



BIOLOGY

BOOKS - FULL MARKS BIOLOGY (TAMIL ENGLISH)

APPLICATIONS OF BIOTECHNOLOGY

Textbook Evaluation Solved

1. The first clinical gene therapy was done for the treatment of

A. AIDS

B. Cancer

C. Cystic fibrosis

D. SCID

Answer: D



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2. Dolly, the sheep was obtained by a technique known as

- A. Cloning by gene transfer
- B. Cloning without the help of gametes
- C. Cloning by tissue culture of somatic cells
- D. Cloning by nuclear transfer

Answer: D



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3. The genetic defect adenosine deaminase deficiency may be cured permanently by

A. Enzyme replacement therapy

B. periodic infusion of genetically engineered lymphocytes having ADA cDNA

C. administering adenosine deaminase activators

D. introducing bone marrow cells producing ADA into embryo at an early stage of development

Answer: D



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4. How many amino acids are arranged in the two chains of Insulin?

A. Chain A has 12 and Chain B has 13

B. Chain A has 21 and Chain B has 30 amino acids

C. Chain A has 20 and chain B has 30 amino acids

D. Chain A has 12 and chain B has 20 amino acids

Answer: B



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5. PCR proceeds in three distinct steps governed by temperature, they are in order of

A. Denaturation, Annealing. Synthesis

B. Synthesis, Annealing. Denaturation

C. Annealing. Synthesis. Denaturation

D. Denaturation. Synthesis, Annealing

Answer: A



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6. Which of the following statements are true regarding DNA polymerase used in PCR ?

- A. It is used to ligate introduced DNA in recipient cells
- B. It serves as a selectable marker
- C. It is isolated from a Virus
- D. It remains active at a high temperature

Answer: D



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7. ELISA is mainly used for

- A. Detection of mutations
- B. Detection of pathogens
- C. Selecting animals having desired traits
- D. Selecting plants having desired traits

Answer: B



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8. Transgenic animals are those which have

- A. Foreign DNA in some of their cells

B. Foreign DNA in all their cells

C. Foreign RNA in some of their cells

D. Foreign RNA in all their cells

Answer: B



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9. Recombinant Factor VIII is produced in the

_____ cells of the Chinese Hamster .

A. Liver cells

B. blood cells

C. ovarian cells

D. brain cells

Answer: C



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10. Vaccines that use components of a pathogenic organism rather than the whole organism are called

A. Subunit recombinant vaccines

B. attenuated recombinant vaccines

C. DNA vaccines

D. conventional vaccines

Answer: A



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11. Mention the number of primers required in each cycle of PCR. Write the role of primers

and DNA polymerase in PCR. Name the source organism of DNA polymerase used in PCR.



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12. (b) How is the amplification of a gene sample of interest carried out using PCR?



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13. What is genetically engineered insulin ?



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14. Explain how "Rosie" is different from a normal cow.



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15. How was Insulin obtained before the advent of rDNA technology? What were the problems encountered?



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16. ELISA is a technique based on the principles of antigen- antibody reactions. Can this technique be used in the molecular diagnosis of a genetic disorder such as Phenylketonuria?



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17. Gene therapy is an attempt to correct a Genetic defect by providing a normal gene into the individual. By this the function can be restored. An alternate method would be to provide gene product known as enzyme

replacement therapy, which would also restore the function. Which in your opinion is a better option? Give reasons for your answer.



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18. What are transgenic animals? Give example.



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19. If a person thinks he is infected with HIV, due to unprotected sex, and goes for a blood

test. Do you think a test such as ELISA will help ? If so why ? If not , why ?



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20. Adenosine deaminase (ADA) deficiency is a hereditary disease, where ADA, which is crucial for functioning of immune system is absent. Explain how ADA deficiency can be treated.



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21. What are DNA vaccines ?



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22. Differentiate between Somatic cell gene therapy and Germline gene therapy.



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23. What are stem cells? Explain their role in the field of medicine.



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24. One of the applications of biotechnology is 'gene therapy' to treat a person born with a hereditary disease.

(i) What does "gene therapy " mean ?



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25. PCR is a useful tool for early diagnosis of an Infectious disease. Elaborate.





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26. What are recombinant vaccines ? Explain the types .



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27. Explain why cloning of Dolly, the sheep was such a major scientific breakthrough ?



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28. Mention the advantages and disadvantages of cloning.



