المستوى الرابع - ميكروبيولوجي - علم زراعة الأنسجة النباتية م ٤١٤

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. 2012

Educational Year: Fourth Level **Program (Branch): Biology**
Subject: M 414 **Course(s): Plant tissue culture**
Time: 2 hrs **Date: 25 / 12 /2012** **Full mark:** 60 **Question mark: 20**

Answer the following questions:

(20 mark)

Q1 **A: Define the following terms:** **(12 mark)**

Totipotency theory, callus, explant, cell suspension culture, anther culture, protoplast culture, organogenesis, hardening off, somaclonal variation, subculture, morphogenesis, and micrografting.

B: Outline the general steps of the following: **(8 mark, 2 mark each)**

1- Protoplast culture production
2- Anther culture.
3- Establishment of a typical plant tissue culture system.
4- Large scale production of secondary metabolites by cell suspensions in bioreactors.

Q2 **Complete the following sentences** **(20 mark)**

a- In plant tissue culture, acclimatization means--- (1)--- and its methods include –(2)--
b- Higher --(1)- ratio promotes shoot formation whereas higher -(2)--ratio induces root formation.
c- Types of protoplast fusions are ---(1)--- and ---(2)---.
d- Steps of plant regeneration from callus include---(1)---,--(2)--,--(3)--, and --(4)---
e- During callus initiation, calli of different appearance, color, degree of compaction and morphogenic potential can be obtained from a single explant because -(1)-, -(2)-, and --(3)---
f- Methods of monitoring growth of cell suspension culture include---(1)---,------(2)------,----(3)----, and ---(4)---.
g- Properties of a "good" cell suspension culture include -(1)-,-(2)--,--(3)-,-and --(4)-
h- Continuous shaking is so important in plant cell suspension because it---(1)----(2)--, ---(3)--,and --(4)--
i- Cell clumps are formed in cell suspension culture as a result of--(1)---and this phenomenon can be overcome by adding ---(2)---, ---(3)---,and --(4)---
j- Strategies for improving production of important secondary metabolites via cell suspension cultures include --(1)--, --(2)--, --(3)--, --(4)-, ----(5)--,and --(6)--.
k- Somatic embryogenesis means-(1)- whereas zygotic embryogenesis is-(2)- and the embryogenic cells that give rise to somatic embryos are characterized, anatomically, by----(1)----, ---(2)---, and --(3)--,

Q3 **Describe, briefly, each of the following:** **(20 mark)**

i- Applications of different types of plant tissue culture. **(4 marks)**
ii- Significance of haploid plant production. **(3 marks)**
iii- Significance of plant tissue culture for society. **(2.5 marks)**
iv- Growth curve of plant cell suspension culture. **(2.5 marks)**
v- The role of phytohormones in plant tissue culture. **(4 marks)**
vi- Methods of initiation of a plant cell suspension culture. **(4 marks)**

Best wishes

Examiner: Dr. Farag Ibraheem

المستوى الرابع - ميكروبيولوجي - البيولوجية الجزيئية (م ٤٠٢)

Mansoura University
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Final Examination in Botany
First Term: Jan. 2013

Educational Year: Fourth level
Program (Branch): Microbiology
Subject: Molecular biology
Course(s): M 402
Time: 2 hrs Date:29 /12 /2012
Full mark: 60 **Question mark**: 20

Answer the following questions:

Q1: A woman was found dead in her apartment and the investigators obtained a single hair from the crime scene containing about 10 to 20 picograms (10^{-12}g) of DNA. To characterize a small portion of this DNA and determine whether or not it matches the same region of the DNA from a tissue sample from your four prime suspects, you need about 10 to 100 nanograms (10^{-9}g) of DNA from the crime scene. How would you go about obtaining sufficient DNA to compare the five samples? **(7 points)** What information would you need before you could proceed? **(6 points)**, How you incriminate or exonerate any of the four suspects?**(7 points)**

Q2: Answer the following questions with True (T) or False (F) and correct the False ones. (1 point each)

