المستوى الرابع - ميكروبيولوجي - (م ٤٠٦) وراثة خلوية

Mansoura University
Faculty of Science
Botany Department

جامعة المنصورة
كلية العلوم
قسم النبات

Final Examination in Botany
Jan. 2012

Educational Year: Fourth Level Program (Branch): Microbiology
Subject: (م ٤٠٦) Course(s): Genetics
Time: 2 hrs Date: 14 / 1 /2012 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- Duplicate genes (Duplicate factors).
2- Phenylketonuria.

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 Y-chromosomes called ..... .
3- ..... epistasis modifies the Mendelian F2 ratio into (13:3).
4- The Himalayan rabbit changes fur colour when the ..... changes.
5- Interaction of genes controlling the same character is called ..... .
6- In ..... inheritance variation is continuous, whereas, in ..... it is discontinuous.
7- ..... individuals have similar alleles, whereas ..... individuals have different alleles.
8- Inheritance of coat colour in rabbits is governed by ..... .
9- Based on Mendel experiments, he put two important principles or laws, these are ..... and ..... .
10- Some trait such as ..... are affected by age.
11- Colour blindness is a ..... trait.
12- In test cross if the ratio of offspring is 50% : 50% the individual is ..... .
13- The external feature of a character is termed ..... .
14- External environmental effects on gene expression such as ....., ..., ... and ..... .

Q.3 Explain briefly: (20 marks)
1- Sex-linkage inheritance in birds.
2- Additive or polymeric genes.
3- Inheritance of blood groups in human.
4- Complementary genes.
5- Recessive lethal genes.

Examiners: Prof. Amal Amin Prof. Magda Soliman

المستقبل ٢٠١٢ ع - ميكروبيولوجي - تخمرات وصناعات تخمرية (٤٠٣م)

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): Microbiology**
Subject: M (403) **Course: Fermentations and Fermentation industries**
Time: 2 hrs **Date: 21 /1 /2012** **Full mark: 60** **Question mark: 20**

Answer the following questions:

Q.1.Write on each of the following:

A)The requirements for a cost effective fermentation of organic feed stocks from plant carbohydrates.(7 marks)
B)Biosynthesis of ethanol.(13 marks)

Q.2.

A)Discuss the different substrates which can be used as carbon sources for industrial fermentation.(10 marks)
(B) Complete each of the following sentences (10 marks)
1-The optimum industrial bioprocess should have ..... ,....., ... & ..... (2 marks)
2-.....causes yoghurt texture & characteristic taste where causes ..... (1.5 marks)
3-Scale up of a microbial process is .....that involved in.....while Up stream processing is .....(1.5 marks)
4- Over acidity in yoghurt may be due to .....or..... & can be detected by .....while gas evolution and broken coagulant due to ..... & ..... respectively (2.5 marks)
5-Streptococci are catalase .....where.....but may be .....(1.5 marks)
6-.....used for thermal priming as ..... (1 mark)

Q3.Answer each of the following questions as requested

1-What are the factors considered during industrial media preparation (3 marks)
2-What are the advantages of Chemostat , Fermentation Cascade program , Paddle and Fermenter Jacket ? (4 marks)
3-Describe the down stream processing for *Streptomyces* to produce streptomycin & for yeast to produce compressed yeast?(4 marks)
4-Describe the manufacturing process of yoghurt with special reference to starter culture , its percent & mechanism of its action, Name the chemical additives & state its role , Effect of starter culture on milk composition& Yoghurt significance. (6 marks)
5-Draw a labelled diagram of fermenter , describe its structure & mention its application in industry.(3 marks)

Examiners: **Dr. Attiya Mohamedin** **Dr. Ahmed El-shobaky**

مكرر بيولوجي - (م ٤٠٠)
البيولوجيا الجزيئية

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

جامعة المنصورة
كلية العلوم
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المنصورة - مصر

Final Examination in Microbiology
Second Term: Jan. 2012

Educational Year: Fourth Year **Program (Branch): Microbiology**
Subject: Molecular Biology **Course(s): M 402**
Time: 2 hrs **Date: 31 /12 /2011** **Full mark: 60** **Question: 15-30 points**

Answer the following questions:

1 a- You are mapping a circular double-stranded plasmid 17 kb in size using HindIII and PstI restriction enzymes. HindIII digestion produced two DNA fragments: A and B, 11 and 6 kb, respectively, while PstI also cuts twice yielding two fragments: 5 and 12 kb, respectively. When double digestion was performed 4 different fragments were produced with sizes 1, 4, 5 and 7 kb respectively. **(10 points).**

