Mansoura University
Faculty of Science
Botany Department
Mansoura, Egypt

جامعة المنصورة
كلية العلوم
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المنصورة - مصر

Final Examination in Botany
1st Term: Jan. 2016
Qualifying Examination For **2nd Level Biotechnology**

Subject: Course(s): DNA metabolism
Time: **2 hrs** Date: **15 / 5/2016**
Full mark: **60** Question mark: **20**

Answer The Following Questions:

Q1- I- Choose the correct answer(s) (10 marks):

a- The protein that binds to single strand DNA is …….
i- Topoisomerase I ii- Primase
iii- RNase iv- Helix stabilizing protein

b- During plasmid replication, it should be …….
i- One replication fork ii-two origin of replication
iii-two replication forks iv-one origin of replication

c- RNA is unstable in the cell because of……..
i-uracil ii-2-OH iii-enzymatic degradation iv- its folding

d- Pyrimidine synthesis in *E. coli* is increasing by …….. However, it decreased by……. in mammals
i-ATP ii-PRPP iii- CTP iv- UTP

e- tRNA is synthesized by ……
i-head polymerization ii-tail polymerization
iii- RNA polymerase iv- spontaneous polymerization

f- The glycosidic bond of A-form DNA should be……..
i-anti ii-syn iii- both anti and syn iv- none of them

g- Deoxy Ribose sugar of DNA is ……. However, ribose sugar should be ……..
i-L-form ii-D-form iii-Both L and D iv- Do not like amino acids

h- The most important universal cell feature is …….
i- DNA ii- Energy metabolism
iii- Protein catalysis iv- The membrane

II- Illustrate <u>only</u> by a labeled and detailed diagram (10 marks):
a- The asymmetry of the replication fork.
b- The difference between thymine and Uracil.
c- The different RNA secondary structures.
d- The Right handed DNA.

Q2- A- Explain the following items (12):
I- Explain the steps to synthesize orotate in pyrimidine synthesis.
II- Explain at least two reasons that led to propose "the world of RNA"

P.T.O

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III- Explain an experiment to confirm the semi-conservative DNA replication.
IV- The cross-regulation of AMP and GMP

B- Give reasons for the following items (8 marks):

1- ATP formation is an energetically unfavorable reaction
2- GC pairing contains three hydrogen bonds and AT pairing contains two hydrogen bonds
3- Uracil must not be in DNA
4- RNase could recognize ribonucleotides only

Q3- A- What would happen if (4 marks):

i- Salvage pathway for purine synthesis stopped
ii- ATP was subjected to double hydrolysis step

B- Explain the role of the following enzymes in DNA metabolism with equations (10 marks):

a- Ribonucleotide reductase
b- Hypoxanthine-guanine phosphoribosyltransferase
c- Amido phosphoribosyl transferase
d- Nucleoside phosporylase

C- Compare between each of the followings (6 marks):

1- Topoisomerase I and II
2- Positive and negative DNA supercoiling

Best regards
Dr. Amr M. Mowafy

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Final Examination in Botany
Second Semester: May 2016
Second Year (Second Level) – Biotechnology and Application Programme

Subject: Botany | Course: Algae and Lichens (B209)
Time: 2.0 hrs | Date: 22 /05/2016
Full Mark: 60 | Question marks: 15

Answer the following questions

Question 1: Complete the missing word(s) (15 Marks)

1. The microalga *Euglena* reproduces vegetatively by…
2. Glucans are polymers of…
3. Algae that live attached to rocks are known as...
4. In marine environment, the algal habitat between the upper and lower tides is known as …
5. All the species belonging to the order Chamaesiphonales are…
6. Vegetative reproduction of Dinoflagellates takes place by…
7. The storage product of Chrysophyceae is…
8. Diatom cell has a very characteristic wall called…
9. The unicellular red algae belong to the order...
10. Growth in *Ectocarpus* is terminal and occurs by…
11. The cell wall of the brown algae is very rich in…
12. The main storage product of Chlorophyceae is…
13. The green alga *Charcium* reproduce asexually by…
14. Algal antibiotics have been already produced from the genera…and…
15. A lichen thallus is composed of …and…