1. DNA modifying enzymes are involved in the degradation, synthesis and alteration of the nucleic acids.
2. Endonucleases cleave the double-stranded DNA at specific sequences internally while exonuclease chew up nucleotides from either end of the double-stranded DNA.
3. Nucleases are enzymes that degrade the DNA molecules by breaking phosphodiester bonds that hold nucleotides together. There are two types of nucleases: endonucleases act on internal phosphodiester bonds within a DNA molecule, while exonucleases degrade DNA and remove nucleotides from the end of the DNA molecule
4. The basic principles of gene manipulation involves restriction enzymes, ligases, methylases, nucleases, cloning vector and reverse transcriptases.
5. There are several terms coined to genetic engineering such as gene manipulation, gene cloning, genetic modification and recombinant DNA technology.
6. The restrictive mechanism involves the modification of host DNA by numerous ways. One way of modification was through the addition of methyl group to cytosine nucleotide; a modification known as methylation. These modifications aid in recognizing and degrading the foreign DNA.
7. Once the prokaryotic genome has been condensed, DNA topoisomerase I, DNA gyrase, and other proteins help maintain the supercoils.
8. Dolly, the first mammal to be cloned from an adult cell, naturally conceived and , gave birth to her first lamb, Bonnie; is a prime example of therapeutic cloning.
9. Plasmids are circular pieces of DNA and cannot replicate on their own
10. Telomeres are sequences located at the ends of the linear eukaryotic chromosomes, which help stabilize them.

Examiners: Prof. Yehia Ellazeik Dr. Linda Samaan

11. A cDNA libraries is a set of cloned fragments that collectively represent the genes of a particular organism generated by shotgun cloning.
12. Genome size is clearly an indicator of the genomic or biological complexity of an organism.
13. A gene is a segment of the genetic material that determines or codes for one enzyme not one gene-one protein or a visible property.
14. Regulatory sequences provide signals that determine the beginning and end of structural genes or function as initiation points for replication or recombination.
15. Eukaryotic genomic DNA containing the ß- globin gene can be cloned and expressed in *E.coli.*
16. Basically, plasmid, phage, lambda, BAC and YAC cloning vectors possess the exact same features.
17. Southern and/or Northern hybridizations are the techniques of choice to study the degree of similarity between genes and their protein products.
18. The central dogma of molecular genetics is the general pathways of information flow via the processes of replication, transcription, and translation. It was acceptable at a time early times, but now it is no longer valid term!
19. The maintenance of genetic diversity, specialized DNA repair systems, the regulation of expression of certain genes, and programmed genetic rearrangements during development. These events represent some of the recognized roles for genetic recombination and require availability of special enzymes in the cells.
20. Gene gun is a device used to bombard animal cells with metal particles coated with foreign genes to accomplish genetic engineering, similar to electroporation process.

Q3: A- Choose the correct answer(s): (1 point each)

1- Assume that you are trying to amplify a single molecule of ds-DNA. After 10 rounds of PCR, how many molecules would have (assume that you started with a single molecule).

a- 5 b- 10 c- 25 d- 32 e- 50

2- Which of the following is true about the origin of replication of the plasmid?

a. All plasmids have a single origin of replication
b. Replication occurs along the plasmid non-specifically in a random fashion
c. The replication machinery binds to the minor groove along the plasmid molecule

d. Origins of replication contain AT rich domains as well as several specific recognition sequences
e. Origins of replication contain GC rich domains as well as several specific recognition sequences

3- Which is the average size of DNA fragments that are generated by digesting the mouse genome with a restriction enzyme that recognizes 6 bp sequence GAATTC?
a- 2420bp b- 256bp c- 1024 d- 4096 e- 2524

4- Plasmid and transposable elements have been combined to create transformation vector s for creating transgenic *Drosophila* strains. Which of the following is used as a selectable marker for identifying transformant flies?
a- White wings **b-** Multiple cloning sites
c- Antibiotic resistanceGene **d-** Transposable elemen

