

Mansoura University
Faculty of Science
Chemistry Department
Courses(s): Chem. (323)
Biochemistry & Zoology



First-Term
Third Level
Date: 23/12/2013
Time Allowed: 2 hours
Full Mark: 80 Marks

1. a- Write the structural formula for each of the following complex and indicate the

possible isomers:

(10 Marks)

- Hexaaquatitanium(III)chloride.
- Pentaaminenitrocobalte(III)chloride.
- μ -dihydroxobis(aminetrichloroiron(III)).
- Potassium diaminetetrachloronickelate(II).
- Tetraamine platinum(II)tetrachloroplatinate(II).

b- Name the following complexes:

(10 Marks)

- $\text{Na}[\text{CrO}_4]$
- $[\text{Co}(\text{NH}_3)_4\text{CO}_3]\text{NO}_3$
- $\text{K}_3[\text{Fe}(\text{C}_2\text{O}_4)_3] \cdot 3\text{H}_2\text{O}$
- $[\text{Cr}(\text{py})_2(\text{H}_2\text{O})\text{Cl}_3] \cdot \text{H}_2\text{O}$
- $[(\text{NH}_3)_3\text{Co}-(\text{OH})_3-\text{Co}(\text{NH}_3)_3]$

2. a- Give one example of the following:

(10 Marks)

- Neutral bridging ligand.
- Neutral tridentate ligand.
- Preparation of complex by substitution reaction.
- A square planar complex with no dipole moment.
- Mononegative bidentate ligand forming five membered ring.

b- Complete the following sentences:

(10 Marks)

- A ligand may be an atom, ion or molecule which attached to the central metal atom by or bond.
- Chelates rings are most stable when they have or including the metal ion.
- Compounds with the same but, different structural arrangements are called.
- Cations which serves best as centre for coordination are the ones with &
- The ligand which forms with two metal atoms is called ligand.

Please turn out

3. a- Complete the following sentences:

(10 Marks)

- i. Zr and Hf have nearly the same size due to
- ii. Many transition metals and their compounds have properties.
- iii. The rusting of iron is a special case of, where compound is formed, which can be prevented by and
- iv. The $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ complex has color, because d-d transition is, while, the $[\text{Mn}(\text{CN})_6]^{4-}$ complex has color, because d-d transition is
- v. Cobalt is extracted from Co_3O_4 by reaction, while titanium is extracted from TiCl_4 by process.

b- True and false (circulate the correct response) :

(10 marks)

- i. T – F V_2O_5 is amphoteric oxide.
- ii. T – F Mn(IV) is more basic than Mn(VII).
- iii. T – F Cobalt chloride used for detection of water or moisture.
- iv. T – F $[\text{Fe}(\text{CN})_6]^{2-}$ complex is used for testing urine-sugar.
- v. T – F Cr(III) acetate is a diamagnetic compound.

4. a- Arrange the following according to the listed property:

(10 Marks)

- i. Reactivity: La , Sc , Y
- ii. Size of atom: Ti , V, Sc
- iii. Melting point: Hg , Cd , Cu
- iv. Basic character: VO , VO_2 , V_2O_3
- v. Magnetic properties: Ti^{3+} , Cr^{3+} , Sc^{3+}

b- Complete the following reactions:

(10 Marks)

- i. $\text{Sc} + \text{H}_2 \rightarrow \dots\dots\dots$
- ii. $\text{Mn} + \text{O}_2 + \Delta \rightarrow \dots\dots\dots$
- iii. $\text{TiO}_2 + \text{NaOH} \rightarrow \dots\dots\dots$
- iv. $2 \text{VCl}_4 \rightarrow \dots\dots\dots + \dots\dots\dots$
- v. $\text{MnO}_2 + \text{HCl} \rightarrow \dots\dots\dots + \dots\dots\dots + \dots\dots\dots$

Best Wishes
Prof. Dr. Magdy Bekhite
Dr. Ola A. El-Gammal
Dr. Rania R. Zaky

^{21}Sc	^{22}Ti	^{23}V	^{24}Cr	^{25}Mn	^{26}Fe	^{27}Co	^{28}Ni	^{29}Cu	^{30}Zn
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Mansoura University
Faculty of Science
Chemistry Department
Subject: Chemistry
Course(s): Org.Chem.337

