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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

# Final Examination in Botany
## FirstTerm:Jan.2016

Educational Year: Third Level Program :Microbiology.
Subject: Bot. (m303) Course(s):Microbial Genetics& Cell Ultrastracture
Time: 2 hrs Date:31 /12 /2015 Full mark: 60

**Answer the following questions:**

**Q1:Discuss the following: (30 marks)**

a- Nature of transduction (5marks)
b- Gene mapping of viral chromosome(5marks)
c- Conjugation between Hfr strain and F⁻ strain of *E.col(*5marks)
d- Chemical and optical methods for contrast enhancement *(*5marks)
e- Membrane transformation (5marks)
f- Mitochondrial and plastidic compartments (5marks)

**Q2: Complete the following(5marks):**

a- Genetic recombination requires the presence of……..DNA and some……. Markers.
b- Tautomeric shifts means that ……..can exist in……..forms.
c- The enol form of thymine pairs with…….whereas the imino form of adenine pairs with……..
d-……and…….phages can replicate by replicase enzyme whereas oncogenic phages replicate via the action of……
e- According to Chargaff the total amount of…….. equals the total amount of…….
f- Cell theory includes $_1$……., $_2$…….. and $_3$……
g- Unit membranes appear as ….. outer dark lines (2 nm/ each) which are separated by one unstained space (…. nm thick)
h- The unique organelles are ……..and ……because$_1$……..,$_2$……and$_3$……..

**Q3 A-Answer the following either true or false and correct the false ones(10marks):**

a- Missense mutation means that the base substitution alters a codon for a specific amino acid to give a stop codon.
b-.The information necessary for phage to infects the bacterial cell is carried by phage proteins
c-The integration of F plasmid into *E .coli* chromosome is reversible.
d- QB and M13 phages contain single stranded DNA whereas MS2 and influenza viruses have single stranded RNA.
e- Missense and non-sense mutations can be suppressed by the insertion or deletion of a single base.
f-Natural transformation requires linear DNA, Whereas induced one requires intact circular plasmid .
g- At the end of lysis cycle, the bacterial cell wall is ruptured by the action of nuclease enzyme .
h-During DNA replication ,the nucleotides polymerize one to another by the action of transcriptase.
i-Okazaki fragments are synthesize in a direction of 3⁻ to 5⁻
j-The primers are converted to DNA by DNA polymerase I before ligase enzyme joins the the fragments.

**Q3 B- Answer the following using only labeled diagram:**

a- Disassembly and re-formation of the nuclear envelope during mitosis *(*5marks)
b- Types of lysosomes *(*5marks)

*With Our Best Wishes*

**Examiners: Dr. Linda Samaan Dr. Ashraf Elsayed**

Mansoura University
Faculty of Science
Botany Department
Mansoura - Egypt

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة- مصر

# Final examination in Botany
## First Term Jan. 2016

**Educational Year:** Third level — **Program (Branch):** Microbiology
**Subject:** M 302 — **Course:** Virology - Immunology
**Time:** 2hrs. **Date:** 4/1/2016 **Full mark:** 60 **Question mark:** 20

**Answer the following questions** (الامتحان في صفحتين)

**Q1):-** **I ) Give a brief account and illustrations on only ONE of the following:- (8 Mark)**

a- The nature of viruses. **(8 Mark)**

b- Temperate life cycle for viral replication. **(8mark)**

**II ) Concisely explain only TWO of the following:**

a- Chemical nature of viral lipids with respect to origin, structure and functions. **(6 Mark)**

b- Organized tissue technique for viral cultivation. **(6 Mark)**

c- Only one tool for virus purification and determination of its purity. **(6 Mark)**

d- Viral- related entities. **(6 Mark)**

**Q2)-A:- Answer each of the following as requested**

**a) Prove only ONE of the next facts: (4 Mark)**

- Only nucleic acid is the genetic information carrier in viruses.
- "Contagium Vivum Fluidum" as a nature of virus.

**b) True and false (circulate the correct response); correct simply the wrong one (4 Mark)**

1- ( T – F ) Bacteriophages were named by Towrt.

