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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
First Term: Jan. 2015

Educational Year: Third Level   Program (Branch): Chemistry/Botany
Subject: B (314)   Course(s): Photobiology and Phytohormones
Time: 2 h   Date: 22 / 12 /2014   Full Mark: 60 Marks

Answer the following questions:

Q1: Discuss shortly each of the following: (20 Marks)

a- Auxins and phototropism.

b- Mode of action of gibberellins in mobilization of reserve food in dicot seeds.

c- Cytokinins and control of morphogenesis.

d- Abscisic acid and stomatal closure.

Q2: A. Complete the missing words in the following: (10 Marks)

1- Growth stimulators hormones classified into three groups…………, …….. and ………..

2- Biosynthesis of cytokinins occur within…………and translocate mainly within………….

3- Accumulation of abscisic acid induces……….. of leaves and inhibits ………….of seeds.

4- Zeatin is a natural……………………………………

5- Gibberellins acts as a complimentary factor for……………………….

6- Geotropism induced mainly by …………………………

7- Coconut milk diffusate is very rich with …………………..

8- Genetic dwarfism is………. …..…………… mutant.

9- Plastids biogenesis induced mainly by …………………

10-   Inhibition of lateral buds growth by apical bud is called ……………………..

P.T.O   من فضلك اقلب الصفحة

Q2: B- Complete the following sentences with the right words: (10 Marks)

1- *Arabidopsis* has ………. phytochrome genes which are ………..but rice has only ……. Which are……………...

2- There are three groups of blue/UV-A photoreceptors: a)…………………. , b)………………. and c)…………………………

3- There are three modes of phytochrome action named a)……………, b)……………, c)……………

4- Photoreactivation is defined as……………………………………………..

5- Mass pigments are…………………………while sensor pigments are……………………….

6- In plants, phytochromes are found in……………………………

Q3: A- Choose the correct answer: (10 Marks)

1- In the structure of phytochrome, apoprotein and its chromophore make up the…………

(a) pterin (b) phytochromobilin (c) holoprotein (d) flavine

2- In short day plants, these plants flower in winter when ……..

(a) $Pr > Pfr$ (b) $Pr < Pfr$ (c) $Pr = Pfr$ (d) Pr & Pfr not involved

3- The stems of many plants elongate faster if they receive additional ……….. from the side.

(a) blue light (b) far-red light (c) red light (d) UV radiation

4- The one pigment model of phytochrome was confirmed by Butler and his fellows in ……….

(a) 1963 (b) 1959 (c) 1952 (d)1989

5- Phototropism under low light levels is mediated by…………..

(a) CRY2 (b) CRY1 (c) PHOT2 (d) PHOT1

Q3: B- Identify whether the sentence is true or false and mention why? (10 Marks)

1- HY5 is one of the blue/UVA photoreceptors.

2- Shade avoidance is a set of responses that plants display when they are subjected to the shade of rocks.

3- The synthesis of flavonoids is often stimulated by visible radiation.

4- Phytochromes play a vital role in seed germination.

5- Plants grown under low R:FR ratio have reduced internode length.

Best wishes

Examiners:

Prof. Heshmat S. Aldesuquy
Dr. Heba M. M. Abdel-Aziz

Mansoura University		1st Term
Faculty of Science		3rd Level Students
Chemistry Department		Date: 25 / 12 / 2014
Subject: Chemistry		Time Allowed: 2 Hours
Course(s): Org.Chem.337		Full Mark: 80 Marks

Answer All Questions

1- Predict the heterocyclic product(s): [27 Marks]

i) $CH_3CHO \xrightarrow[\text{(CH}_2\text{OH)}_2]{Br_2}$ .... $\xrightarrow{NH_3}$ .... $\xrightarrow{H_3O^+}$ .... $\xrightarrow[\text{CHO}]{\overset{NH_2}{|}}$ ....

ii) $\xrightarrow{NH_3}$ .... $\xrightarrow{H^+}$ ....

iii) + PhLi $\xrightarrow{\triangle}$ ....

iv) $H_2C{=}\underset{H}{C}{-}CHO$ + NH_2NH_2 $\longrightarrow$ ....

v) + $\longrightarrow$ ....

vi) + PhCOCH$_3$ $\xrightarrow{CH_3O^-}$ .... $\xrightarrow{HI}$ .... $\xrightarrow{-H_2O}$ ....

vii) $\xrightarrow[POCl_3]{DMF /}$ .... $\xrightarrow[\text{reduction}]{\text{Wolf-Kischner}}$ ....

viii) $\xrightarrow{Ph^- Na^+}$ .... $\xrightarrow[\text{ii) } H^+]{\text{i) } CO_2}$ ....

ix) $\xrightarrow{CH_3CHO}$ .... $\xrightarrow{H^+}$ .... $\xrightarrow{Pd-C}$ ....

