BIOLOGY

BOOKS - OSWAAL BIOLOGY (KANNADA ENGLISH)

BIOTECHNOLOGY PRINCIPLES AND PROCESSES

Topic 1 Very Short Answer Type Questions

1. Gel electrophoresis is considered as very important technique in recombinant DNA technology . Why?

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2. Mention the technique used to separate DNA fragments in rDNA technology.

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3. Why a pathogen Agrobacterium tumifaciens is generally used as a vector in plants for cloning .

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4. Restriction enzymes are considered as a type of endonucleases. Why?

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5. Mention the significance of gel electrophoresis in rDNA technology.

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6. Name the enzyme that joins DNA fragments.

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7. Would you like lo choose an exonuclease enzyme while producing a recombinant DNA

molecule?

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8. Resbiction enzymes present in the cloning site of a vector should not have more than one recognition site. Comment.

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9. What does 'competent' refer to in competent cells used in transformation?

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10. Define Biotechnology.

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11. What are plasmids?

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12. What are palindromic nucleotide sequences? Write the restriction site for Eco-RI enzyme.

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13. Write the function of DNA ligase.

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14. Name the stain used to visualise DNA fragments in gel electrophoresis.

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15. What is agarose?

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16. What do mean by 'ori'?

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17. What is elution?

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18. Who constructed the first artificial recombinant DNA molecule?

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19. Name the scientists who constructed pBR 322.

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20. What is the signficance of selectable marker in cloning vector ?

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21. What is Micro- Injection

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22. What is biolistics or gene gun?

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23. What is transformation?

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24. What is competent host?

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25. Expand EFB.

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26. Which is the commonly used host cells in genetic engineering?

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27. Which are the common vectors used for cloning genes in plants?

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28. Name the enzyme used as an alternate selectable marker.

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29. Name the source of Taq polymerase?

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30. what are recombinant proteins?

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31. Name the commonly used vector for transformation in plant call?

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32. Who isolated Restriction enzyme for the first time?

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33. Name the enzyme which is also called "molecular scissors".

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34. Name the compound used for visualizing DNA under UV radiation.

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35. Which was the first type II restriction endonuclease to be discovered?

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36. Why type ll restriction enzymes are used in recombinant DNA technology?

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37. Name the enzyme commonly used to dissolve bacterial cell wall.

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38. What is Ti plasmid?

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39. Before integrating DNA with bacterial plasmid, bacterial cells are treated with divalent cations. Why?

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40. How is the action of exonudease different from that of endonudease?

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41. What type of cuts ends are formed when both the strands of DNA is cleaved at exactly the same nucleotide position?

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42. What is the popular terminology of recombinant DNA technology?

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Topic 1 Short Answer Type Questions I

1. Explain the method of introduction of alien DNA Into bacterial cells.

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2. The restriction enzymes that are used in construction of recombinant DNA molecule are endonucleases which cut the DNA at 'specific recognition sequence'. What would be

the disadvantage if they would not cut the DNA at specific-recognition sequence?

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3. Name the selectable markers of E. coli.

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4. What is a palindrome sequence of DNA Illustrate with a suitable example.

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5. Differentiate between exonuclease and endonuclease.

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6. Mention the function of Ti plasmid. Name the source organism from whkh it is isolated.

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7. Mention the methods of making bacteria capable to take up recombinant DNA.

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8. Name any two important sites of a plasmid.

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9. Name the polymerase which is generally used in PCR? What is the source of this

enzyme?

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10. How bacteria are made capable to take up recombinant DNA? Nam.e the bacteria used for this process.

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Topic 1 Short Answer Type Questions Ii

1. Discuss with your teacher and find out how to distinguish between the following:

(a) plasmid DNA and Chromosomal DNA

(b) RNA and DNA

(c) Exonuclease and Endonuclease.

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2. A mixture of fragmented DNA was electrophoresed in agarose gel. After staining

the gel with ethldium bromide, no DNA bands were observed. What could be the reason?