2- ( T – F ) Viruses may be present in crystal form only outside the host.

3- ( T – F ) Tulip breaks is the frist recorded plant viral disease.

4- ( T – F ) Viroid: a group of proteinaceous infectious agent that cause disease to animals only.

**c3) Fill the space:- (4 Mark)**

1---------- refer to cancer causing viruses which firstly discovered by Rous.

2- The virus that cannot replicate in the absence of helper called ----------.

3- ---------- refer to the viral coat, composed of ---------- (morphological unit) which in turn composed of protomers (----------).

4-Viruses are used as a very powerful tool in the molecular biology field because of-----,----and----

**d): Chose the most correct answer (4 Mark)**

1- Protoplast and Callus technique used for ----------virus cultivation.

a) animal b) plant c) bacteria d) insect

2- The viral purity can be determine--------

a) biologically b) chemically c) physically d) all

3- Viral symmetrical pattern may be ----------.

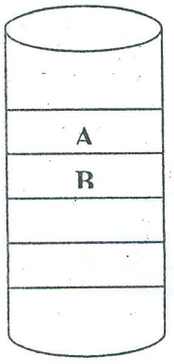
a) helical b) icosahedral c) a and b d) a and/or b

4---------- animal viruses have outer envelope.

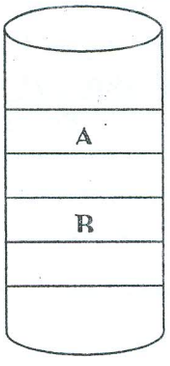
a) No b) Some c) All d) Most

: As a result of isopycnic purification for an infected plant sample the A, B and C bands were obtained using the provided data determine the types of these bands: **(4 Mark)**

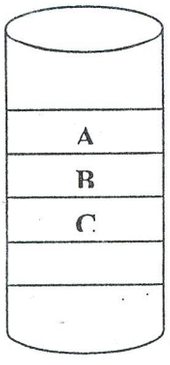
فضلا تابع التالي




A + *Datura* leaf = 0 LL
B + *Datura* leaf = 250 LL
A + B + *Datura* leaf = 250 LL
**Then:**
**A** may be ----------
**B** may be ----------




A + *Datura* leaf = LL
B + *Datura* leaf = no infection
A + B + *Datura* leaf = More LL
**Then:**
**A** may be ----------
**B** may be ----------




A + *Datura* leaf = LL
B + *Datura* leaf = no infection
C + *Datura* leaf = no infection
A + B + *Datura* leaf = LL
A + C + *Datura* leaf = LL
A + B + C + *Datura* leaf = LL + M
**Then:**
**A** may be ----------
**B** may be ----------
**C** may be ----------

**Q-2B: Choose the correct answer:**

1- newborn infant is passively immune due to:
- A. transplacental transfer of maternal antibodies in utero
- B. exposure to foreign antigens during birth
- C. activation of the immune system which occurs at birth
- D. immediate colonization by a normal flora
- E. recovery from diseases acquired after birth

2- Bacterial substances that are antigenic to an animal
- A. typically have a high molecular weight (>10,000 daltons)
- B. will cause the formation of antibodies
- C. are often the surface components of the bacterial cells
- D. are "foreign" molecules to the animal
- E. all of the above

3- The type of cell in an animal that is the precursor of phagocytes and lymphocytes is
A. bone marrow stem cell B. lymphoblast C. monocyte D. B cell E. pre T cell

4- During a primary immune response antibody molecules (immunoglobulins) are synthesized by
A. T cells B. B cells C. macrophages D. plasma cells E. none of the above

5- The most important activity of IgA on the surface of the intestinal or respiratory mucosa is to
- A. stimulate the development of an immune response
- B. activate an inflammatory response
- C. block colonization of the surfaces by pathogens
- D. stimulate the development of a T-cell response
- E. block the production of IL-1 by macrophages

6-. Circulating antibody molecules participate in anti-bacterial host defense by

A. opsonizinzation of bacterial cells
B. activation of complement on the bacterial surface
C. agglutination (immobilization) of bacterial cells
D. neutralization bacterial toxins E. all of the above

7- The function of cytotoxic T cells (TC) during an immunological response is to

A. act as antigen presenting cells for the induction of the immune response
B. kill cells which show a new antigen on their surface
C. produce lymphokines that activate macrophages
D. produce IL-2 that stimulates the development of T cells E. none of the above

8- An infected area becomes red and hot during an inflammatory response because:

A. phagocytic cells release lysozyme B. neutrophils leave the capillaries
C. fluid escapes from the capillaries D. macrophages engulf and process antigen
E. capillaries enlarge

9-Which of the following is not a feature or effect of the activated complement system?