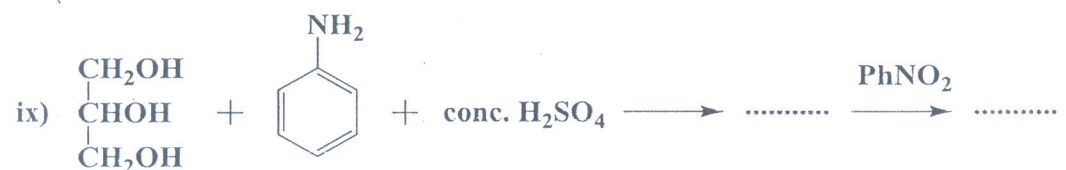
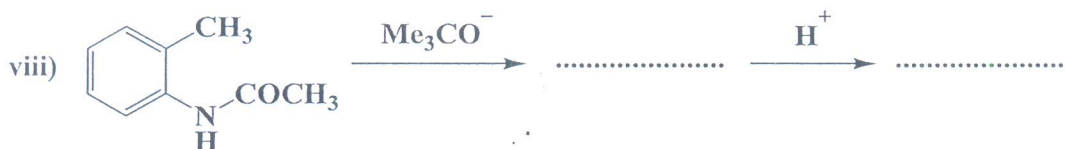
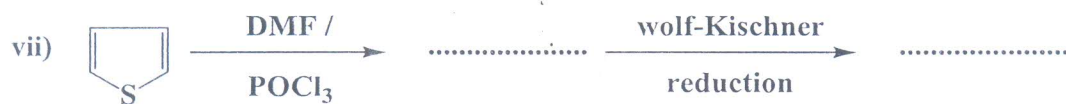
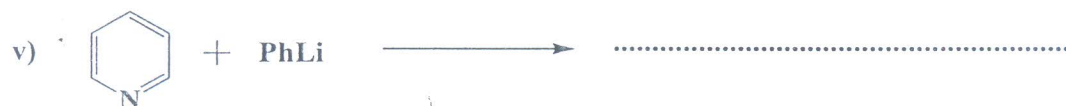
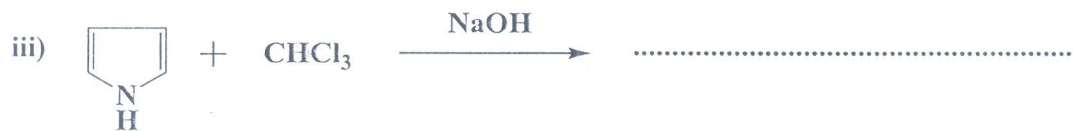


1st Term
3rd Level Students
Date: 26 / 12 / 2013
Time Allowed: 2 Hours
Full Mark: 80 Marks

Answer All Questions

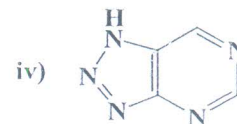
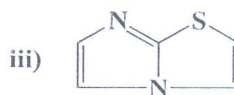
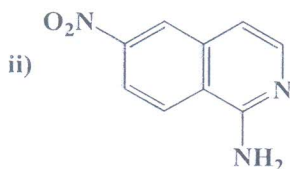
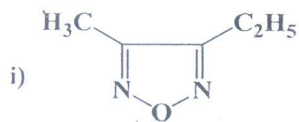
1- Suggest the organic product(s):

[27 Marks]



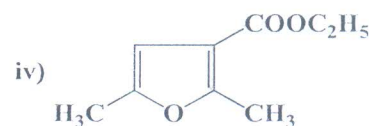
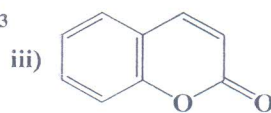
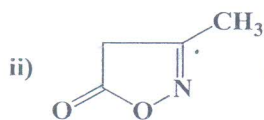
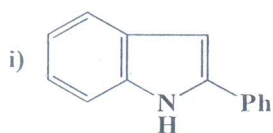
2- a) Give acceptable name of each of these heterocycles:

[8 Marks]