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3. What are nucleases ? Distinguish between exonucleases and endonucleases .

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4. What are 'Selectable markers"? What is their use in genetic engineering?

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5. What is insertional inactivation?

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6. Name the three basic steps involved in genetically modifying an organism.

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7. Draw a neat labelled diagram of plasmid pBR322.

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8. List the features of a vector required to facilitate cloning.

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9. Which are the common vectors used for cloning genes in plants?

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10. How are restriction endonuclease named ?

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Topic 1 Long Answer Type Questions

1. With the help of a diagram explain plasmid BR322.

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2. Name the five key tools for accomplishing the tasks of recombinant DNA technology. Also mention the functions of each tool.

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3. Name the tools of recombinant DNA technology. Write a note on restriction enzymes,

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4. Mention the significance of gel electrophoresis in rDNA technology.

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5. What essential features must be present in a cloning vector?

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Topic 2 Process Of Recombinant Dna Technology Very Short Answer Type Questions

1. Define polymerase chain reaction.

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2. For producing a recombinant protein (for therapeutic purpose) in large scale, which vector , would you choose - a low copy number or high- copy number?

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3. What is the significance of adding proteases at the time of isolation of genetic material (DNA)?

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4. While doing a PCR, 'denaturation' step is missed. What will be its effecton the process?

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5. What is insertional inactivation?

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6. Name the plasmid isolated from Agrobacterium tumifaciens.

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7. What is a bioreactor?

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8. (a) Explain down streaming process ? (b) What are molecular stitchers ?

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9. what are recombinant proteins?

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10. Define the term plasmid.

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11. Starting from double stranded DNA suggest a strategy for obuining large amounts

of pure single stranded DNA for sequencing purpose.

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Topic 2 Process Of Recombinant Dna Technology Short Answer Type Questions I

1. You have created a recombinant DNA molecule by ligating a gene to aplasmid vector. By mistake, your friend adds exonudease enzyme to the tucontaining the

recombinant DNA. How will your experimentgel affected as you plan to go for transformation now?

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2. You have chosen a plasmid as vector for cloning your gene. How ever this vector plasmid lacks a selectable marker. How would it affect your experiment?

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3. Name two enzymes used in biotechnological processes.

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4. What are molecular scissors ? Explain their role .

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5. What is vector? Which cloning vector was discovered first?

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6. Write the full form of PCR. What are the three basic steps involved in a single PCR amplification cycle?

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7. How many types of restriction endonucleases are found? Why they are called as molecular scissors?

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Topic 2 Process Of Recombinant Dna Technology Short Answer Type Questions Ii

1. Mention the different steps of process of recombinant DNA technology.

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2. Explain briefly:

(a) PCR

(b) Restriction enzymes and DNA

(c) Chitinase

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3. . Explain in brief the separation and isolation of DNA fragments.

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4. Explain the action of restriction endonudease.

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Topic 2 Process Of Recombinant Dna Technology Long Answer Type Questions

1. Mention the different steps of process of recombinant DNA technology.

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2. Mention any three tools used in genetic engineering with examples for each.

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3. Describe briefly the following :

(a) Origin of replication

(b) Bioreactors

(c) Downstream processing .

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4. You have identified a useful gene in bacteria. Make a flow chart of the steps that you would follow to transfer this gene to a plant .

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5. (a) Write diagrammatic representation of Recombinant DNA technology.

(b) Write a note on down stream processing.

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Topic 2 Process Of Recombinant Dna Technology Multiple Choice Questions

1. Rising of dough is due to :

A. Multiplication of yeast

B. Production of CO_2

C. Emulsification

D. Hydrolysis of wheat flour starch into sugars.

Answer: B

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2. An enzyme catalysing the removal of nucleotides from the ends of DNA is :

A. Endonudease

B. Exonuclease

C. DNA ligase

D. Hind - II

Answer: B

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3. The transfer of genetic material from one bacterium to another through the mediation of a vector like virus is termed as :

A. Transduction

B. Conjugation

C. Transformation

D. Translation

Answer: A

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4. Which of the given statement is correct in the context of observing DNA separated by agarose gel electrophoresis?