A. bacterial opsonization B. chemotaxis of neutrophils E. lysis of bacterial cells
C. release of mediators of inflammation by mast cells
D. release of lymphokines from effector T cells

10- Opsonization of bacterial cells refers to

A. coating the bacterial cells with molecules for which macrophages bear receptors in order to increase the efficiency of phagocytic engulfment
B. the process of killing bacterial cells in the phagolysosome of a macrophage
C. presentation of bacterial antigens by macrophages or other APCs which initiates an immunological response
D. lysis of bacterial cells in the presence of complement E. cytotoxic killing by Tc cells

**Q3): Choose the correct answer**

1- Which of these cell types can play a primary role in attacking and killing cancer cells?

a- Red blood cell b- platelets c- Mast cells d- Cytotoxic T cell

2- The membrane attack complex consists of:

a- C5a,6,7,8,9 b- C3,b3, Bb c-C5b,6,7,8,9 d-C3b,C5b, 6,7,8,9

3- Interferons:

a- Are found only in mammalian species
b- Are divided into 5 main families
c- **Induce enzyme synthesis in the target cell.**
d- Only affect infected cells
e- Are specific for individual viruses

4- Natural killer (NK) cells do not:

a- Respond to interferon b- Contain perforin c- Contain tumor necrosis factor (TNF).
b- d- Kill only by damaging the target cell outer membrane. e- Contain serine proteases.

5- A complement component which is strongly chemotactic for neutrophils is:

a- C9 b-C5a c- C3 d- C3b e- C5b

6- The initial complement component that is bound by complement-fixing antibodies is:

a- C1q b- C1s c- C1r d- C3b e- C5a f- C9

7 - The classical and alternative pathways meet at complement component:

a- C4 b-C4b c-Factor D d- Facter B e-C5 f-C3

8- Clonal selection occurs when antigen is encountered by:

a-Neutrophil b-basophil- c-Easinophil d-Mast cells e-T-cells

8- Plasma cells are:

a- Have a thin layer of cytoplasm b- derived from T-cell c-Develop into B-cell c- Secrete large amounts of interferons e- Have a highly developed rough endoplasmic reticulum

10- Specific antibodies are readily detectable in serum following primary contact with antigen after:

a- 10 min b- 1 hour c- 5-7 days d- 3-5 weeks e- only after a second contact.

11- A plasma cell secretes:

a- Antibody of a single specificity related to that on the surface of the parent B-cell

b- Antibody of two antigen specificities

c- The antigen it recognizes d- Many different types of antibody e- Lysozyme

12- Immunological unresponsiveness to self antigens is called:

a- Toleragen b- Tolerance c-Memory d- Acquired immunity

13- Secondary antibody responses are better because:

a- They provide defense against unrelated antigens.

b- They do not require T-cell help.

c- The antibody can be made by both T and B cells

d- They are stronger and faster

e- Complement-fixing antibodies are made.

14- The secondary, but not the primary, immune response is based on:

a- The bonus effect of multivalency

b- Memory c- Complement activation d- Clonal selecton e- Mast cell degranulation

15- Protection against microorganisms inside cells is provided by:

a- Antibody b- C3b c- C1q d- Membrane attack complexe- T-cell

16- The basic Ig unit is composed of:

a- 2 identical heavy and 2 different light chains.

b- 2 identical heavy and 2 identical light chains.

c- 2 different heavy and 2 identical light chains.

d- 2 different heavy and 2 different light chains

17- A Fab fragment:

a- Is produced by pepsin treatment. b- Binds antigen. c-Has no interchain disulfide bonds.

e- Is produced by separation of heavy and light chains.