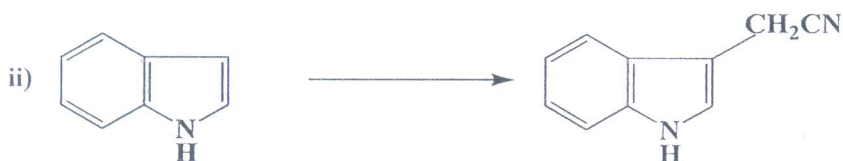
b) Design one synthesis for each of the molecules below:

[18 Marks]



3- a) Diagram these conversions:

[9 Marks]



b) Show the following:

[18 Marks]

- Conversion of pyridine to penta-1,3-diene
- Preparation of saccharine
- Pictet-Spengler synthesis of isoquinoline
- Paal-Knorr synthesis of pyrrole

Best Wishes and Good luck

*Examiners: Prof. Dr. Ez Kandil, Prof. Dr. Evelin Boshra,
A.Prof. Dr. Eman Keshk*



Final Examination in Botany (Jan. 2014)

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

Subject: Botany (B.315)
Program: Chemistry/Botany
Date: 30 / 12 / 2013
Question mark: 20

Answer the following questions:

Q1: Report on the theories governing the stomatal movement throughout the structural features of stomatal apparatus as biotic factor. (20 marks)

Q2: Regarding the role of the essential elements in plant growth and metabolism, discuss the effect of stress physiology that induced by nutrient deficiency of nitrogen, sulfur, phosphorus and iron. (20 marks)

Q3: Briefly write on the following:

- a- Significance of transpiration (10 marks)
- b- Effect of temperature as abiotic stress factor on the absorption of water by plant root. (10 marks)

Examiners:

Prof. Dr. Omar A. El Shahaby

Prof. Dr. Afaf Gaber

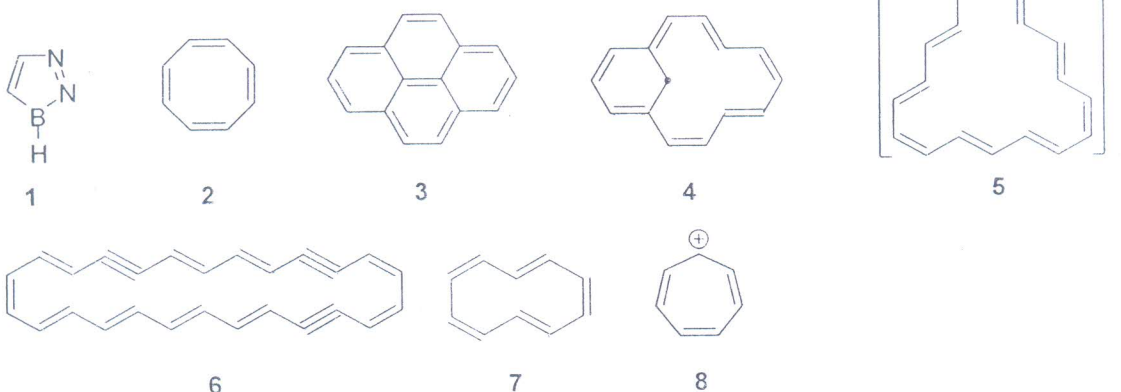


Mansoura University
Faculty of Science
Chemistry Department
Final exam 3rd level students
Program : Chemistry/ Botany

Subject : Physical Organic Chemistry
Code : Ch 336
Time : 2 hrs
Total marks : 80 Date :02/01/2014

Answer all questions:

1-A-Predict with discussion which one of the following structures will be aromatic , anti-aromatic or non-aromatic . (12 marks)



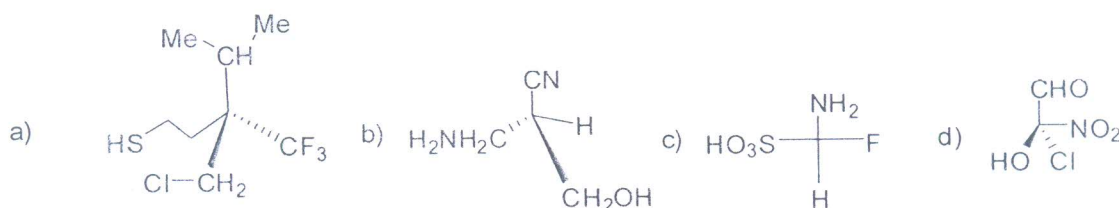
B Write short notes on:

(8 marks)

- a- Friedel-Craft 's alkylation and its limitations.
- b- Kinetics of S_N^2 mechanism.