5- Which of the following information from the genome of the grape variety (pinot noir) could be used to make genetically modified grape vine that could grow anywhere in the world that produce flavorful grapes
a- Genes that code for enzymes that produce flavorings and aromatic compounds
b- Genes that confer resistance to bacterial, viral and fungal diseases
c- Genes that code for drought tolerance
d- A and B e- None of the above

6- The genetic code is called "degenerate" which statement best describe this concept?
a. Multiple tRNAs can physically bound to the same amino acid
b. A single codon can code for multiple amino acids
c. Multiple codons can code for the same amino acid
d. A single tRNA can binds multiple amino acids

7- DNA microarrays detect differences amongst the cells and tissues in which of the following categories?
a. Replication b- Translation c- Transcription
d- RNA editing

8- Doing a DNA microarray with normal and cancerous skin cells, where the gene spot from normal cell is green and the gene spot from cancer cell is red; What does it mean if a different gene spot on the microarray slide is yellow?
a. The gene is transcribe at higher level in normal cells sample
b. The gene is transcribe at higher level in cancercells sample
c. The gene is transcribed at lower level in the normal cell

sample

d. The gene in question is not transcribed
e. The gene is transcribed equally in both cells.

9- Polymerase chain reaction (PCR) is used to amplify DNA fragments. The first step is to denature DNA at 95° C. Which of the following molecules is used during cellular replication to accomplish the same task?

a. DNA helicase b- Topoisomerase c- Single-stranded binding protein d- Slide clamping

10- Which of the following removes supercoiling ahead of the replication fork during DNA replication?

a. DNA helicase b. Topoisomerase c. Single-stranded binding protein d. DNA polymerase

Q-3-B- Fill in the missing word(s) (1 point each)

1- Nucleosome a fundamental packaging structure of DNA that is found in all eukaryotic chromosomes; consisted of -------,--------,--------.
2- Plasmids that commonly carry genes for resistance to antibiotics are called-----.
3- The addition of plasmids to microorganisms to increase the yield of useful substances is known as ---------.
4- Genetic units that have been known to cause double mutations within the chromosome are called------ .
5- Transposons are segments of DNA that can move around to different positions in the genome of a single cell in a -------- or -----fashion and causing, -------, -----.

المستوى الرابع - ميكروبيولوجي - تخمرات وصناعات تخمرية ٢٠١٣م

Mansoura University
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جامعة المنصورة
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المنصورة - مصر

Final Examination in Botany
First Term: Jan. 2013

Educational Year: Fourth Level **Program (Branch): Microbiology**
Subject: M (403) **Course: Fermentations and Fermentation industries**

Time: 2 hrs **Date: 1 /1 /2013** **Full mark: 60** **Question mark: 20**

Answer the following questions:

I.Discuss the following:

a.Microbial transformation process and advantages of microbial processes over chemical reagents.(7marks)
b.Drying and crystallization of fermentation products.(7marks)
c.The advantages and disadvantages of using chemically defined and chemically undefined medium components in fermentation process.(6marks)

II.Write briefly on:

a.Methods which can be used to release the cellular contents of microorganisms. (7marks)
b.Commonly used nitrogen sources in media for industrial fermentations.(7marks)
c.Microbial metabolites as a product of fermentation process.(6marks)

III.Complete the following:

a.The component parts of a fermentation process are :1….., 2…., 3….., 4,….. 5…., 6…..
b.The first stage for the recovery of an extracellular product is the removal of …… by …….. or…….method.
c.In body construction of a fermenter, glass is useful than stainless steel because……..
d.In the fermentation process, heat will be produced by……..and…….
e.The structural components of the fermenter involved in aeration and agitation are……,……,……,……
f. Fermenters may be liquid, also known as …… or solid state, also known as……and most of the fermenters used in industry are of the ……type.
g.The working volume of the fermenter is about 80% of the total volume because…….
h.Fermenters are grouped in several ways on the basis of ……, ……., ……..
i. Fermenters are also known as……..
j.In industrial microbiology fermentation is defined as……..