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29. Explain how recombinant Insulin can be produced.



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30. Explain the steps involved in the production of recombinant h GH.



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Additional Questions 1 Mark Questions

1. Statement 1: Human Insulin is a polypeptide

Statement 2: It is composed of 52 amino acids

A. Statement 1 is true. Statement 2 is false.

B. Statement 1 is false. Statement 2 is true.

C. Both statements 1 and 2 are true.

D. Both statements 1 and 2 are false.

Answer: A



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2. Statement 1: Rosie was the first transgenic goat. Statement 2: Meat is enriched with human protein.

- A. Statement 1 is true. Statement 2 is false.
- B. Statement 1 is false. Statement 2 is true.
- C. Both statements 1 and 2 are true.
- D. Both statements 1 and 2 are false.

Answer: D



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3. Statement 1: Recombinant Hepatitis B vaccine is a live vaccine.

Statement 2: It is obtained by cloning HB antigen gene in yeast.

A. Statement 1 is true. Statement 2 is false.

B. Statement 1 is false. Statement 2 is true.

C. Both statements 1 and 2 are true.

D. Both statements 1 and 2 are false.

Answer: B



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4. Statement 1: ADA deficiency was the first disease treated by gene therapy.

Statement 2: ADA is an autosomal recessive metabolic disorder.

A. Statement 1 is true. Statement 2 is false.

B. Statement 1 is false. Statement 2 is true.

C. Both statements 1 and 2 are true.

D. Both statements 1 and 2 are false.

Answer: C



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5. Statement 1: Attenuated recombinant vaccines are live vaccines.

Statement 2: Polio is a live vaccine.

- A. Statement 1 is true. Statement 2 is false.
- B. Statement 1 is false. Statement 2 is true.
- C. Both statements 1 and 2 are true.
- D. Both statements 1 and 2 are false.

Answer: C



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6. Assertion (A): Interferons are used to treat herpes zoster.

Reason (R): Interferons are antiviral protein.

A. R explains A.

B. Both A and R are incorrect.

C. A is correct. R is incorrect.

D. A and R are correct. R does not explain

A.

Answer: A



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7. Assertion (A): PCR is a amplification technique used in biotechnology.

Reason (R): Using PCR multiple copies of DNA can be generated.

A. R explains A.

B. Both A and R are incorrect.

C. A is correct. R is incorrect.

D. A and R are correct. R does not explains

A.

Answer: A



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8. The B-chain of Insulin is composed of aminoacids

A. 70

B. 30

C. 45

D. 60

Answer: B



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9. The gene for the formation of factor VIII is located in.....

A. Polycythemia

B. Anaemia

C. Thalassemia

D. Haemophilia

Answer: C



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10. Name the scientists who discovered Interferons?



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11. The first synthetic vaccine produced was

_____.

A. Polio Vaccine

B. Hepatitis B Vaccine

C. BCG Vaccine

D. MMR Vaccine

Answer: B



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12. Identify the incorrect statement.

(i) The first clinical gene therapy was given by French Anderson.

- (ii) For a four year old boy with ADA deficiency.
- (iii) ADA is a autosomal dominant metabolic disorder.
- (iv) Where patients have non-functioning B - lymphocytes.

- A. i and iv only
- B. ii, iii and iv
- C. i, ii and iv
- D. all the above

Answer: B



13. Identify the correct statement(s).

(i) Totipotency is the ability of single cell to produce a whole organism.

(ii) Pluripotency refers to ability of stem cell with a potential to differentiate into any kind of germ layers.

(iii) Unipotency refers to ability of stem cell to differentiate into one cell type.

(iv) Oligopotency refers to stem cells to differentiate into few cell types.

A. i and iii

B. ii and iv

C. i and iv

D. all the above

Answer: D



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14. Identify those correct sequence of ELISA testing .

A. Coating → Blocking → Detection

→ Read out

B. Detection → Read out → Coating

→ Blocking

C. Read out → Coating → Detection

→ Blocking

D. Blocking → Detection → Read out

→ Coating

Answer: A



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15. PCR was developed by _____

A. Eva Engvall

B. Peter Perlmanin

C. Kary Mullis

D. Wilmut

Answer: C



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16. Arrange the steps of PCR in proper sequence.

A. Denaturation, Primer extension,
Renaturation

B. Renaturation, Denaturation, Primer
extension

C. Primer extension, Denaturation,
Renaturation

D. Denaturation, Renaturation, Primer
extension

Answer: D



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17. Which of the following is the first cloned organism?