2-A- Assign configuration , if (R) or (S) to the following enantiomers

(12 marks)

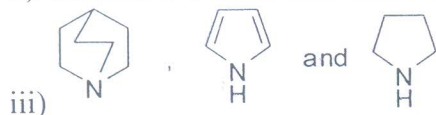


B- Arrange the following compounds from the highest acidic to the lowest acidic and comment on your answer . (8 marks)

- i) HCOOH , CH₃COOH , (COOH)₂ and CH₂(COOH)₂.
- ii) NO₂CH₂COOH , CF₃COOH , EtOOCCH₂COOH and CCl₂HCOOH.
- iii) Picric acid ,phenol and benzoic acid.
- iv) propanoic acid, propynoic acid and acrylic acid.

3-A- Arrange the following compounds from the highest basic to the lowest basic and give your comment. (8 marks)

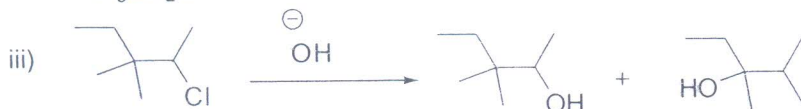
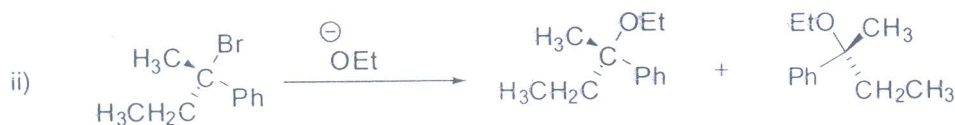
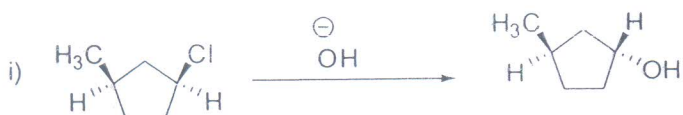
- i) Aniline , 2,4,6-trinitroaniline and 2,4,6-trinitro-N,N-dimethylaniline.
 ii) Guanidine , acetamide and methyl amine.



- iv) Phthalimide , benzamide and diethylamine.

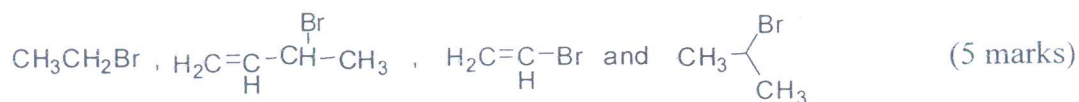
B-Suggest a mechanism for the following reactions

(12 marks)



4A-Arrange the following alkylhalides in order of increasing their S_N^2 reactivity
 1-Chloro-3,3-dimethylpentane , 1-Chloro-2,2-dimethylpentane & 2-bromo-2-methylpentane . (5 marks)

B- Arrange the following alkylhalides in order of increasing their S_N^1 reactivity



C-Compleat the following equations:

(10 marks)



With best wishes

Examiner : Dr. Soha M.Abdelmageed

Faculty of Science
Botany Department
El-Mansoura, Egypt

كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany

First Term: Jan. 2014

Level: Third

Program (Branch): Chemistry-Botany

Subject: N 313

Course(s): Microbial genetics and Molecular Biology

Time: 2 hrs

Date: 09 /01 /2014

Full mark: 60

Question mark: 20

Answer the following questions:

Q1 Choose the correct answer (2 marks each):

1- Which of the following is not a feature of eukaryotic gene expression?

1. polycistronic mRNAs are very rare.
2. many genes are interrupted by noncoding DNA sequences.
3. RNA synthesis and protein synthesis are coupled.
4. mRNA is often extensively modified before translation
5. multiple copies of nuclear genes, and pseudogenes can occur.