Examiners: **Dr. Attiya Mohamedin** **Prof. Dr.Mohamed Nageeb**

المستوى الرابع - كيمياء تحليلية - التحليل الكهربي والتحليل الطيفي لـ 417

Mansoura University
Faculty of Science
Chemistry Department
Subject: Analytical Chemistry
Course: **electroanalytical and Spectrometry .....**
Course code: ~~314~~ 417

4th level(Chemistry students)
Date:5-1-2013
Time allowed: **2** hours
Full Mark:**80** Marks

Answer the Following Questions

A-**Spectrometry** (~~40~~ marks)

1-What is colourimetry ? what are the basic components of single and double beam spectrophotometer .

2-How can analyse a coloured compound by spectrophotometric method .

3 - what are the types of emission spectra . Discuss

a- absorption or emission b- nonradiative relaxation c- Fluorescence

4-If a 3.9x10-4 M solution of compound A (Molecular weight = 122) exhibited an absorbance of 0.624 at 238nm in a 1- cm cuvet .A blank had an absorbance of 0.029 .The absorbance of the unknown solution of compound A was 0.375 at the same wavelength .Find the concentration of A in the unknown expressed in g/l .

5- How can choice the method of analysis between the following techniques

i) Turbidometry . ii) Nephelometry .

what are the differences between Nephelometry and Fluorimetric techniques .

6- Explain how atomic spectroscopic methods are categorized based on the type of atomization process . Explain <u>shortly</u> the type of interferences in flame AAS and the ways their elimination .

Answer ALL Question only and express your answer by equation, diagram: with formula ,equation ,figures whenever possible

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Section Electro-analytical chemistry (40 marks)

1-a)Define *5 only* of the following : (10 marks)

1- Faraday 's 2nd law , α (conductance) **2-i_d. &i_p** **3- E_{cell} & E_j** 4-Cyclic voltammetry 5- Back titration in Coulometry with control potential 6- Anodic stripping analysis 7-$E_{1/2}$ & $\Delta E_{1/2}$. 8-Λ_{eq} & Kohlrauch law

b) Discuss *2 only* of the following sentences: (10 marks)

1-Electro-deposition depend on several factors& has many applications.

2 -Dropping Hg electrode has many advantages & polarography analyses very useful in analytical chemsitry ,O_2 removed from analytic solution in polarographic cell .

3-Ions – molecular selective electrode are versatile.

c) A mineral sample 500.0 mg containing stibnite Sb_2S_3 is decomposed and dissolved in acid and diluted to 100 ml .A 5.0 ml aliquot is added to 150 ml of an electrolyte containing 2 M HCl and 0.2 M KBr. Electro-generated bromine oxidizes Sb^{+3} to Sb^{+5} and the coulometric titration requires 200.0 sec. At 50.0 mA to reach the end point signal . Calculate the % of Sb & Stibnite Sb_2S_3 in the sample. (At. Wt. Sb =122, S = 32). : (10 marks)

d) complete 4 only the following: (10 marks)

1- $E_{1/2}$= .....for E_c = -0.66 v. and E_a = -0.64 v. and the number of electrons=.... for organic compound (cyclic voltammetry).

2- Controlled potential coulometry used for analysis of .....and determine no of .....

3- Using coulometry with constant current for determination of ..... and produce .....

4- Equivalent conductance Λ° are .....and depends on ..... while Λ° is .....

5- Quantitative analysis in polarography technique depends on ..... using .....and ..... methods. while, qualitative analysis depends on .....

Good Luck : prof. Dr. I. Kenawy

المستوى الرابع. ميكروبيولوجي - وراثة. م ٤٠٦

Mansoura University
Faculty of Science
Botany Department

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Final Examination in Botany
Jan. 2013

Educational Year: Fourth Level Program (Branch): Microbiology
Subject: (م ٤٠٦) Course(s): Genetics
Time: 2 hrs Date: 12/ 1 /2013 Full mark: 60 Question mark: 20

Answer the following questions:

Q.1 A- "Haemophilia is much more frequent among men than among women" Explain in details this statement with examples. (10 marks)

B- Give an account on the following: (10 marks)

1- Skin colour in man.