18- The inducible defenses of an animal include

A. inflammation

B. the immunological response

C. phagocytosis

D. activities of complement

E. all of the above

19- Secondary antibody responses are better because:

a- They provide defense against unrelated antigens. b- They do not require T-cell help.

c-Clonal selection and memory d- They are stronger and faster and memory

e-Complement activation.

20- Cytokines are molecules:

a- which mediate communication between cells.

b- are not recognized by the T-cell surface receptors for antigen,

c- T-cells possess other receptors that specifically recognize individual cytokines.

d- All of the above e- None of the above

---

*With our best wishes*

***Examiners:-*** ***Prof. Yahia A. Othman*** ***Dr. Adel A. El-Morsi***

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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة- مصر

**Third Level: Microbiology** **Course: Plant Biochemistry 1(M 304)**

**Time: 2 hrs** **Date: 11 / 1 / 2016** **Full mark:60** **Question mark: 20**

**Answer the following questions:**

**Q1: Write on each of the following:**

**(i) Ammonia assimilation (6 marks)**

**(ii) Cyclic structure of monosaccharaides (6 marks)**

**(iii) Herbicide groups affecting lipid metabolism (6 marks)**

**(iv) Biodegradeble plastics (2 marks)**

**Q2: Explain the biosynthesis of four only of the following:** (5 marks/ each)

**(i) Fatty acid**

**(ii) Sucrose**

**(iii) Asparagine**

**(iv) Triacylglycerol (Kennedy pathway)**

**(v) Sugars from CO2 (Calvin cycle)**

**(vi) Proline and arginine**

**Q3: Give an account on:**

**A-Two categories of lipids (5 marks /each)**

**B- Regulation of either citric acid cycle or lipid synthesis (5 marks)**

**C- Peptide bond formation (5 marks)**

*"Best Luck"*

**Examiners:** ***Prof. Samia A. Haroun*** ***Prof. Omar A. El Shahaby***

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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

**Final Examination in Botany**
**January 2016**

**Educational Year: Third Level** **Program (Branch): Microbiology**
**Subject: M 301** **Course: Biology of Bacteria**
**Time: 2 hrs** **Date: 14 /1 /2016** **Full mark: 60** **Question mark: 20**

**Answer all questions: Draw suitable diagrams wherever necessary**

## I. In a Table, compare and contrast each pair of the following :

1. Gram- positive and Gram-negative bacteria. (6 Marks)

2. Poly-hydroxybutyrate and polyphosphate. (4 Marks)

3. Bacterial endospores and cysts. (6 Marks)

4. Ribosomes and mesosomes. (4 Marks)

## II. Discuss each of the following:

1. Effect of pH on bacterial growth. (7 Marks)

2. Chemical structure and functions of cytoplasmic membrane of bacteria. (7 Marks)

3. Bacterial growth curve. (6 Marks)

## III. Give a brief account on:

1. The place of microorganisms in the living world. (7 Marks)
2. Plasmids. (6 Marks)
3. Bacterial capsule. (7 Marks)

---

Examiners:

Prof. Dr. Attiya Mohamedin

Prof. Dr. Yehia Osman

جامعة المنصورة – كلية العلوم
قسم الرياضيات
التاريخ :18 / 1 / 2016 م
الدرجة الكلية : 80
الزمن : ساعتان

امتحان دور يناير 2016 م
المستوى : الثالث
اسم المقرر : احصاء حيوى
كود المادة : ر 301

برامج: فيزياء حيوى- ميكروبيولوجى - كيمياء و حيوان - كيمياء و نبات - علوم بيئة

## Answer the following questions:

**[Q1] a- Compute the Pearson's correlation coefficient $r$ for the following data. Explain the reason for this value of $r$.** ( 10 Marks )

| x | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| y | 3 | 5 | 7 | 9 | 11 |

