
	Final Exam:	Mai Season	Course Code:	A23	Percentage of Degree%:	60 %	
	Academic Year:	2017/2018	Program Name:	MSc	The number of exam bulletin:	1	
	Semester:	Second	Department:	compulsory course	Date of Exam:	/5 /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

(10 points)

- 1- Comment how the choice of vector is dependent on insert size and application?
- 2- Explain the Biotechnological possible solutions for pollution and the role of recombinant DNA as one of these solutions?

Second question:

Total score (20)

a- Give a definition of Biotechnology and the four main subfields of biotechnology?

(5points)



b- Choose the one alternative that best completes the statement or answers the question

(15 points)

1) 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.

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Examiners:	Prof. Dr. Omaira Khamiss prof. haroun abo-Shama	Prof. khalil Elhalfawy	Head of Department:	Prof. Dr. Omaira Khamiss
Examination committee:	Prof. Dr. Omaira Khamiss Prof. Hamdy Emarah Ibraheem Abdelmaksoud			
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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.

2) 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.

3) 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.



4) 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

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

- A) Endonuclease, transcriptase
- B) DNA polymerase, topoisomerase

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- C) Restriction enzyme, ligase
D) Polymerase, ligase
E) Transcriptase, ligase

6) 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

7) 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.

8) 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 non-plasmid DNA fragments

V. Use ligase to seal plasmid DNA to non-plasmid 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

9) 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

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- 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

Third question:

Total score (10)

- 1- Mention the different methods of transformation specially in plant Explaining one in detail?

Fourth question:

Total score (20)

Discuss:

- = Pre-determination theory in Somatic embryogenesis
- = Uses of haploids plants

- Explain:

- Morphogenesis
- Totipotency
- Re-differentiation
- De-differentiation

----- *Best wishes* -----

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