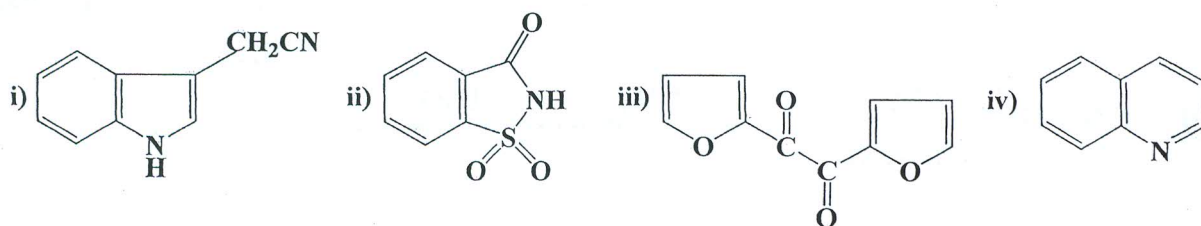**P. T. O.**
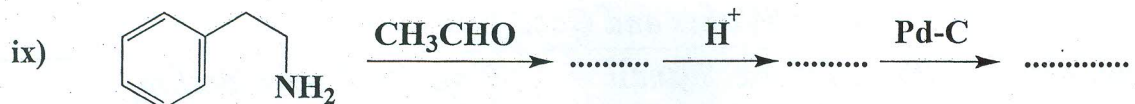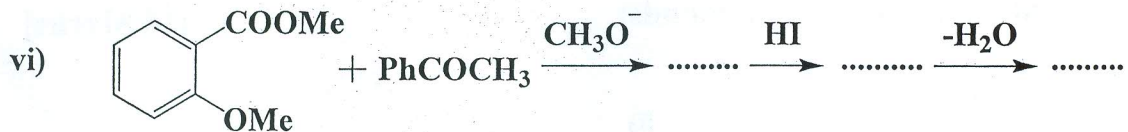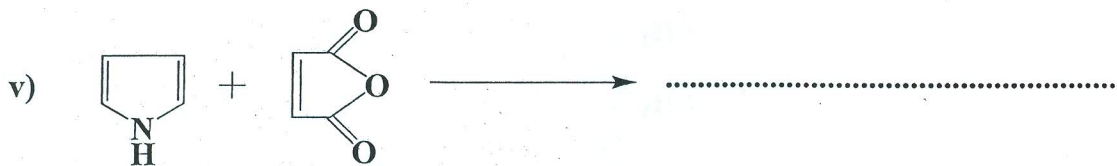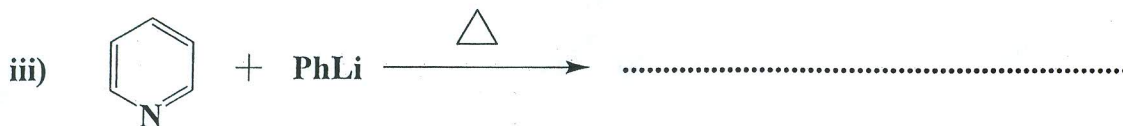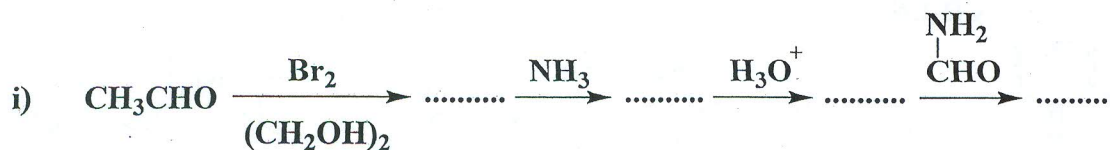
2- a) Give acceptable name of each of these heterocycles: [8 Marks]