2- The primary RNA transcript of chicken ovalbumin gene is 8000 nucleotides long, but the mature mRNA is 2172 nucleotide long, the size difference is a result of:

1. capping
2. cleavage of polycistronic mRNA
3. Splicing
4. removal of poly A tails
5. reverse transcription

3- Promoters of eukaryotic mRNA synthesis:

1. are more complex than prokaryotic promoters
2. can require binding of multiple transcription factors to form a transcription complex
3. have specific DNA sequences such as the "TATA" box that are recognized by proteins
4. are the stretches of DNA to which RNA polymerase binds to initiate transcription
5. All of the above
6. None of the above

4- Which of the following is NOT a common feature of prokaryotic and eukaryotic gene expression:

1. Genomic complexity creates additional need for complex regulation
2. An elaborate machinery is assembled using proteins and DNA elements
3. Many proteins involved in gene expression are conserved
4. Genes are converted to RNA during transcription
5. DNA binding proteins are used to initiate and process the transcriptional machinery

5- Which of the below is not true about the location of enhancers?

1. The position of the enhancer has no effect on gene regulation.
2. They can be found downstream of the promoter.
3. They can be found in introns.
4. They can be found 3' of the polyadenylation site.
5. They can be found upstream of the transcription initiation site.

6- Which of these events occur as a prokaryotic mRNA is being transcribed?

- a. splicing
- b. addition of a cap at 5 end
- c. addition of a poly-A tail

- b. binding of ribosomes e. more than one of the above

7- In eukaryotic cell Transcription takes place in the

- a. Nucleus b. Cytoplasm c. Endoplasmic reticulum d. Ribosomes

8- Transcription factors and RNA Polymerase bind the promoter region of DNA during which stage of transcription?

- b. Initiation b. Elongation c. Termination d. Modification

9- Three key characteristics of an enhancer element.

- a. An enhancer element can activate a promoter at a distance.
b. An enhancer element can activate a promoter in either orientation
c. An enhancer element can activate a promoter when positioned upstream, downstream, or within a transcription unit.
d. All are correct e. all are none correct

10. During translation, the _____ site within the ribosome hold the growing amino acid chain while the _____ site holds the next amino acid to be added to the chain.

- a. A, P b. P, A c. A, B d. B, A

Q2

A- True/False, correct the false (1 mark each).

- 1- RNA is a direct copy of the sequence of the DNA in the sense strand (with U in place of T). While the antisense strand is the template strand for the synthesis of the RNA.
 - 2- The σ factor has a critical role in promoter recognition, and its binding to the core RNA polymerase enzyme converts it into the holoenzyme.
 - 3- The three amino acids: lysine, arginine and histidine generally impart (give) a positive charge to proteins. While aspartate and glutamate impart a negative charge to proteins.
 - 4- Transcriptional attenuation of the *E. coli* trp operon is a repression mediated by differential folding of RNA and dimeric Trp repressor protein, when tryptophan is abundant in the cell.
 - 5- The cAMP receptor protein (CRP) activator mediates the global regulation of gene expression from catabolic operons in response to glucose and/or tryptophan levels.
 - 6- Transcription of a single eukaryotic gene or an operon starts at the promoter, ends at the terminator and produces a monocistronic or polycistronic messenger RNA.
 - 7- A set of five general transcription factors, denoted TFIIB, TFIID, TFIIE, TFIIIF, and TFIIH, is responsible for promoter recognition and for unwinding the promoter DNA of bacteria.
 - 8- RNA pol II and bacterial RNA polymerase are absolutely dependent on a set of five auxiliary transcription factors, denoted TFIIB, TFIID, TFIIE, TFIIIF, and TFIIH, for the initiation of transcription; promoter recognition and for unwinding the promoter DNA.
-

- 9- The E. coli chromosome is positively supercoiled , consisted of 50–100 domains or loops, the ends of which are constrained by binding to the protein HU attached to part of the cell membrane.
- 10- The lac repressor and the RNA polymerase can bind simultaneously to the *lac* promoter and operator sites.