A. Goat

B. Cow

C. Sheep

D. Pig

Answer: C



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18. The first transgenic clone of sheep was called as.....

A. Rosie

B. Dolly

C. Sameera

D. Joel

Answer: B



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19. In cloning process of Dolly, how many embryos were implemented by Ian Wilmut and Campbell, out of which one successful Dolly was developed?

A. 267

B. 277

C. 287

D. 307

Answer: B



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20. The term biotechnology was coined by



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Additional Questions 2 Mark Questions

1. How insulin controls blood sugar level?



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2. State the role of Somatostatin and Somatotropin in human beings.



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3. Mention the manifestation of the disease -
Haemophilia-A



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4. What are Interferons ?



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5. Who discovered Interferons? On which basis it was classified?



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6. Name some diseases that can be treated using interferons.



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7. Recombinant vaccines are better than conventional ones - Justify.



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8. Name the types of recombinant vaccines.



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9. What are recombinant vaccines ? Explain the types .



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10. What are recombinant vaccines ? Explain the types .



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11. List out the benefits of recombinant vaccines.



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12. Name the strategies used in gene therapy .



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13. Comment on SCID.



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14. Differentiate between Gene augmentation therapy and gene inhibition therapy.



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15. Define the terms (a) Totipotency (b) Unipotency



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16. What are the best sources of stem cells in mammals?



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17. Name any three techniques related to biotechnology that help in early diagnosis of some diseases.



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18. What does ELISA stands for ?



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19. Name the types of ELISA test.



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20. Simply define the PCR technique. Also mention its inventor.



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21. Expand PCR and name the steps involved in the process.



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22. Name the hereditary disease for which the first clinical gene therapy was used.



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23. Define Transgenesis.



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24. Why are genetically modified organisms produced ? Explain the purpose and advantages .



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25. What does Biological Product refers to?



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26. Define cloning. Name the first organism developed by cloning



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27. Who created Dolly _____.



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28. What is biotechnology ?



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Additional Questions 3 Mark Questions

1. Briefly explain the structure of human insulin. What was the main challenge for production of insulin using rDNA technique?



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2. Who was the first to discover the role of insulin against diabetes? From which organism does insulin isolated?



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3. Explain how "Rosie" is different from a normal cow.



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4. Point out any two microbes that play crucial role in recombinant DNA technology.



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5. Write notes on edible vaccines? Where do they target?



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6. How recombinant hepatitis B vaccine is produced in laboratory?



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7. Suggest few methods to treat SCID.



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8. How gene therapy is done to treat ADA deficiency?



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9. Differentiate between Somatic cell gene therapy and Germline gene therapy.



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10. Differentiate pluripotency and multipotency.



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11. Write a short note on stem cell banks.



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12. State any two uniquenesses of ELISA test.



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13. What does ELISA stands for ?



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14. Elucidate the methodology of ELISA test.



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15. Whether PCR can be done for RNA molecules? Yes or No? Explain.



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16. How PCR helps forensic personnel?



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17. Role of PCR in phylogenetics. Explain.



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18. Enumerate the use of biological products.



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19. Name the principles underlying cloning technique.





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Additional Questions 5 Mark Questions

1. (a) Explain in detail about stem cell therapy.



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2. Describe the role of PCR in clinical field.



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3. Enumerate the steps involved in producing transgenic animals.



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4. List the uses of transgenesis.



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5. Technique by which Dolly was developed

_____ .



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6. What are the ethical issues about cloning.



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Higher Order Thinking Skills Hots Questions

1. The immune system of a person is suppressed,. In ELISA test, the result is positive

(i) Name the disease associated with

condition.

(ii) Why did he lose his immunity?



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2. Why do children cured by enzyme replacement therapy for ADA deficiency need periodic treatment? Suggest a permanent solution for this issue.



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3. *Saccharomyces cerevisiae*, acts as a best host than *Escherichia coli* for the production of recombinant interferons. Yes or No? Support your answer.



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4. Isolation of blood to treat Haemophilia A is practically impossible. Give reason.



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5. Functional Insulin differs from its pre-hormonal form. How?



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6. Whether PCR can be done for RNA molecules? Yes or No? Explain.



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7. Suggest any two techniques for early diagnosis of bacterial/ viral human diseases.



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