i) ii) iii) iv)
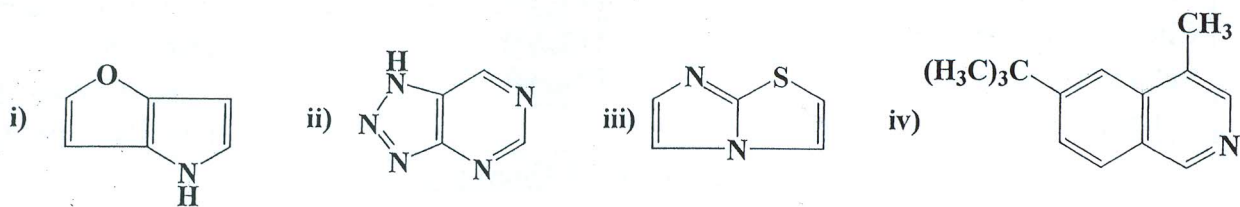
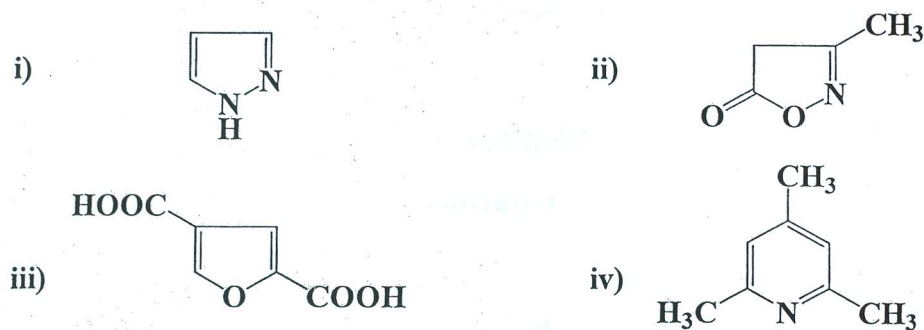**b) Diagram one synthesis of each of the molecules below:** [18 Marks]

i) ii) iii) iv)

3- a) Diagram these conversions: [9 Marks]

i)

ii)

iii)
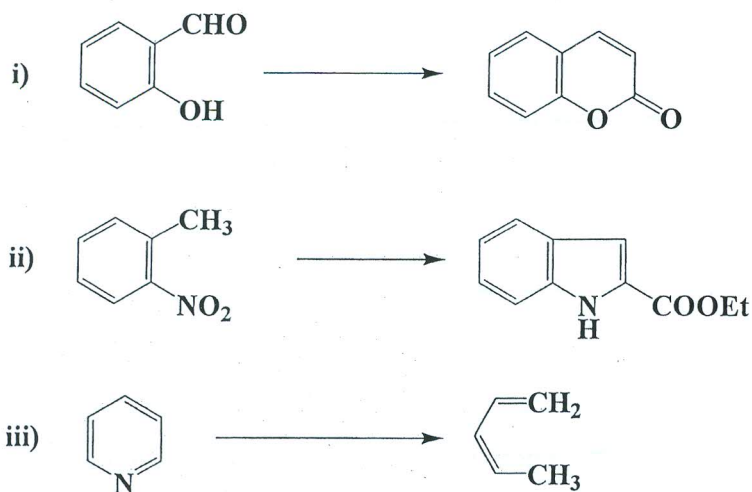
b) Design the synthesis of these compounds: [18 Marks]

i) ii)

iii) iv)

Best Wishes and Good luck

Mansoura University		**First Term**
Faculty of Science		**Third year**
Chemistry Department		**Date:** 29/12/2014
Subject: Inorganic & Analytical		**Time Allowed:** 2 hours
Course(s): Chemistry (323)		**Full Mark:** 80 Marks