Question 2: Choose the most correct answer (15 Marks)

1. In sea shore the alga that dominates the spray zone is:

a. *Lyngbya* **b.** *Enteromorpha* **c.** *Ulva* **d.** *Sargassum*

2. Which of the following algae reproduces asexually by statospores:

a. *Gonium* **b.** *Dermocarpa* **c.***Gymnodinium* **d.** *Synura*

3. The storage product of Rhodophyceae is:

a. Manitol **b.** Floridean starch **c.** starch d. oil

4. The following are giant brown algae except:

a. *Laminaria* **b.** *Macrocystis* **c.** *Ectocarpus* **d.** *Alaria*

5. The unicellular flagellated green algae (Chlorophytes) belong to the family :

a. Chlamydomonaceae **b.** Volvocaceae **c.** Oocystaceae **b.** Desmediaceae

6. The phycocolloids extracted from red algae (Rhodophyceae) include:

a. Agar **b.** Carrageenan **c.** algin **d.** a + b

7. All the following algae are eukaryotic except::

a. *Prochloron* **b.** *Volvox* **c.** *Oscillatoria* **d.** a+c

Question 3 (15 Marks)

A. The algal life cycles fall in five categories. With the help of a labeled diagram, describe the life cycle of **only one** category. **(5 Marks)**

A. Mention **only two** diagnostic characteristics of: Prochlorophyceae, Cyanophyceae, Euglenophyceae, Cyanophyceae, Bacillariophyceae, Chrysophyceae, Phaeophyceae, Rhodophyceae, Xanthophyceae and Chlorophyceae **(10 Marks)**

Question 4 (15 Marks)

Give a brief account of:

A. Morphological diversity of algae. Support your answer with diagrams **(5 Marks)**

B. Statospores. Support your answer with a labeled diagram. **(4 Marks)**

C. The formation of pit connection in red algae **(3 Marks)**

D. Nutritional value of algae **(3 Marks)**

BEST WISHES

Examiners:

Prof. Sami Ahmed Shaaban Prof. Mohammad Ismail Abdel-Hamid

Mansoura University
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Final Theoretical Examination in Botany
Second Semester: May 2016

Educational Year: Second Level **Program (Branch):** Biotechnology
Course(s): Mineral Nutrition - Physiology of Plant Growth & Development
Subject: B 207 **Full Mark:** 60
Time: 2 hours **Date:** 5 / 6 / 2016

Answer all of the following questions

(Q_1) Discuss briefly each of the following: **(20 marks)**

1. Solution cultures as a technique used for studying plant mineral nutrition

2. Apoplasmic and symplasmic transport across plant roots

(Q_2) Write an account on: **(20 marks)**

1. Occurrence, availability, functions and deficiency symptoms of nitrogen

2. Physiological stages of seed development

(Q_3) What is the difference between growth and development?

Explain the growth of leaves and its stages; and the environmental factors affecting leaf growth. **(20 marks)**

Best Wishes;

Prof. Mohammad A. Abbas & Prof. Omar A. El Shhaby

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Final Examination in Botany
Second Term: May 2016

Educational Year: Second Level **Program (Branch): Specific Program-Biotechnology and its applications**

Subject: B (208) **Course(s): Plant Molecular Biology**

Time: 2 h **Date: 1 / 6 /2016** **Total Marks: 60 marks**

Answer the following questions:

Q1: A- Complete the following sentences with the missing word(s): (5 marks)

1- Because bacteria have circular chromosomes, the termination of replication occurs when.....
2- If the backbones of double helix chains are far from each other they form ..... but when close to each other form .....
3- DNA which has higher concentration of A and T, denatures at low temperature because.....
4- The preinitiation transcription complex contains ..... , ... , ... , ... and .....
5- The enzymes required to cleave phosphodiester bond in DNA are ..... and .....