**b- Let $X$ be the number of heads when a coin is tossed three times.** ( 12 Marks )

**Find i)The cumulative distribution function $F(x)$ ii) $E(2X+1)$ and $Var(3X+5)$**

**c- If the average number of visitors to a web server per minute is 6 . What is the probability that** ( 8 Marks )

**i) The number of visitors in one minute will be less than two ?**

**ii) There are exactly two visitors in 30 seconds ?**

**[Q2]a- The heights of 1000 students in a certain college are normally distributed with mean 68 inches and standard deviation 3 inches. How many of these students would you expect to have heights: i) More than 64 inches ii) Between 67 and 71 inches.**

**( $\Phi(1.33)=0.908$ , $\Phi(-1.33)=0.092$, $\Phi(1)=0.841$, $\Phi(-0.33)=0.371$ )** ( 10 Marks )

**b-The contents of seven similar containers of sulfuric acid are 9.8 , 10.2 , 10.4 , 9.8 , 10.0 , 10.2 , 9.6 liters. Find 95 % confidence interval for the population mean $\mu$ , assuming the population is normally distributed.**

**( $t_{(0.025,6)} = 2.447$ , $Z_{0.025} = 1.96$ )** ( 15 Marks )

**[Q3]a- The following table shows the weights (in kilogram) of 60 children** ( 18 Marks )

| weight | 9.5 –19.5 | 19.5 –29.5 | 29.5– 39.5 | 39.5 –49.5 | 49.5– 59.5 |
|---|---|---|---|---|---|
| frequency | 5 | 10 | 18 | 20 | 7 |

**Find i) The sample mode by two different methods. ii) The sample median.**

**iii) Graph the cumulative frequency and deduce the median from it.**

**b-If we choose randomly two tubes in succession from a shipment of 86 tubes of which 12 are defective. What is the probability that both tubes will be defective?** ( 7 Marks )

مع أطيب التمنيات بالنجاح د. فاتن شيحه – د. عبد الفتاح مصطفى - د. محمد عبدالرحمن

| | | |
|---|---|---|
| **Mansoura University**<br>**Faculty of Science**<br>**Chemistry Department**<br>**Subject code: Chem. 314**<br>**Course: Volumetric analysis, Gravimetric analysis and Chromatography** | | **First semester examination**<br>**3rd level students**<br>**Program: Chemistry/Zoology, Chemistry/Botany and Microbiology**<br>**Date: 28/1/2016**<br>**Time allowed: 2 hours**<br>**Full mark: 60 marks** |

**Answer the following questions: (الأسئله في صفحتين)**

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

**Question 1: (14 marks)**

**A. Put true (√) or false (×) and correct the wrong one: (5 marks)**

1. The phenol phethaline indicator is suitable for the titration of $NH_4OH$ against HCl.
2. The **ppb** unit for concentration can be expressed as **µg/L**.
3. For precipitation reactions, the ionic product should be higher than the solubility product.
4. The complexometric titration between **EDTA** and $Ca^{2+}$ shouldn't be carried out at pH=3.
5. The equivalent weight = Molecular mass for $NaHCO_3$.

**B. Write on the properties of metallochromic indicators. (2 marks)**

**C.** A 0.5 g sample containing Ca and Mg carbonates was dissolved in diluted HCl and completed with distilled water to 250 ml. 10 ml of the resulting solution were titrated with 0.01M EDTA solution. Using EBT indicator, 19 ml of EDTA were consumed, while on using murexide indicator, 8 ml of EDTA were consumed. Calculate the percentage of both Ca and Mg carbonates in the sample. **(3 marks)**

**D. Define each of the following: (4 marks)**

i- Peptization. ii- Co-precipitation. iii- Post precipitation. iv- Digestion.

**Question 2: Choose the correct answer: (16 marks)**

1) What do you understand by the term "Quantitative analysis"?
   - **a.** Involves determining the individual constituents of a given sample.
   - **b.** Involves the determination of the relative or absolute amount of an analyte in a given sample.
   - **c.** Involves the addition of measured volume of a known concentration of reagent into a solution of the substance to be determined (analyte).
   - **d.** Involves determining the level of purity of an analyte.
   - **e.** Involves determining the quality of a sample.

