

P-302[DEVELOPMENTAL BIOLOGY AND ANIMAL BIOTECHNOLOGY]

1. Answer the following questions.

[1 mark]

1. A recombinant DNA molecule is produced by

- a) joining of two DNA fragments
- b) joining of two or more DNA fragments
- c) both a and b
- d) joining of two or more DNA fragments originating from different organisms

2. The gene formed by the joining of DNA segments from two different sources are called as

- a) recombinant gene
- b) joined gene
- c) both a and b
- d) chimaeric gene

3. Which of the following enzyme is used to cut DNA molecule in rDNA technology

- a) ligase
- b) phosphatase
- c) ribonuclease
- d) restriction enzymes

4. Restriction enzymes are also called as

- a) biological scissors
- b) molecular scalpels
- c) molecular knives
- d) all of these

5. The most important discovery that lead to the development of rDNA technology was

- a) Double helix model of Watson and Crick
- b) discovery of restriction enzymes
- c) discovery of ligase enzyme
- d) discovery of plasmids

6. Who discovered restriction enzymes

- a) Nathan, Arber and Smith in 1970
- b) Watson, Crick and Wilkins in 1970
- c) Boyer and Cohen in 1975
- d) Paul Berg in 1975

7. Who created the first rDNA molecule

- a) Nathan, Arber and Smith
- b) Watson, Crick and Wilkins
- c) Boyer and Cohen

d) Paul Berg

8. The DNA molecule to which the gene of insert is integrated for cloning is called

- a) carrier
- b) transformer
- c) vector
- d) none of these

9. The DNA segment to be cloned is called

- a) gene segment
- b) DNA fragment
- c) DNA insert
- d) all of these

10. Which of the following statements are true regarding rDNA technology

- a) rDNA technology is used to obtain large number of copies of specific DNA fragments
- b) rDNA technology is used to obtain large quantities of the protein produced by the concerned gene
- c) rDNA technology is used to integrate gene of interest into chromosomes where it expresses itself
- d) all of these

11. The first successful transformation of rDNA molecule into a bacterium was carried out by

- a) Nathan, Arber and Smith
- b) Watson, Crick and Wilkins
- c) Boyer and Cohen
- d) Paul Berg

12. The plasmid used by Cohen and Boyer for their transformation experiment was

- a) pSC 101
- b) PUC 17
- c) pBR 322
- d) E.coli plasmids

13. The mechanism of intake of DNA fragments from the surrounding medium by a cell is called

- a) transformation
- b) transduction
- c) both a and b
- d) conjugation

14. Gene cloning refers to the

- a) production of large number of copies of the gene being cloned
- b) production of asexual progeny from a single individual or a cell
- c) both a and b
- d) none of these

15. Paul Berg's gene splicing experiment created the first rDNA molecule which was a

- a) a T4 phage fragment incorporated into SV40 vector
- b) a lambda phage fragment incorporated into SV40 vector
- c) a T4 phage fragment incorporated into pSC 101 vector
- d) a lambda phage fragment incorporated into pSC 101 vector

Answers:

- 1. d) joining of two or more DNA fragments originating from different organisms
- 2. d) chimaeric gene
- 3. d) restriction enzymes
- 4. a) biological scissors
- 5. b) discovery of restriction enzymes
- 6. a) Nathan, Arber and Smith in 1970
- 7. d) Paul Berg
- 8. c) vector
- 9. c) DNA insert
- 10. d) all of these
- 11. c) Boyer and Cohen
- 12. a) pSC 101
- 13. a) transformation
- 14. a) production of large number of copies of the gene being cloned
- 15. b) a lambda phage fragment incorporated into SV40 vector

2. Answer the following questions within 2-3 sentences.

[1.5 mark]

- 1. Define potency.
- 2. What is commitment (w.r.t. developmental biology)?
- 3. What is specification ?
- 4. What is competence ?
- 5. What is imprinting ?
- 6. What is fertilizin anti-fertilizin reaction ?
- 7. What is fertilization membrane ?
- 8. What is cortical reaction ?
- 9. What is cleavage ?
- 10. What are morphogenetic movements ?
- 11. What are primordial organ rudiments ?
- 12. What is natural media ?
- 13. What is synthetic media ?
- 14. Write application of stem cell culture ?\
- 15. What is regeneration ?
- 16. Describe briefly about environmental regulation of normal development .
- 17. What is eye lens induction ?
- 18. State about axis pattern formation in *Drosophila* .
- 19. How is vulva formed in *C.elegans*.

3. Answer the following questions within 75-100 words.

[2 marks]

1. What is induction ?
2. What is determination and differentiation ?
3. What are morphogenetic gradients ?
4. What do you understand by cell fate and lineages ?
5. What is genomic equivalence ?
6. What are cytoplasmic determinants ?
7. What is gametogenesis ?
8. What is gastrulation ?
9. What is neurulation?
10. Give the origin & fate of neural crest cells .
11. Give some basic equipments used in cell culture .
12. Mention aseptic and aseptical techniques .
13. What are nutritional compounds of media.
14. State role of serum in cell culture.
15. Give some techniques of tissue dis-aggregation.
16. What is monolayer and suspension culture ?
17. Mention some application of animal cell culture.
18. What is stem cell culture ?
19. What is tissue engineering ?
20. What is metamorphosis ?

4. Answer the following questions within 500 words.

[6marks]

1. Write a short note on history of developmental biology .
2. What is genomic equivalence ? Also mention about cytoplasmic inheritance.
3. Explain gametogenesis.
4. Give the morphological aspects and biochemical events of fertilization.
5. What is cleavage ? Add a note on gastrulation.
6. Explain neurulation. State about primordial organ rudiments.
7. Explain about post –embryonic development including larval formation , metamorphosis and environmental regulation of normal development.
8. Give the axis pattern formation in *Drosophila* , amphibian and chick.
9. Give an account on vulva formation in *C. elegans*.
10. Describe about limb development and regeneration in vertebrates.
11. State about eye lens induction.
12. Write about the design and layout of culture room.
13. What are the basic equipment used in cell culture ?
14. What are the different sterilization and aseptic techniques ?
15. What are natural media and synthetic media ?
16. State nutritional compounds of media.
17. Write the role of serum in cell culture .

18. What are the various techniques of tissue disaggregation ?
19. What do you understand by monolayer & suspension culture ?
20. Give the application of animal cell culture .
21. State about stem culture and its application.
22. Write a short note on tissue engineering.