B- Differentiate between each of the following: (10 marks)

1- Rho-dependent and Rho- independent terminations. (4 marks)
2- Forms of DNA double helix. (3 marks)
3- Abortive initiation in prokaryotes and eukaryotes. (3 marks)

Q2: A- Answer the following questions: (10 marks)

1- List the major DNA replication enzymes.
2- Write the general steps of transcription process.

B- Define each of the following terms: (5 marks)

1- TATA box
2- Melting temperature
3- Reverse transcription
4- Chargaff's rules
5- Replication fork

Please turn over the page

Q3: A- Complete the following sentences with the right words: (5 marks)

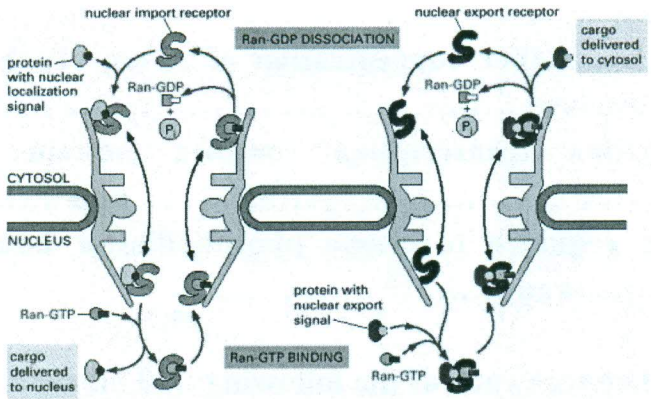
1- **Carrier proteins resemble ..... in their behavior but are different from them because.....**
2- **Nuclear localization signals are required for.....**
3- **Channel proteins form.....across membranes.**
4- **To initiate nuclear import, most nuclear localization signals must be recognized by .....**

B- Answer the following questions:

1- **Protein translocation across mitochondrial membranes is mediated by multi-subunit protein complexes.**
   - **What are these protein complexes? Give an account on one type of these protein complexes. (5 marks)**
2- **Two signal sequences are required to direct proteins to the thylakoid membrane in chloroplasts.**
   - **What are these two signal sequences? (5 marks)**

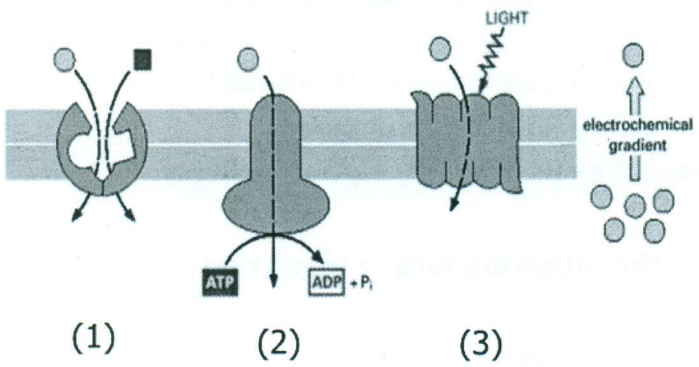
Q4: From the provided pictures A and B, answer the following questions:

A



Describe what this diagram illustrates. (10 marks)

B



Describe what this diagram illustrates and mention the labels (1), (2) and (3). (5 marks)

Best Wishes

Dr. A. Shawky Gebreil **Dr. H. M. M. Abdel-Aziz**

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Final examination in Botany / Second Term / May 2016

Educational Year: Second level **Program (Branch):** Biotechnology
Subject: B 206 **Course:** Virology - Immunology
Time: 2hrs. **Date:** 29/5/2016 **Full mark:** 60 **Question mark:** 15

Answer the following questions (الامتحان في صفحتين)

Q1):

A): Chose the most correct answer (4 Mark, you have one free)

