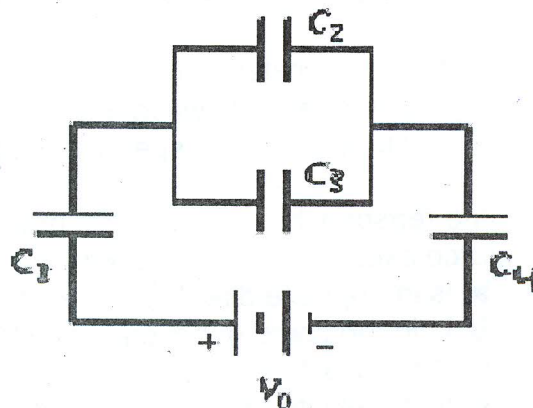   at point **P**, located at the center of the square of edge length **0.2 m**.

$\mu_o = 4\pi \times 10^{-7}$ T.m /A   **[8] Marks**

A ⊗ ---------- ⊙ C

P   0.200 m

B ⊗ ---------- ⊙ D
     0.200 m

[4] **a** - Determine the energy stored by C4 when
    C1 = 20 μF, C2 = 10 μF, C3 = 14 μF, C4 = 30 μF,
    and V_o = 45 V.   **[9] Marks**

C_2

C_3

C_1

C_4

V_o

b- Calculate the maximum value for the incident angle α max (numerical aperture) for which the
   internal   ray will refract at the critical angle for an optical fiber.   **[6] Marks**

Examiners: 1- Dr. Nabil Kinawy   2- Dr. Moneim Ismail

Mansoura University
Faculty of Science
Department of Physics

Time Allowed: 2 h
Date: 16 / 1 / 2016
All Programs

First Term Exam 2015-2016
Physics (101)

Answer the following Questions:

Q.1) What is the meaning of each expression: _(20 Mark)_

1- The work done to produce a quantity of heat equal to 1 cal.
2- Particles that are very close together can transfer heat energy by.....
3- The quantity of heat (Q) that flow perpendicular to the face during a time (t).
4- The rate of heat flow per unit area per unit temperature gradient when the heat flow is at right angle to the faces of a thin parallel material under steady state condition.
5- The amount of time it takes to complete one oscillation or 1 cycle.
6- The amount of heat per unit mass needed to change one gram of a solid substance into one gram of liquid without changing its temperature.
7- The deformation produced in the body is not completely recovered after the removal the load.
8- The negative ratio between the lateral strain to longitudinal strain.
9- An external pressure applied to an enclosed fluid is transmitted uniformly throughout the volume of the liquid.
10- If a body is totally or partially immersed in a fluid, the buoyant force will equal to the weight of displaced fluid.

Q.2) Write 'T' if the statement is true and 'F' if the statement is false. _(10Marks)._

1- Hooks law is applied correctly up to Elastic limit. ( )
2- Insulators do not have free electrons and so they conduct heat as well as metals. ( )
3- Heat conduction is the transfer of heat by the direct collision between particles of matter. ( )
4- The heat travels between the Sun and the Earth by conduction or by convection. ( )
5- The latent heat of vaporization of a substance is always Greater than its latent heat of fusion. ( )
6- The coefficient of linear expansion is twice the area of thermal expansion. ( )
7- Substances with higher heat capacities heat up more slowly than those with lower heat capacities. ( )
8- In steady flow, the velocity of an incompressible fluid at each point does not remains constant. ( )
9- A thermometer is an instrument that measures the temperature of a system in a quantitative way. ( )
10- Change in shape or size (or both) of a body due externally applied force is called stress. ( )

Q.3) Solve these Problems _(10 Marks)_

1- A 0.1 Kg unknown (ingot) of metal is heated to 300 °C and then dropped into a beaker containing 0.5 Kg of water initially at 25 °C. If the final equilibrium temperature of the mixed system is 50 °C. Find the specific heat of the metal. (C_w = 4190 J)
2- The smaller and larger pistons of a hydraulic press have diameters of 4 cm and 12 cm. What input force is required to lift a 4000 N weight with the output piston?
3- The extremes of temperature in the bottom of the earth, over a period of 50 years, differ by 116 °F. Express this range in Celsius degree?
4- A square hole 8.00 cm along each side is cut in a sheet of copper. Calculate the change in the area of this hole if the temperature of the sheet is increased by 50.0 K. β_c = 34 x 10^{-6} K^{-1}.
5- If the force F equal $F = 2\pi r L v \eta / R$ where r is radius L is length, v is speed and R is distance, what are the dimensions of η (viscosity)?

Q.4) Answer these questions: 20 Marks)

1- If the general equation of simple harmonic motion is gives by $[d^2x/dt^2 + (k/m)x = 0]$. Prove that the angular frequency $\omega^2 = k/m$ where x is the displacement k is the spring constant and m is the mass of object.

2- Write the difference between the tensile, the Bulk and the Rigidity modulus.

3- Bernoulli's equation studies the relation between pressure P, density ρ, velocity υ and height h and their ability to describe fluids in motion. Discuss this equation in When i- the liquid at rest, ii- if the height is constant. iii- When there is no change in pressure

4- There are three temperature scales that are used by scientists to measure temperature. How are they different from each other?