1- Show the electrophoretic separation patterens of the different digests, and
2- Show the location of all restriction sites on the circular plasmid

b- Custom-designed oligonucleotides can be synthesized in vitro and are available commercially to be used routinely as template primers in DNA sequencing and PCR reactions. Explain how can we synthesize such DNA primers in vitro **(10 points).**

c- Diagram the use of a YAC vector to clone a piece of eukaryotic DNA? What are the major advantages of the YAC vectors? **(10 points).**

2 **Place T for true or F for false and correct the false statement (15 points).**

1- Transposition is the movement of specific pieces of DNA in the genome.
2- Plasmids copy number per cell are under either relaxed or stringent control depending on their fine structures
3- A key feature of insertional mutagensis for identification of a plasmid containing recombinant DNA is the disruption of the mutated gene.
4- Duplicative and conservative transpositions are genetic elements which resemble plasmids in their movement between related organisms and cause no mutation.
5- A compatibility group of plasmids contains members unable to coexist in the same bacterial cell.
6- Bacterial conjugation is the process in which DNA is transferred from a bacterial donor cell to a recipient cell by cell-to-cell contact; through sex pili.
7- Competency is a process by which Cell-free DNA enters bacterial and fungal cell
8- DNA and mRNA are the starting materials for cloning eukaryotic genes.
9- Reverse transcription is not necessary for cloning insulin gen but for interferon.
10- A Restriction Enzyme is bacterial enzyme that cuts single-stranded DNA at specific recognition nucleotide sequences known as restriction sites.
11- Episomes are transposons that can integrate themselves into the chromosomal DNA of the host organism.
12-PCR amplifies a region of DNA between two predetermined sites using

oligonucleotides complementary to these sites and serve as primers for synthesis of millions of copies of the DNA between these two sites.

13-Expression vector with inducible promoter are designed for continuous and strong expression of cloned genes.

14-RT-PCR (reverse transcriptase PCR) is a simple method used to clone genes from animals and plants.

15-As a forensic tool, modern DNA typing can be used to test parentage, to identify criminals, or to remove innocent people from suspicion.

3 Choose the correct answer(s) (15 Points):

1- Restriction endonucleases are categorized into three types I, II and III, based on:

a- their composition and enzyme cofactor requirements,
b- the nature of their target sequence, and
c- the position of their DNA cleavage site relative to the target sequence.
d- all of the above e- none of the above

2- A simple genome such as that of phage P1 has a double-stranded DNA with 91.kb and it assumes no complication in its structure, use these information to answer the following questions:

A) this DNA contains almost 8714 full double-helical turns
B) the length of this DNA equal 31.11 in microns (1micron=10^4 angstroms)?
C) This DNA contains 183,000 phosphorus atoms
D) the number of genes in this genome cannot be calculated.
E)

3- The eukaryotic chromosome is:

a- DNA molecule twisted onto itself, and the supercoiled molecule is wrapped around histone proteins which maintain its shape.
b- The complex DNA protein is called chromatin, while the structure formed by two turns of DNA around one histone is called a nucleosome.
c-This chromosome assumes rosette structure

4- A promoter at the beginning of a genetic operon is a(n)

A. enzyme that facilitates the transcription of DNA
B. site where DNA replication begins
C. site on DNA where RNA polymerase binds
D. site on RNA where translation starts
E. gene that codes for RNA polymerase

5- . The operator region of an associated operon

A. codes for the synthesis of a repressor
B. is a nucleotide sequence of DNA that binds an active regulatory protein
C. binds RNA polymerase at the beginning of transcription of an operon
D. is a nucleotide sequence of an RNA molecule which is not translated into protein E. none of the above

6- In bacterial genetics the term competence refers to a bacterium with

A. ability to be transformed
B. the F factor integrated into its chromosomal DNA
C. susceptibility to lytic infection by bacteriophage

7- *Exonuclease III* does all the specified functions EXCEPT:

a-Catalyzes the stepwise removal of nucleotides from the 3' hydroxyl termini of duplex DNA.

b- It will not make internal cleavages, however, it will degrade the ends of DNA at existing internal "nicks".

c-This enzyme hydrolyzes duplex or single DNA strands preferentially at the phosphodiester bonds 5' to pyrimidine nucleotides

d- Since duplex DNA is required, the enzyme will not digest the 3' end of duplex DNA where the termini are 3' overhangs.

8- The gene gun is a new way of gene transfer:

a- to grains in response to the difficulty of getting them across grain cell walls.

b- similar to the plasmid method of transformation and conjugation.

c- its efficiency depends on the temperature, amount of cells, and their ability to regenerate as well as the type of gun used: helium powered vs. gun-powder, hand-held vs. stand-alone, etc.