1- The earliest recorded plant viral disease was --------- by Carlos closus.
a) broken b) poliomyelitis c) mosaic d) dwarf

2- Bacteriophages were discovered by ----------.
a) Towrt b) D"herell c) a and b d) none

3- Viruses may be present in crystal form ---------- the host.
a) outside b) inside c) a and b d) none

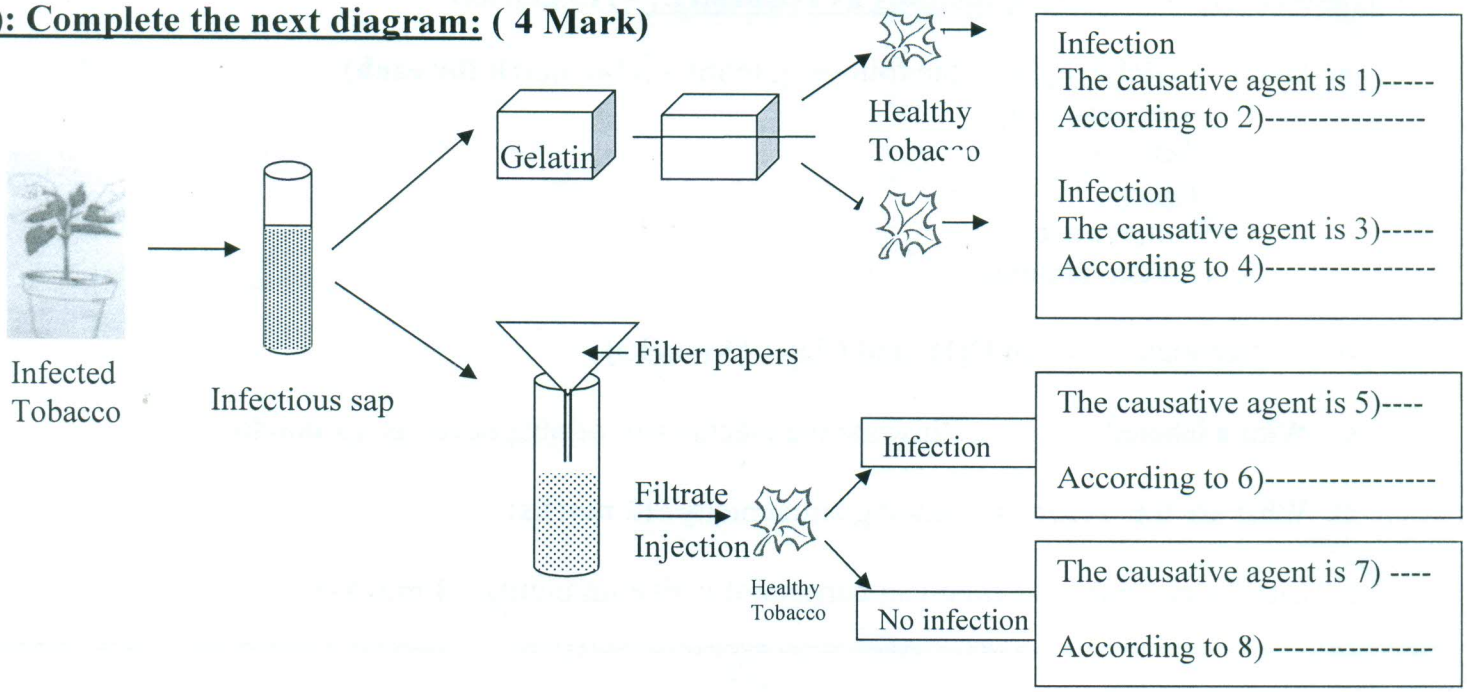
4- Based on types of morphology bacterial viruses may be classified into ---------- groups.
a) four b) five c) six d) none

5- Virus purity means maintenance of its ---------- features.
a) biological b) chemical c) physical d) all

B): Circulate the correct response and correct simply the wrong one (4 Mark, you have one free)

1- (T – F) Icosahedral is the only viral symmetrical pattern.
2- (T – F) Prion: That entity lacking nucleic acid.
3- (T – F) Bacterial viruses may be classified into three groups based on types of nucleic acids.
4- (T – F) Most animal viruses have outer envelope.
5- (T – F) Viral cultivation means support replication outside living system.