2- Multiple alleles and give an example.

Q.2 Fill in the spaces using suitable words or phrases: (20 marks)

1- In quantitative inheritance the F2 phenotypic ratio is ..... .

2- Genes located on both X and Y-chromosomes called ..... .

3- ..... epistasis modifies the Mendelian F2 ratio into (13:3).

4- Blood groups in human is controlled by.....

5- Interaction of genes controlling the same character is called ..... .

6- The appearance of yellow fats in rabbits depends on two factors.....and.....

7- ..... individuals have similar alleles, whereas ..... individuals have different alleles.

8 - Based on Mendel experiments, he put two important principles or laws, these are ..... and ..... .

9- Some traits such as ..... are affected by age.

10- Colour blindness is a ..... trait.

11- The external feature of a character is termed ..... .

12- External environmental effects on gene expression such as ....., ..., ... and ..... .

13- Cross of an individual of unknown genotype to completely recessive individual called.....

14- F2 phenotypic ratio in agouti colour of mice is .....

Q.3 Write a brief notes on each of the following: (20 marks)

1- Inheritance of comb shape in poultry. (5 marks)

2- Complementary genes. (5 marks)

3- Incomplete dominance and incomplete epistasis (Give example). (10 marks)

Examiners: Prof. Magda Soliman Dr. Rehab Mahmoud

المستوى الرابع - ميكروبيولوجي - فطريات ومقاومة الأمراض م405

Mansoura University
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جامعة المنصورة
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Final Examination in Botany
First Term: Jan. 2013

Educational Year:2012- 2013 **Program (Branch):Microbiology**
Level4

Subject:Botany **Course(s):**Mycology and phytopathology (M405)
Time: 2 hrs **Date: 12 /1 /2013** **Full mark: 60** **Question mark: 20**

Answer the following questions:

Q1: Give an account on each of the following:

a- General principles of plant disease management (5 marks)
b- Identification of Abscission, Hyperplasia, Epidemiology, Host range and Syndrome (5 marks)
c- Classification of plant diseases (5 marks)
d- Mechanisms of biological control (5 marks)

Q2 : Using illustrative diagrams describe each of the following:

a- Essential components of an epiphytotic (disease triangle) (6 marks)
b- Methods of penetration and invasion by fungi (4 marks)
c- Histological defense structures (6 marks)
d- Cellular defense structures (4 marks)

Q3 :

a- Compare and contrast between each of the following:
   1- Soil inhabitants and soil invaders (5 marks)
   2- Host specific and non host specific toxins (5 marks)

b- Write an account on each of the following:
   1- Koch's postulates (4 marks)
   2- Seed as the source of autonomous dispersal (6 marks)

Examiners :

Prof. Yehia Azab **Dr. Hoda Soliman**

المستوى الرابع - ميكروبيولوجي - ٢٠١٣ فسيولوجيا الكائنات الدقيقة

Mansoura University Faculty of Science Botany Department Mansoura - Egypt		جامعة المنصورة كلية العلوم قسم النبات المنصورة - مصر

Final Examination in Botany
Jan. 2013

Educational Year: 4th Year — Program: **Microbiology**

Subject: **Microbiology (M401)** Course: **Physiology of Microorganisms**

Time: 2 hrs Date: 15/1/2013 Full mark: 60 Question mark: 15

Answer the following questions:

Q1. Discuss each of the following:

a. Fungal adaptations for nutrient capture

b. **Van Niel's** postulates

c. Efficiency of substrate utilization

Q2. Outline each of the following:

a- fungal hyphae anastomosis

b- mechanism of apical growth in fungi

c- lactose utilization in ***Escherichia coli***

Q3. a. Why is pyruvic acid considered the hub of carbohydrate metabolism?

b. Illustrate the architecture of fungal cell wall and outline chitin biosynthesis

Good Luck

Examiners:

- Prof. Anwar T. Manqarious
- **Ass. Prof. Mervat H. Hussein**