A. DNA can be seen in visible light.

B. DNA can be seen without staining in visible Light

C. Ethidium bromide stained DNA can be seen in visible light

D. Ethidium bromide stained DNA can be seen under exposure to UV light

Answer: D

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5. 'Restriction' in Restriction enzyme refers to :

A. Cleaving of phosphodiester bond in DNA by the enzyme.

B. Cutting of DNA at specific position only

C. Prevention of the multiplication of bacteriophage in bacteria

D. All of the above

Answer: D

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6. A recombinant DNA molecule can be produced in the absence of the following :

A. Restriction endonuclease

B. DNA ligase

C. DNA fragments

D. E.coli

Answer: B

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7. In agarose gel electrophoresis, DNA molecules are separated on the basis of their :

A. Charge only

B. Size only

C. Charge to size ratio

D. All of the above

Answer: C

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8. The most import.mt feature in a plasmid to be used as a vector is :

A. Origin of replication (ori)

B. Presence of a selectable marker

C. Presence of sites for restriction endonudcase

D. Its size

Answer: B

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9. While isolating DNA from bacteria, which of the following enzymes is not used?

A. Lysozyme

B. Ribonuclease

C. Deoxyribonuclease

D. Protease

Answer: C

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10. Which of the following has popularised the PCR (polymerase chain reactions)?

A. Easy availability of DNA template.

B. Availability of synthetic primers

C. Availability of cheap deoxyribonudeotides

D. Availability of 'Thermostable' DNA polymerase.

Answer: B

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11. An antibiotic resistance gene in a vector usually helps in the selection of:

A. Competent cells

B. Transformed cells.

C. Recombinant cells.

D. None of the above.

Answer: C

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12. Significance of 'heat shock' method in bacterial transformation is to facilitate :

A. Binding of DNA to the cell wall.

B. Uptake of DNA through membrane transport proteins.

C. Uptake of DNA through transient pores in the bacterial cell wall

D. Expression of antibiotic resistance gene.

Answer: B

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13. The role of DNA ligase in the construction of a recombinant DNA molecule is :

A. Formation of phosphodiester bond between two DNA fragments.

B. Formation of hydrogen bonds between sticky ends of DNA fragments.

C. Ligation of all purime and pyrimidine bases.

D. None of the above

Answer: A

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14. Which of the following bacteria is not a source of restriction endonuclease?

A. Haemophilus influenzae.

B. Escherichia coli.

C. Agrobactcrium tumefaciens.

D. Bncilus amyloliquefaciens.

Answer: B

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15. Which of the following steps are catalysed by Taq polymerase in a PCR reaction?

A. Denaturation of template DNA.

B. Annealing of primers to template DNA

C. Extension of primer end on the template DNA.

D. All of the above

Answer: A

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16. A bacterial cell was transformed with a recombinant DNA that was generated using a human gene. However, the transformed cells

did not produce the desired protein. Reasons could be :

A. Human gene may have intron which bacteria cannot process.

B. Amino acid codons for humans and bacteria are different.

C. Human protein is formed but degraded by baclcria.

D. All of the above

Answer: B

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17. Which of the following should be chosen for best yield if one were to produce a recombinant protein in large amounts?

A. Laboratory flask of largest capacity.

B. A stirred-tank bioreactor without in-lets and out-lets.

C. A continuous culture system.

D. Any of the above.

Answer: C

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18. Who among the following was awarded the Nobel Prize for the development of PCR technique?

A. Herbert Boyer.

B. Hargovind Khurana.

C. Kary Mullis.

D. Arthur Kornberg.

Answer: C

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19. Which of the following statements does not hold true for restriction enzyme?

A. It recognises a palindromic nucleotide sequence

B. It is an endonudease

C. It is isolated from viruses.

D. It produces the same kind of sticky ends in different DNA molecules

Answer: C

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