Answer the following questions

[1] **a)** Write the electronic configuration for each of the following transition metal atoms and ions. Use [Ar] to represent the argon core configuration: $1s^2, 2s^2, 2p^6, 3s^2, 3p^6$. *(5 Marks)*

      i- Co   **ii- Mn^{3+}**

b) Identify the **ligands,** determine the **oxidation state** of the transition element in each of the following complexes, **coordination number**, **name** the following complexes and indicate the **possible isomers**. *(5 Marks)*

      i- $Na_2[Ni(CN)_4]$ **ii- $[Cl_3(NH_3)Fe\text{-}(OH)_2\text{-}Fe(NH_3)(en)Cl]$**

c) Indicate what type of reaction in the following equations: *(5 Marks)*

      i- $[Cu(acac)_2] + Py \rightarrow [Cu(acac)_2Py]$

      ii- $CuSO_4.5H_2O \xrightarrow{96.5°C} CuSO_4.4H_2O \xrightarrow{102°C} CuSO_4.3H_2O \xrightarrow{115°C} CuSO_4$

d) Which is more likely to form a high-spin complex— *en*, F^-, or CN^-? *(5 Marks)*

[2] **a)** What are the geometries of the following two complexes? *(5 Marks)*

      i- $[AlCl_4]^-$ **ii- $[Ag(NH_3)_2]^+$**

b) Show the possible stereoisomers of octahedral $[Mn(H_2O)_2(en)_2]^{2-}$. *(5 Marks)*

c) Give the correct IUPAC name for each of the following coordination compounds: *(5 Marks)*

      i- $Na_2[Ni(CN)_4]$ **ii- $[Mn(en)_2I_2]ClO_4$**

d) Complete the following: *(5 Marks)*

      i-   Three series of elements are formed by filling the *3d*, ... and ... ... shells of electron.

      ii-   The covalent radii of the elements decrease from .... to .... across a row in the transition series

      iii- The melting and boiling points of the transition elements are generally ....

      iv- Many ionic and covalent compounds of transition elements are colored due to ....

      v-   Diamagnetism arises as a result of .... electron spins in the atom.

[3] **a)** **What is the formula of lithium Triiodotris(trifluorophosphine)nickelate(0)?** (Note: trifluorophosphine is a neutral ligand with the formula PF_3.) *(5 Marks)*

b) Which of the following can be a function as a **bidentate ligand**? *(5 Marks)*

      $NH_3, C_2O_4^{2-}, CO, OH^-$

c) Complete the following equations: *(10 marks)*

      i. $2VF_4 \xrightarrow[\text{disproportionate}]{\text{heat to 600°C}} \cdots + \cdots$

      ii. $Sc + NaOH \rightarrow$ .... + ...

      iii. $MnO_2 + KOH_{(s)} \rightarrow$ .... $\rightarrow$ ....

      iv. $3Mn_2O_3 + 8Al \rightarrow$ .... + ...

      v. $3Co(NO_3)_2 \rightarrow$ .... + ... + ...

(Atomic numbers: $^{21}Sc, ^{22}Ti, ^{23}V, ^{24}Cr, ^{25}Mn, ^{26}Fe, ^{27}Co, ^{27}Ni, ^{29}Cu, ^{30}Zn$)   **Please turn over** ➤

[4] **Choose the correct answer to each of the following questions:** *(20 marks)*

1) **Which one of the following can act as a tridentate ligand (occupies 3 coordination positions in a complex ion)?**
   a) $(CH_3)_2NH$ b) $CH_3HNCH_2CH_2NHCH_3$ c) NH_3 d) $CH_3HNCH_2CH_2NHCH_2CH_2NHCH_3$

2) **The number of unpaired electrons in the low-spin complex, $[Co(CN)_6]^{3-}$ is**
   a) 0   b) 1   c) 2   d) 4

3) **Which one of the following compounds is likely to be colorless?**
   a) $[Cu(OH_2)_6]^{2+}$ b) $[Zn(OH_2)_6]^{2+}$ c) $[Fe(OH_2)_6]^{2+}$ d) $[Cr(OH_2)_6]^{2+}$

4) **d-Block elements among the following contain partially filled d – subshell and does not show variable oxidation states.**
   a) Zn   b) Cd   c) La   d) Hg

5) **d-Block elements have the maximum number of unpaired electrons.**
   a) Fe^{2+} b) Fe^{3+} c) Co^{3+} d) Co^{2+}

6) **Ethylenediaminetetraacetate ion ($EDTA^{4-}$) is commonly referred to as a:**
   a) Hexadentate   b) Monodentate   c) Bidentate   d) Tridentate

7) **In the complex $[Fe(H_2O)_5(NO_2)]SO_4$, the oxidation state of iron is:**
   a) +1   b) 0   c) +2   d) +3