Good luck
Examiners

Prof . Dr. Moustafa Tawfik   Prof . Dr. Rizk Moustafa
Ass. Prof. Maysa -Ismael   Dr. Mohamed Mekamer
Dr. Afaf Sarhan   Dr. Menem Reda

أجب عن الأسئلة الآتية: (الدرجة الكلية ٨٠ درجة)

[١]-أ) أكمل ما يأتي:

(i) إذا كان $\underline{x} = 2\underline{k}$ ∧ $\underline{i}$ فان .... $\underline{x} = $.

(ii) إذا كان $\underline{A} \cdot \underline{B} = B^2$ فان مسقط المتجه $\underline{A}$ على المتجه $\underline{B}$ يساوى.........

(iii) القوتان $F_2 = -\alpha\underline{i} + 2\underline{k}$ ، $F_1 = 2\underline{i} + (2 - \alpha)\underline{j} - 2\underline{k}$ يمكن أن تكافئا ازدواج إذا كانت .... $= \alpha$.

(iv) إذا كان أقصى مدى لجسيم قذف فى مستوى رأسي هو *32 ft/sec* فان سرعته الأبتدائيه تساوى ....

(v) جسيم يتحرك طبقا للمعادلة $x = 5 \cos \frac{\pi}{2} t$ فان أقصى سرعه له هي .... ، أقصى عجله هي ....

ب) ضع علامة (√) أمام العبارة الصحيحة وعبارة (×) أمام العبارة الخطأ مع تصحيح الخطا:

(i) المتجهان $\underline{B} + \underline{C}, \underline{B} - \underline{C}$ يكونان متعامدان إذا تساوى $\underline{B}, \underline{C}$ في المقدار .   (   )

(ii) اذا كان المتجه $\underline{A} = 2\underline{i} + \underline{k}$ قطر في متوازي أضلاع ، $\underline{B} = \underline{j} - \underline{k}$ أحد أضلاعه فان مساحته تساوى 3 وحده مربعه.   (   )

(iii) إذا كان عزم مجموعة من القوى يتلاشى عند نقطة ما فان هذه المجموعة تكون متزنة.   (   )

(iv) إذا تحرك جسيم حركة توافقية بسيطة في خط مستقيم فإن أكبر قوة تحدث عند مركز الحركة.   (   )

(v) إذا قذف جسيمان في مستوى رأسي بنفس السرعة، في اتجاهين $25°, 65°$ مع الافقى فان الجسمين يكونا لهما نفس المدى على الافقى.   (   )

[٢]-أ) إذا كانت المتجهات $\underline{A} = 2\underline{i} + \underline{j} - \underline{k}$, $\underline{B} = \underline{j} + 2\underline{k}$, $\underline{C} = \underline{i} + \underline{k}$ فأوجد:

١- قيمة الثابت α التي تجعل المتجهات $\underline{A} + \alpha\underline{B}, \underline{A}, \underline{C}$ تقع في مستوى واحد.

٢- متجه عمودي على كل من $\underline{B}, \underline{C}$ ومسقطه على محور x يساوى 3 وحدات.

٣- متجه يوازى المتجه $\underline{B} + \underline{C}$ وطوله يساوى $2\sqrt{11}$.

ب) ازدواج يتكون من القوة $\underline{F} = 5\underline{i} - \underline{j} + 2\underline{k}$ وتمر بالنقطة (1,0,2-) وقوة $(\underline{F}-)$ وتمر بالنقطة (3, 2, 0) أوجد عزم الازدواج .

باقي الأسئلة بالخلف

[٢]-أ) مجموعة من القوى تتكون من القوة $\underline{F_1} = \underline{i} - \underline{j}$ وتمر بالنقطة $(1,0,-1)$ وقوة أخرى $\underline{F_2} = 2\underline{i} + \underline{k}$ وتمر بنقطة الأصل وازدواج عزمه $\underline{C} = 3\underline{i} - \underline{k}$ أوجد ما تكافئه هذه المجموعة عند نقطة الأصل وكذلك المجموعة اللولبية المكافئة.

ب) قذف حجر إلى البحر من قمة صخرة ارتفاعها $91\ ft$ بسرعة مقدراها $40\ ft/sec$ في اتجاه يصنع زاوية ظلها $\frac{3}{4}$. أثبت أن الحجر يصل إلى الماء عند نقطة تبعد $104\ ft$ من قاعدة الصخرة وأوجد أقصى ارتفاع يصل الحجر واتجاه حركته عندما يصل إلى الماء.

[٣]-أ) سرعه جسيم يتحرك حركه توافقيه بسيطة تساوى $4\ ft/sec$ عند نقطه P تبعد مسافة $\frac{3}{2}\ ft$ من مركز الذبذبة O، وعجلته عند نفس النقطة تساوى $6\ ft/sec^2$. أوجد سعة الحركة وزمنها الدوري، ثم أحسب زمن الحركة من P إلى نقطه أخرى `P تبعد مسافة $2\ ft$ من النقطة O إذا كانت P ، `P في جهة واحده من O.

ب) ثبت أحد طرفي خيط مرن طوله الطبيعي $3\ ft$ ومعامل مرونته $lb.wt/ft$ $\lambda = \frac{4}{3}$ في نقطه ثابتة O وعلق في الطرف الأخر جسيم كتلته $2\ lb$ فإذا رفع الجسيم الجسم إلى نقطة التعليق وترك ليسقط من سكون. أوجد أقصى عمق يصل إليه الجسيم أسفل النقطة O.

مع أطيب التمنيات بالنجاح

أ.د/ مجدى إلياس فارس

د/ الشحات عبدالعزيز

د/ دعاء ابراهيم عطا