B- Complete the following with a suitable word or phrase (10 Marks):

1. The consequence of base substitution depends on the - ----- and its-----
2. Insertion or deletion of a single----- leads to-----
3. The percentage of recombination in the mixed infection experiments is found to be directly proportional to the-----between----- along the chromosome.
4. Transversion mutations involves substitution of ----- for -----
5. Suppressor mutants are ----- which have ----- phenotype and they have-different----- of ----- from the wild type strains
6. When 5-bromouracil is in ketoform , it pairs with-----, whereas its enol form pairs with----- and this may leadsto----- mutation
7. ----- and----- bases could exist either in amino or imino forms, Whereas ----- base changes from ----- to----- and this phenomena is known as -----

Q3 A: Discuss the following (10 Marks):

- 1- Excision repair of DNA
- 2- The seven important features of DNA
- 3- Replication of bacterial chromosome


B-Compare between each pair of the following(10 Marks):

- 1-Replication of viruses that contain DNA and RNA
- 2-Hfr × F⁻ and F⁺ × F⁻ conjugations

Examiners:	Prof. Dr. Yehia Abdel-Moneim Osman Ellazeik Dr. Linda Zakharie Samaan
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العليل الحجم والوزن - جود افضل الكربونطرس له ٣١٤

المستوى الثالث كيمياء حيوية
كيمياء نبات
ميكروبيولوجية

Mansoura University Faculty Of Science Chemistry Department Subject : Analytical Chemistry Course(s): 314 C.		3 th . Year Botany, Micro Bio & Zoology/ Chemistry Program: Chemistry Date: 16-Jan 2014 Time Allowed: 2 Hours Full Mark: 60Marks
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Answer The Following Questions

Section a (30 Marks)

a) Define only 5 of the following: (10 Marks)

- 1- R_f 2- K_d & α 3-H (height equivalent to theoretical plate)
4- D_c (distribution a ratio) 5- D_v , V_{max} 6- Affinity Chromatography
7-Gel Chromatography .

c) Write short notes on only one of the following (5 Marks) :

1-Application of ion exchanger chromatography, its fundamental requirements, types.
What is meant by separation factor and capacity?

2-Types of Paper – thin- layer chromatography , its Detectors .

d) One gram of benzoic acid originally dissolved in 100 ml of water is to be ..
equilibrated with 100 ml of ether . K_d is 100 , K_a is 6.5×10^{-5} . Calculate the D at

pH3, 5 , 9. (5 Marks)

e) Three analysts were separated on a column of 3 cm length at 0.5, 0.6 and 0.65 minutes with 3, 2 and 5 sec beak widths, respectively. Calculate n , H , and R . Comment on the results. (5 Marks)

f)-Give illustrative figures for GC or HPLC and discuss the detectors used in each (5 Marks).

Good Luck Prof.. Dr. A. El-Wakil & I. Kenawy.

Volumetric and Gravimetric Section (30 marks)

Q3- (15 marks)

- a) In the Titration of 50 ml of 0.1M HCl with 0.1M NaOH .Calculate the pH of the solution after the following additions , 0.0 ,10.0 ,50.0 and 60.0 ml of the base .
- b) Calculate the Ksp value for Ag_2CrO_4 , its solubility 2.5×10^{-2} g/l (Mol.wt. =322).
- c) Find the molarity of 1.4g/l HCl .

Q4-(15marks)

- a) Discuss the following (Choose three only)
 - i) Nernst Equation in Oxidation Reduction Reactions.
 - ii) Metallic indicators in EDTA titrations.
 - iii) Q-Test for analytical data.
 - iv) Peptization in gravimetry .
 - v) pH- range in acid base indicator .
- b) Put (V) or (X) on the following statements and explain why:
 - i) KMnO_4 is a self indicator in KMnO_4 titrations.
 - ii) The M-indicator complex must be more stable than M-EDTA complex in complexometric titration.
 - iii) Mohr method must be carried out in acidic medium in precipitation titrations.
- c- Explain how Ca^{2+} and Mg^{2+} are determined in drinking water sample by EDTA titration.

Mansoura University

Faculty of Science

Botany Department



جامعة المنصورة

كلية العلوم

قسم النبات

Final Examination in Botany

First Term: Jan. 2014

Educational Year: Third Level

Program (Branch): Chemistry/Botany

Subject: B (314)

Course(s): Photobiology & Plant Hormones

Time allowed: 2 h

Date: 20 / 1 / 2014

Full Mark: 60 marks

Answer the following questions

Q1. Discuss shortly each of the following:

(20 Marks)

- a- Auxins biosynthesis.
- b- Mode of action of gibberellins in mobilization of reserve food in monocot seeds.
- c- Cytokinins and morphogenesis.
- d- Absciscic acid considered as antitranspirant hormone.