C): Complete the next diagram: (4 Mark)



D): Prove that: "Hershy has a key role in virus nature discovery". **(3 Mark)**

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Q2):

Give a brief account with illustrations on <u>THREE only</u> of the following :- (15 Mark)

1- Only one tool used for virus purification and another one for purity determination. **(5 Mark)**
2- Lysis cycle for viral replication. **(5 Mark)**
3- Chemical nature of viral protein with respect to structure, types and functions. **(5 Mark)**
4- Protoplast and callus method for plant virus cultivation. **(5 Mark)**
5- Morphology as a good tool for viral identification and classification. **(5 Mark)**

Q3):

<u>Complete the following sentences with the missing word(s) :-</u> (15 marks)

1- The cellular immunity are also called ---------- which can be transferred to ---------- with ---------- from ---------- but not with ---------- or ----------. **(3 marks)**
2- There are two main lineages that derived from hemopoietic stem cell: ---------- and ----------. **(1 mark)**
3- In humoral immunity, ---------- are produced by ----------. **(1 mark)**
4- The eosinophils are ---------- but the basophils are ----------. **(4 marks)**
5- The histocompatibility antigens are ..... which present on ---------- and they are called ---------- or ----------. **(2 marks)**
6- The characteristics of adaptive immunity are ----------, ---------- , ---------- and ----------. **(4 marks)**

Q4):

<u>Answer the following questions as requested: -</u> (15 marks)

A. Define **<u>THREE only</u>** of the following terms:- **(One mark for each)**
1. Cross reactivity
2. Mast cell
3. Hapten
4. Lymph nodes
5. Human albumin

B. Differentiate between $CD4^+$ and $CD8^+$. **(3 marks)**

C. With a labeled diagram, illustrate the mechanism of phagocytosis. **(3 marks)**

D. What are the factors influencing antigenicity? **(2 marks)**

E. List the physical and chemical barriers of native immunity. **(4 marks)**

With our best wishes

Examiners: - ***Asst. Prof. Adel Ahmed El-Morsi*** ***Dr. Ahmed Shawky Gebreil***

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Final Examination in Botany
Second Semester: May2016

Students: 2st Level Biotechnology
Time: 2 hours.
Full mark: 60

Course: Plant Tissue Culture (B 210)
Date: 18/5/2016
Question mark: 15

Answer The Following Questions:

Q1: Complete the following :

1. In protoplast fusion PEG causes immediate ----------.
2. Biosynthesis of 2ry metabolites results from -------- and it is better during ----- phase
3. Protoplast isolation needs enzyme mixture: ----------, ---------- and ---------- while sorbitol is used as ----------.
4. The packed cell volume can be determined by -------- and it is described as ---------.
5. Both oxygen electrode and Warburg nanometer can be used for ---------- in case of ----------.
6. The establishment of a callus from an explant is divided into 3- developmental stages: ----------, ---------- and----------.

Q2:

Mention :

a. The importance of the protoplast cultures.
b. Factors affecting yield, viability and quality of protoplast.
c. Significance of cell suspension cultures.

Q3: Discuss:

a. Development of embryo from anther or pollen cultures.
b. The most important factors affecting 2ry metabolites biosynthesis.

Q4: Give an account on :

d. Initiation of cell suspension cultures and mention how the maintenance of these cultures can be done?
e. Isolation and culture of protoplast.

Best Wishes

Examiners: **Prof. Samy A. Abo-hamed** **Prof. Heshmat S. Al-Desuquy**