8) **Which of the following will show maximum magnetic moment?**
   a) $3d^9$ b) $3d^5$ c) $3d^7$ d) $3d^8$

9) **The most widely used commercial chemical as a paint pigment is:**
   a) SiO_2 b) MgO c) TiO_2 d) Al_2O

10) **The aqueous solution of which salt is colored:**
    a) $Co(NO_3)_2$ b) $Zn (NO_3)_2$ c) $CrCl_3$ d) Both a and c

11) **The lanthanide contraction is related to:**
    a) Density   b) Ionic radii   c) Color   d) Valence electrons

12) **Which among the following show variable oxidation states?**
    a) Mn   b) Fe   c) Co   d) All of these.

13) **Which among the following is a set of transition elements?**
    a) Cu, Au, Ni   b) Sn, Bi, Na   c) Sb, Pb, Al   d) All of these.

14) **The surrounding ions or molecules in complexes of transitional elements are called as**
    a) Chelates   b) Ligand   c) Matalloids   d) None of these

15) **Paramagnetism is exhibited by d-block elements due to the presence of**
    a) Unpaired electron   b) Paired electron   c) Incomplete f-orbitals   d) None of these

16) **Manganese is in +4 oxidation state in**
    a) MnO   b) MnO_3 c) MnO_2 d) None of these

17) **Which of the following scientists is associated with complex compounds?**
    a) Werner   b) Pauling   c) Lweis   d) Wilkinson

18) **In Lithium tetrahydro aluminate, the ligand is:**
    a) H   b) H^+ c) H^- d) None of these.

19) **IUPAC name for $[Co(NH_3)_5(ONO)]SO_4$ is:**
    a) Pentaaminenitrocobalt(II) sulphate   b) Pentaaminenitrocobalt(III) sulphate
    c) Pentaaminenitritocobalt(II) sulphate   d) Pentaaminenitritocobalt(III) sulphate

20) **With decrease in size of cation:**
    a) Complex forming tendency decreases.   b) Complex forming tendency increases.
    c) Complex forming tendency does not change.   d) None of these.

|		
Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Chem.336 Physical Organic Chemistry for 3rd Level Biochemistry, Chem. Zool., Chem. Bot., students		First Term Time Allowed: 2 Hours Date: Jan. 2015 Full Marks : 80

Answer All Questions

Q1: a) Which reaction of each pair of the following would you expect to be more rapid. **Explain** (12 Marks)

**i-** $CH_3CH_2Cl + CH_3O^-$ & $CH_3CH_2Cl + CH_3S^-$

ii- $(CH_3)_3C-Br$ **(1 M)** $+ EtO^-$ **(1 M)** & $(CH_3)_3C-Br$ **(1 M)** $+ EtO^-$ **(2 M)**

iii- $CH_3CH_2Br + CH_3COO^-$ & $CH_3CH_2Cl + CH_3COOH$

**iv-** $(CH_3)_3C-Br + H_2O$ & $H_2C{=}\underset{H}{C}-Br + H_2O$

b- When toluene was treated with 1-chloro-2-methylproppane in the presence of anhydrous $AlCl_3$, the product was 1-*t*-butyl-4-methylbenzene. **Explain** the formation of such product. (4 Marks)