2) If the concentration of $H^+$ ions in an aqueous solution is $2.5 \times 10^{-4}$ then,
   a-Its pH <7 b-The solution is acidic c- Its pOH >7
   d-Its $OH^-$ concentration is less than the concentration of $OH^-$ in neutral solution e. All

3) The chemical formula of the indicator formed at the end point in volhard's method is:
   a- $FeCl_3$ b- $[Fe(SCN)_6]^{2+}$ c- $Fe(OH)_3$ d- none

4) Which one of the following considered as a monodentate ligand:
   a- $H_2N\text{-}CH_2\text{-}CH_2\text{-}NH_2$ b- $NH_3$
   c- EDTA d- $C_2O_4^{2-}$

5) 3.60 M Sulphuric acid solution that is 29% $H_2SO_4$ (Molar mass = 98 g $mol^{-1}$) by mass, the density (in $g.mL^{-1}$) will be:
   a- 1.45 b- 1.64 c- 1.88 d- 1.22

6) In the precipitation of $Ag^+$ as AgCl, which one of the following can be used as a washing solution?
   a- $HNO_3$ b-$H_2O$ c-NaCl d-$Ba(NO_3)_2$

7) Mohr's titration should be carried out at pHs:
   a- 7 b- 9 c-12

8) Indicator used in complexometric titration is…….
   a- Eriochrome black T b- Xylenol orange c- Murexide d- all

**Please turn the page→**

## Section B: (Chromatography) (30 marks)

### Question 3: (15 marks)

**a. Complete each of the following sentences: (5 marks)**

1. **Mikhail Tswett** used…… to separate……according to ……..……..mechanism.
2. Mobile phase in column chromatography is moved under the effect of……..or……..
3. The aim of elution process is to get ……..……and to regenerate……..……..……
4. Number of theoretical plates **(N)** is depends on……..…and independent on ……..
5. Degassing process in **HPLC** can be proceed using……..or……..……or……..…..

**b. Sketch the plot which represents:** Van-Deemeter equation. **(3 marks)**

**c. Give the scientific term for each of the following statements: (2 marks)**

1. Number of replaceable sites which available in one gram of the resin.
2. A chromatographic technique which can be used for isolation of cells and viruses.

**d.** The following data were obtained for **three** compounds separated on a **50-cm** capillary column:

| Compound | $t_r$ (sec.) | $w_b$ (sec.) |
|---|---|---|
| A | 75 | 15 |
| B | 120 | 20 |

If the retention time for the **unretained** solute is **15 sec. calculate:**

1. The height of a theoretical plate **only** for **(B)** compound. **(2 marks)**
2. Resolution and selectivity factor. **(3 marks)**

---

### Question 4: (15 marks)

**a. Mention only one disadvantage for each of the following: (5 marks)**

1. Adsorption chromatography.
2. **SEC.**
3. Synthetic organic ion exchanger.
4. **GC.**
5. **HPLC.**

**b. Choose the correct answer for each the following statements: (5 marks)**

1. We can separate basic compounds using: **a. Silica gel. b. Alumina.**
2. **RPLC** can retain compounds with: **a. Polar nature. b. Non-polar nature.**
3. If resin surface contain sulfonic group, it will act as: **a. Cationic exchanger. b. Anionic exchanger.**
4. In calibration curve, as $t_r$ value increase so the separated sample is: **a. Complicated. b. Simple.**
5. Bio-specific elution can produce: **a. Narrow solute peak. b. Broad solute peak.**

**c.** The following data were collected for a series of normal alkanes using **Carbowax 20M** stationary phase:

| Normal alkane | $t_r$ (min) |
|---|---|
| Ethane ($C_2H_6$) | 2.3 |
| Propane ($C_3H_8$) | 5.6 |
| Butane ($C_4H_{10}$) | 9.8 |

What is the retention index for a compound whose adjusted retention time is **7.6 min**? **(3 marks)**

**d.** Sulphate ion is separated on anion exchange column with **30 cm**-length and **2 $cm^2$**-cross section area using potassium nitrate as eluent. If the distribution coefficient ($K_p$) is **90**, calculate $V_{max}$ (knowing that: void volume is **50%** of column volume). **(2 marks)**

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