9- You design a nucleic acid probe of the following sequence:

$^{3'}$**C–T–C–C–T–A–C–A–C**$^{5'}$

Which of the following single stranded DNAs would this probe *hybridize* with the best?

a. $^{3'}$ G–A–C–T–A–G–G–T–C $^{5'}$

b. $^{5'}$ G–A–G–G–A–T–G–T–G $^{3'}$

c. $^{3'}$ C–T–G–A–T–C–C–A–G $^{5'}$

d. $^{5'}$ C–T–G–A–T–C–C–A–G $^{3'}$

e. $^{5'}$ A–G–C–C–G–A–G–T–T $^{3'}$

f. $^{5'}$ T–C–A–A–G–C–T–G–A $^{3'}$

g. none of the above sequences would allow for hybridization

10- Plasmid pBR322 is a commonly using gene cloning vector, contains genes for both ampicillin and tetracycline resistance. Following the cloning of foreign DNA into one of the antibiotic resistance genes and transformation into *E. coli*, cells containing the plasmid will:

a. be *sensitive* to both antibiotics

b. be *resistant* to both antibiotics

c. be *resistant* to one antibiotic but *sensitive* to the other

d. *require* both antibiotics for growth

e. be able to grow in the presence of penicillin

11- Chromosomes are:

A. Multiple units of genes in linear chains

B. A newly discovered very large eukaryote

C. A type of virus that attacks only prokaryotic cells

D. A type of organelle that secretes material

E. Another name for a common yeast

13. Which of the following is NOT true about agarose gel electrophoresis of DNA fragments.

A. The larger DNA fragments are always closest to the wells.

B. The larger DNA fragments are always furthest from the wells

C. The agarose is chemically related to the agar used in petri dishes.
D. The DNA is negatively charged.

14- Which of the following best describes a plasmid?

a. A gene within the chromosome
b. Small circular piece of DNA outside the chromosome
c. The genetic material of a bacteriophage
d. Part of bacterial ribosomes
e. A single, linear strand of DNA

15- What does ligase do during replication of DNA?

f. Makes copies of mRNA from DNA
g. Removes damaged sections of DNA
h. Joins together mRNA
i. Joins together DNA segments
j. Digests mRNA when it is no longer needed

Examiner: ***Prof. Dr. Yehia A. Osman Ellazeik***

المستوى الرابع - ميكروبيولوجي - فسيولوجيا الكائنات الدقيقة (م ٤٠١)

Mansoura University
Faculty of Science
Botany Department
Mansoura, Egypt

جامعة المنصورة
كلية العلوم
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المنصورة - مصر

Final Examination in Microbiology
First Term: Jan. 2012

Educational Year: **Fourth Level** Program : **Microbiology**
Subject: **Microbiology (M 401)** Course: **Physiology of Microorganisms**
Time: **2 hrs** **Date: 14 / 1 / 2012** Full mark: **60** Question mark: **20**

Answer the following questions:

1

a- **Illustrate** enzymatic breakdown of cellulose. (**10** marks)
b- **Diagram** steps of chitin synthesis. (**10** marks)

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2 a- Account on the following: (**6** marks for each)
1- The physiological basis of temperature tolerance.
2- Reserve materials in fungi.
b- Interpret fungal generation to an electrical dimension to hyphal growth. (**8** marks)

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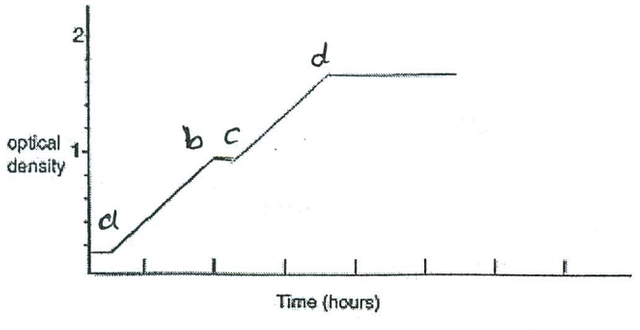
3 a – Complete the following: (**5** marks)
i- Lag phase of microbial growth is prolonged by .... , ... , ... & .....
ii- Growth in microorganisms defined as an increase in ..... , ... , ... & .....
iii- Microbial growth decelerates due to either ..... or .....
iv-Fungi usually have a constitutive transport protein for ..... .
v- At fungal tip, there is an accumulation of membrane-bound vesicles called..... ..

b- Interpret the pattern of fungal growth illustrated in the following figure, where the growth medium contains a mixture of glucose and lactose. (**15** marks)



Examiners: **Prof. Salah El-Dohlob** **Ass. Prof. Mervat H. Hussein**