c) Which compound in the following pair undergoes E^2 reaction more rapidly when treated with CH_3ONa? **Explain your answer** (4 Marks)
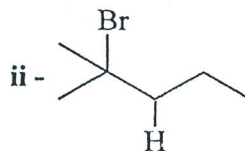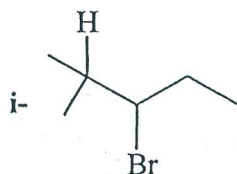
Q2: A) Complete the following equations showing only the **major organic product** and **discuss** which reaction mechanisms (SN^1, SN^2, E^1, and E^2) is the most likely. (18 Marks)
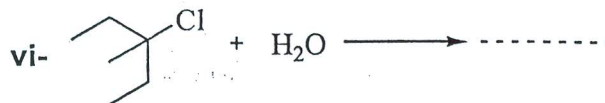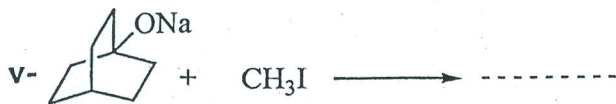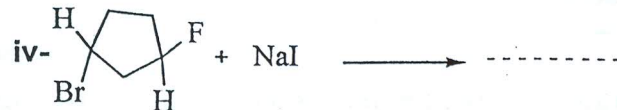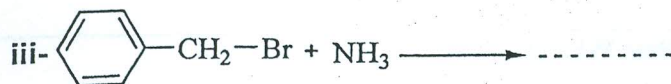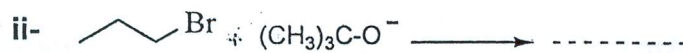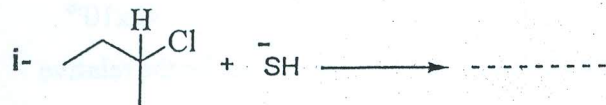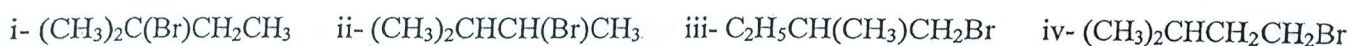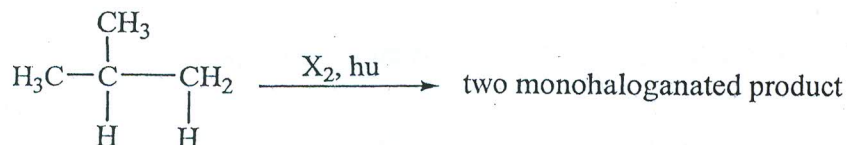

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b) Sketch potential energy diagrams for the following reactions. Label the heat of reaction (ΔH) and activation energy (Eact.) in each case. (6 Marks)

i - $CH_4 + \overset{\bullet}{Cl} \longrightarrow \overset{\bullet}{C}H_3 + HCl$ - 1 Kcal/mole   ii - $2\,C\overset{\bullet}{H}_3 \longrightarrow CH_3CH_3$ + 88 Kcal/mole

C) Which of the following alkyl substrates will rapidly undergo E^1 reaction with strong base to give mixture of two isomeric alkenes? (6 Marks)

i- $(CH_3)_2C(Br)CH_2CH_3$ ii- $(CH_3)_2CHCH(Br)CH_3$ iii- $C_2H_5CH(CH_3)CH_2Br$ iv- $(CH_3)_2CHCH_2CH_2Br$

Q3: a- For the following reaction: (12 Marks)

$$H_3C-\underset{\underset{H}{|}}{\overset{\overset{CH_3}{|}}{C}}-\underset{\underset{H}{|}}{CH_2} \xrightarrow{X_2,\ hu} \text{two monohaloganated product}$$

i- What are the monohalogenated product(s) indicating the yield percentage for each one when $X_2 = Cl_2$ & Br_2

ii- Explain why I_2 less reactive than Br_2 knowing that DH^o Kcal/mole values are shown in the following table:

Halogen	DH^o value	H-X	DH^o value	3° C-	DH^o value
I_2	36	HI	71	3° C-H	91
Br_2	46	HBr	87.5	3° C-X	X = I , 49.5 & X = Br, 63

b- Predict the major ring mononitrated product of the following aromatic compounds indicate your answer with resonance structures in each case: (10 Marks)

i- (benzene ring with OCH_3)   ii- (benzene ring with NO_2)
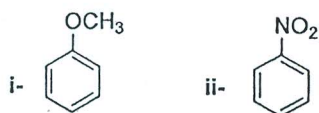
c- The relative rates of ethanolysis of the following alkyl halides are as follows: (8 Marks)

CH_3CH_2Br	$CH_3CH_2CH_2Br$	$(CH_3)_2CHCH_2Br$	$(CH_3)_3C-CH_2Br$
1	0.28	0.03	42×10^{-6}

Are these reactions likely to be SN^1 or SN^2. **Explain** your answer providing an explanation for the relative reactivities that are observed

Mansoura University
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جامعة المنصورة
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Final Examination in Botany (Jan. 2015)

Educational Year: 3ʳᵈ level
Course(s): Physiology Stress
Time: 2 hrs
Full mark: 60

Subject: Botany (B. 315)
Program: Chemistry/Botany
Date   : 15 / 1 / 2015
Question mark: 20

Answer the following questions:

Q1: Account on the effect of stress physiology that induced by nutrient deficiency of Sulfur, potassium, silicon and cupper on plant growth and metabolism.(20 Marks)

Q2: Briefly write on the following:

    I- Significance and nature of transpiration.   (10 Marks)

    II- The response of nitrogen metabolism to water stress.   (10 Marks)

Q3: Discuss the effect of structural features of stomatal apparatus as biotic factor on stomatal movement.   (20 Marks)

Examiners:

Prof. Omar A. El Shahaby

Prof. Shaymaa Nagy

MANSOURA UNIVERSITY
FACULTY OF SCIENCE
MATHEMATICS DEPARTMENT
FINAL EXAM 2014/2015G

FIRST SEMESTER
TIME: 2 Hours
MATH 301: Biostatistics
TOTAL MARKS: 80 Marks

Level 3, Programs: Biophysics, Microbiology, Chemistry & Botany, Chemistry & Zoology and Environment Science.

Answer The Following Questions

Question 1:

(a) Patients were treated for insomnia by some drug. Recorded below are the hours of sleep the patients got during the second night after treatment began:

(i) Complete the following table: [9 Marks]

True class interval	Midpoint	Frequency	Relative frequency	Cumulative frequency
$2.55 - 4.55$	3.55	...	...	13
$4.55 - 6.55$	...	17	0.34	...
... − ...	...	...	...	43
... − ...	...	1	0.02	...
... − ...	...	...	0.08	48
... − ...	...	0	...	...
... − ...	...	...	...	...

(ii) What percentage of patients got 6.55 or less hours of sleep during the second night after treatment? [4 Marks]

(iii) Graph a cumulative frequency distribution. [4 Marks]

(b) Let $P(A) = 0.4$ and $P(A \cup B) = 0.7$. Find $P(B)$ if: [9 Marks]

(i) A and B are independent.　　(ii) A and B are mutually exclusive.　　(iii) A subset of B.

Question 2:

(a) Suppose we measure the duration of labor (in hours) for a sample of pregnant woman and obtain:

Duration of labor	$0.5 - 2.5$	$2.5 - 4.5$	$4.5 - 6.5$	$6.5 - 8.5$	$8.5 - 10.5$	$10.5 - 12.5$	$12.5 - 14.5$
Frequency	10	15	30	20	10	8	7

Find approximate values for: [18 Marks]

(i) The sample mean, mode and median.　　(ii) The variance and coefficient of variation.

(b) The probability that a patient recovers from a rare blood disease is 0.45. If 20 people are known to have contracted this disease. [9 Marks]

(i) What is the probability that at least 3 survive.

(ii) What is the probability that exactly 8 survive.

(iii) What is the expected number and variance of the patients that be survived.

Question 3:

(a) Suppose that in the population of healthy females, the red blood count (divided by 10^{12}/l) has an normal distribution with a mean of 4.8 and a standard deviation of 0.3. What is probability that the red blood count is: [12 Marks]

(i) greater than 5,　　(ii) less than 3.8,　　(iii) between 4.2 and 5.4

(b) Certain tubes manufactured by a company have a mean lifetime of 900 hr., and standard deviation of 50 hr. Find the probability that a random sample of 64 tubes taken from the group will have a mean lifetime between 895 and 910 hrs. [9 Marks]

(c) The probability that a student, selected at random from a certain College, will pass a certain economics course is 4/5 and will pass both economics and statistics courses is 1/2 What is the probability that he will pass statistics if it is known that he had passed economics? [6 Marks]

Hint: $\Phi(0.67) = 0.7486$, $\Phi(0.8) = 0.7882$, $\Phi(1.6) = 0.9452$, $\Phi(2) = 0.9773$, $\Phi(3.33) = 0.9994$.

Good Luck

Examiners: Dr. A. Mustafa, Dr. F. Sheha and M. Abdel Rahman.

