
	Final Exam:	January Season	Course Code:	A23	Percentage of Degree%:	60 %	
	Academic Year:	2014/2015	Program Name:	Master	The number of exam bulletin:	4	
	Semester:	first	Department:	Compulsory course	Date of Exam:	/1 /2018	
	Course title:	Biotechnology (I)	Degree	60	Time of Exam:	3 hours	

Exam instructions:

1. Answer questions only prescribed others will not be considered excess to questions.
2. Use only blue pen and pencil on answer sheet.
3. Disposal of paper and one for each student.
4. Trading instruments is not allowed (pens, ruler, calculators, etc.).
5. Mobiles, smart phones, taps, and calculator application on mobile phone are not allowed.

Answer the following Questions:

First question

Total score (15)

1- Discuss:

- A - The unique features distinguish the Baculovirus expression vector system? (5 points)
- B- "You have three DNA fragments of 7.5kbp, 37kbp and 110kbp and one viral RNA fragment of 6.2 kbp which you have to prepare it for vaccination **choose the vector you'll use for cloning and expression, explaining why and the major characteristics of these vectors?** (5 points)
- 2- What is transformation; enumerate its different methods specially in plant? (5 points)

Second question:

Total score (5)

"Environment is one of areas where biotechnology has played a significant role" Explain by giving examples?

Third question:

Total score (10 points)

Choose the one choice that best completes the statement or answers the question:

1) It is theoretically possible for a gene from any organism to function in any other organism. Why is this possible?

- A) All organisms have ribosomes.
- B) All organisms have the same genetic code.
- C) All organisms are made up of cells.
- D) All organisms have similar nuclei.
- E) All organisms have transfer RNA.



2) One important approach to gene cloning uses:

- A) Non-coding nucleotide sequences.
- B) Plasmids.
- C) Whole chromosomes.
- D) Bacteria.
- E) B and D above.

3) Plasmids are important in biotechnology because they are:

- A) A vehicle for the insertion of recombinant DNA into bacteria.
- B) Surfaces for respiratory processes in bacteria.
- C) Recognition sites on recombinant DNA strands.
- D) Surfaces for protein synthesis in eukaryotic recombinants.
- E) Proviruses incorporated into the host DNA.

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Examiners:	Prof. KHALEEL ELHALAFAWY Prof. Dr. Omaima Khamiss	Head of Department:	
Examination committee:	Prof. Ibraheem Abdel Maksoud Prof. Dr. Omaima Khamiss Prof. Haroon Aboshama		
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5) Assume that you are trying to insert a gene into a plasmid and someone gives you a preparation of DNA cut with restriction enzyme X. The gene you wish to insert has sites on both ends for cutting by restriction enzyme Y. You have a plasmid with a single site for Y, but not for X. Your strategy should be to:

- A) Cut the plasmid with restriction enzyme X and insert the fragments cut with Y into the plasmid.
- B) Cut the plasmid with enzyme X and then insert the gene into the plasmid.
- C) Cut the DNA again with restriction enzyme Y and insert these fragments into the plasmid cut with the same enzyme.
- D) Cut the plasmid twice with restriction enzyme Y and ligate the two fragments onto the ends of the human DNA fragments cut with restriction enzyme X.
- E) Insert the fragments cut with X directly into the plasmid without cutting the plasmid.

6) What is the genetic function of restriction enzyme?

- A) Adds new nucleotides to the growing strand of DNA
- B) Joins nucleotides during replication
- C) Repairs breaks in sugar-phosphate backbones
- D) Joins nucleotides during transcription
- E) Cleaves nucleic acids at specific sites

7) The restriction enzyme used in constructing hybrid molecules of certain gene sequences and plasmid DNA acts by:


- A) Transcribing plasmid DNA into a transformed molecule.
- B) Opening DNA molecules at specific sites, leaving sticky ends exposed.
- C) Binding human genes to bacterial plasmids.
- D) Allowing a hybrid plasmid DNA into a transformed molecule.
- E) Sealing plasmid DNA and foreign DNA into a closed circle.



8) How does a bacterial cell protect its own DNA from restriction enzymes?

- A) By adding methyl groups to adenines and cytosines
- B) By reinforcing bacterial DNA structure with covalent phosphodiester bonds
- C) Adding histones to protect the double-stranded DNA
- D) By forming "sticky ends" of bacterial DNA to prevent the enzyme from attaching
- E) Using DNA ligase to seal the bacterial DNA into a closed circle

9) What two enzymes are needed to produce recombinant DNA?

- A) Endonuclease, transcriptase
- B) DNA polymerase, topoisomerase
- C) Restriction enzyme, ligase
- D) Polymerase, ligase
- E) Transcriptase, ligase

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10) What is a cloning vector?

- A) An agent, such as a plasmid, used to transfer DNA from an in vitro solution into a living cell
- B) The sticky end of a DNA fragment
- C) The laboratory apparatus used to clone genes
- D) A DNA probe used to locate a particular gene in the genome
- E) The enzyme that cuts DNA into restriction fragments

11) What are the essential characteristics of a cloning vector?

- A) Bacterial cells cannot survive without it.
- B) Bacterial cells replicate it.
- C) Bacterial cells take it up.
- D) Both B and C are correct.
- E) A, B, and C are correct.

12) I. Transform bacteria with recombinant DNA molecule

II. Cut the plasmid DNA using restriction enzymes

III. Extract plasmid DNA from bacterial cells

IV. Hydrogen-bond the plasmid DNA to nonplasmid DNA fragments


V. Use ligase to seal plasmid DNA to nonplasmid DNA



From the list above, which of the following is the most logical sequences of steps for splicing foreign DNA into a plasmid and inserting the plasmid into a bacterium?

- A) IV, V, I, II, III
- B) III, II, IV, V, I
- C) III, IV, V, I, II
- D) II, III, V, IV, I
- E) I, II, IV, III, V

13) Bacteria containing recombinant plasmids are often identified by which process?

- A) Removing the DNA of all cells in a culture to see which cells have plasmids
- B) Examining the cells with an electron microscope
- C) Exposing the bacteria to an antibiotic that kills the cells lacking the plasmid
- D) Producing antibodies specific for each bacterium containing a recombinant plasmid
- E) Using radioactive tracers to locate the plasmids


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14) Use the following information to answer the questions below: A eukaryotic gene has "sticky ends" produced by the restriction endonuclease EcoRI. The gene is added to a mixture containing EcoRI and a bacterial plasmid that carries two genes, which make it resistant to ampicillin and tetracycline. The plasmid has one recognition site for EcoRI located in the tetracycline resistance gene. This mixture is incubated for several hours and then added to bacteria growing in nutrient broth. The bacteria are allowed to grow overnight and are streaked on a plate using a technique that produces isolated colonies that are clones of the original. Samples of these colonies are then grown in four different media: nutrient broth plus ampicillin, nutrient broth plus tetracycline, nutrient broth plus ampicillin and tetracycline, and nutrient broth containing no antibiotics. The bacteria containing the engineered plasmid would grow in:

- A) The ampicillin and tetracycline broth only.
- B) The nutrient broth, the ampicillin broth, and the tetracycline broth.
- C) The nutrient broth and the tetracycline broth only.
- D) The nutrient broth only.
- E) The ampicillin broth and the nutrient broth.

----- Best wishes -----

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