Q2. A. Complete the missing words in the following:

(10 Marks)

- 1- Hormones classified into two main categories.....and.....
- 2- Cytokinins biosynthesis occur within.....and translocate mainly within.....
- 3- Accumulation of absciscic acid induces..... of leaves and inhibitsof seeds.
- 4- Zeatin is a natural.....
- 5- Gibberellins acts as a..... for auxins.
- 6- Phototropism induced mainly by
- 7- Coconut milk diffusate is very rich with
- 8- Genetic dwarfism is a simple..... mutant.
- 9- Delay of senescence induced mainly by
- 10- Apical dominance is

Please turn over



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

- 1- Phytochromes exist mainly in two, one with maximum absorption in the red and another with maximum absorption in the far-red .
- 2- The earth gets most of its energy from the sun. This energy is called which travels from the sun to the earth in
- 3- *Arabidopsis* has phytochrome genes which arebut rice has only Which are.....
- 4- There are Modes of phytochrome action named 1)....., 2)....., 3).....
- 5- There are groups of blue/UV-A photoreceptors: a)..... , b)..... and c).....

Q3: A. Identify whether the sentence is true or false and mention why? (10 marks)

- 1- Pr and Pfr forms of phytochrome are both stable in the dark.
- 2- Phytochrome does not have an effect on chloroplast development.
- 3- UV-A constitutes a major portion of the solar radiation and passes through the stratospheric ozone layer.
- 4- Plants grown under low R:FR ratio have increased lateral branching.
- 5- Quantitative long day plants must have constant long days to initiate the photoperiodic response.

Q3: B. Write short notes on each of the following: (10 marks)

- 1- Photoreactivation.
- 2- Photomorphogenesis.
- 3- UV-B photoreceptors.
- 4- Structure of phytochrome.
- 5- The effect of light on the size and shape of leaves.

Examiners

Prof. Heshmat S Aldesuquy

Dr. Heba M M Abdel-Aziz

Mansoura University Faculty of Science Maths department Subject: Biostatistics (R301)		Exam: Jan 2014 Third Year Programs * Date : 23 - 1 - 2014 Time allowed : 2 hours
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*كيمياء و حيوان - فيزياء حيوية - ميكروبيولوجي - كيمياء و نبات - علوم بيئة.

Answer the following questions

1- a - The following table shows the age distribution of patients (21 Marks)

Age	22-24	25-27	28-30	31-33	34-36
No. of pat	3	8	12	5	2

Calculate: i- median ii- standard deviation iii- mode

b- If X has binomial distribution with mean $4/3$ and standard deviation $2\sqrt{2}/3$
Find $P(X \geq 2)$. (5 Marks)

[2]- a- A random sample with $\sum_{i=1}^{40} X_i = 280$ and $\sum_{i=1}^{40} X_i^2 = 2100$. Construct 98% confidence interval for the population mean. (10 Marks)

b- If X is a random variable has the density function (10 Marks)

$$f(x) = \begin{cases} 3x^a & 0 < x < 1 \\ 0 & \text{otherwise} \end{cases}$$

Find 1- Constant a. 2- Distribution function. 3- Variance.

4- $P(0 < X < 0.5)$, $P(0.6 < X < 4)$, $P(X = 0.3)$, $P(X > 0.1)$.

c- A sample of size 64 is drawn from a population with mean 3.2 and standard deviation 1.6 Find the probability that the sample mean will be

1- more than 3.5 2- less than 2.7 (10 Marks)

[3] a- If $\bar{X} = 16$, $\sum_{i=1}^n X_i^2 = 6640$ and $S^2 = 10$, Find n. (4 Marks)

b- If X has Poisson distribution with $P(X = 0) = P(X = 1)$. Find

1- $P(X \geq 4)$. 2- $P(X < 1)$. 3- mean and variance. (10 Marks)

c- A random sample of size 16 has mean 32.8 and standard deviation 4.51, Construct 95% confidence interval for the population mean. (10 Marks)

$Z_{0.01} = 2.33$, $Z_{0.025} = 1.96$, $t_{16, 0.025} = 2.145$, $t_{15, 0.025} = 2.131$, $\phi(1) = 0.8413$, $\phi(1.5) = 0.933$, $\phi(2.5) = 0.9937$.

Best wishes Dr. Noura Fakhry. Dr. Mohamed Abd El-Rahman.