Mansoura University **Faculty of Science** **Chemistry Department** **Subject code: Chem. 314** **Course: Volumetric analysis,** **Gravimetric analysis and** **Chromatography**		**First semester examination** **3ʳᵈ level students** **Program: Chemistry/Zoology,** **Chemistry/Botany and Microbiology** **Date: 12/1/2015** **Time allowed: 2 hours** **Full mark: 60 marks**

Answer the following questions: (الأسئلة فى صفحتين)

Section A: (Volumetric analysis and Gravimetric analysis) (30 marks)

Question 1: Choose the correct answers only: (20 marks)

1. **Determine the number of moles of $Ba(OH)_2$ needed to neutralize 2 moles of HCl.**
   a-1   b-2   c-3   d-4

2. **15.71% (w/w) H_2SO_4 solution its density 1.2 g/mL, the normality of this solution is:**
   a-3.8   b-7.0   c-1.7   (H = 1, S = 32, O =16)

3. **128.1 g of NaCl dissolved in 700 mL of water, the molarity of this solution is:**
   a-5.13   b-3.13   c-0.13

4. **The chemical formula of the compound formed at the end point in Mohr's method is:**
   a-Ag_2CrO_4 b-$Ag_2Cr_2O_7$ c-$AgNO_3$ d-$AgCl$

5. **The number of moles for 200 mL of 2N H_2SO_4 is:**
   a-1.00   b-0.2   c-2   d-0.4

6. **The indicator used in complexometric titrations is:**
   a- bromcresol green   b-litmus
   c- metallochromic   d-methyl orange

7. **pOH of 0.2M Li(OH) is:**
   a-(-log 0.1)   b-(-log 0.2)   c-(-log 0.4)   d-(-log 0.8)

8. **If 200 mL of 0.1M HCl is mixed with 50 mL of 0.1M $AgNO_3$, pCl is:**
   a-1.2   b-4.00   c-0.6   d-0.2

9. **Mohr's titration shouldn't be carried out at pHs:**
   a-3   b-7   c-12

10. **The unit of strength is:**
    a-mol/L   b-mol/kg   c-unitless   d-mg/mL

Question 2: Answer the following:

I. What are the requirements should be met in order that a gravimetric method to be successful. **(3 marks)**

II. In titration of 50 ml 0.1M CH_3COOH with 0.05M NaOH, calculate pH of solution at the following additions : a) 0.0 ml b) 5 ml c) 100 ml d) 120 ml. ($HC_2H_3O_2$, $K_a = 1.8 \times 10^{-5}$). **(3 marks)**

III. Discuss two methods only used for detection of the end point in precipitation titrations. **(4 marks)**

Please turn the page→

Section B: (Chromatography) (30 marks)

Question 3: (15 marks)

   a. **Complete the following sentences: (4 marks)**

      1. In partition chromatography, separation depends on............. of the analyte between...............

      2. For non-polar supports like charcoal, the weak eluent is .... and the strong eluent is.........

      3. Swelling and blocking in polystyrene resin can be avoided using...............which act as...........

      4. Calibration curve in SEC used to determine......................... by knowing.........................

   b. **Put true (√) or false (×) and correct the wrong one: (4 marks)**

      1. RPLC used in urine analysis while NPLC used in purification of organic compounds.

      2. Polycondensation of aromatic amines with formaldehyde results in anionic exchangers.

      3. In SEC, large particles of high molecular weight require small time for separation.

      4. Affinity chromatography use immobilized biological molecule as stationary phase.

   c. **Sketch the diagram which represents:** HPLC instrument. **(4 marks)**

   d. **Define each of the following: (3 marks)**

      1. Chromatography.   2. Degassing.   3. Capacity of resin.

Question 4: (15 marks)

   a. **Compare between each pair of the following: (6 marks)** (المقارنه توضع فى شكل جدول)

    1. FID and TCD (type of signal, selectivity, D_L).

    2. Bio-specific elution and Non-specific elution (speed of elution, shape of solute peak, uses).

   b. **Comment on the following: (4 marks)**

    1. O_2 cannot be used as a carrier gas in GC instrument.

    2. SEC cannot be used for the separation of isomers.

   c. If **50** g of a pollutant with concentration = **1.6** g/L and molecular weight = **80** g/mol, was extracted with **120** cm^3 of organic solvent. The remaining concentration was found to be 2×10^{-3} mol/L. **Calculate:**

    1. Distribution ratio (D_C). **(3 marks)**

    2. Total amount extracted (%E) after 4 times of extraction. **(2 marks)**

Good luck: Prof. M. El-Defrawy, Dr. W. Abo El-Maaty, Dr. Y. Gaber and Dr. H. Moustafa