Marks: 80

Q1. How can DNA segments, separated by gel electrophoresis, be visualised and isolated? **2 Marks**

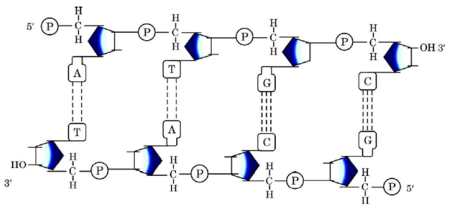
Q2. Observe the given sequence of nitrogenous bases on a DNA fragment and answer the following questions: **2 Marks**

5'	C	A	G	A	A	T	T	C	T	T	A	3'
3'	G	T	C	T	T	A	A	G	A	A	T	5'

1. Name the restriction enzyme which can recognise the DNA sequence.
2. Write the sequence after restriction enzyme cut the palindrome.
3. Why are the ends generated after digestion called as 'Sticky Ends'?

Q3. Differentiate between male and female heterogamety. **2 Marks**

Q4. Study the given molecular structure of double-stranded polynucleotide chain of DNA and answer the questions that follow. **2 Marks**



1. How many phosphodiester bonds are present in the given double-stranded polynucleotide chain?
2. How many base pairs are there in each helical turn of double helix structure of DNA? Also write the distance between a base pair in a helix.
3. In addition to H-bonds, what confers additional stability to the helical structure of DNA?

Q5. Name the type of immunity the colostrum provides to a newborn baby. Write giving an example where this type of immunity should be provided to a person. **2 Marks**

Q6. **2 Marks**

1. Write two closely linked genes that control a-thalassemia.
2. Differentiate between thalassemia and sickle cell anaemia on the basis of their effect on globin molecule of Haemoglobin.

Q7. The basic scheme of the essential steps involved in the process of recombinant DNA technology is summarized below in the form of a flow diagram. Study the given flow diagram and answer the questions that follow. **2 Marks**

Step-1 Vector DNA (cut using Restriction Enzyme EcoR I) + Alien DNA (cut using Restriction Enzyme EcoR I)
↓ Enzyme A
Step-2 Recombinant DNA molecule
↓
Step-3 Transfer of recombinant DNA molecule in *E. coli* (Host)
↓
Step-4 Replication of recombinant DNA molecule in *E. coli*

1. Name the enzyme used in Step-1 to join the cut plasmid and alien DNA.
2. State the technical term used for Step-3.
3. Justify the use of same Restriction Enzyme EcoR I to cut both the vector DNA and the alien DNA.

Q8. Name the microbes that help production of the following products commercially: **2 Marks**

1. Statin.
2. Citric acid.
3. Penicillin.
4. Butyric acid.

Q9. State what are biofertilizers. Name any three sources of biofertilizers. **2 Marks**

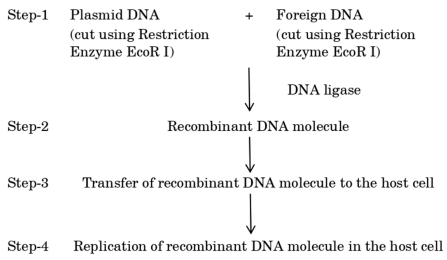
Q10. During the secondary treatment of the primary effluent, how does the significant decrease in BOD occur? **2 Marks**

Q11. List the symptoms of Ascariasis. How does a healthy person acquire this infection? **2 Marks**

Q12. How is DNA isolated in purified form from a bacterial cell? **2 Marks**

Q13. **2 Marks**
1. Name the lymphoid organ in humans where all the blood cells are produced.
2. Where do the lymphocytes produced by the lymphoid organ mentioned above migrate and how do they affect immunity?

Q14. The basic scheme of the essential steps involved in the process of recombinant DNA technology is summarised below in the form of a flow diagram. Study the given flow diagram and answer the questions that follow: **2 Marks**



1. Name the specific enzyme that might have been used to make the multiple copies of foreign DNA before undergoing Step-1 of the process.
2. How does the use of restriction enzyme EcoR I in Step-1 facilitate the action of DNA ligase to form the recombinant DNA molecule?
3. Explain. Name the most commonly used host in the above process.

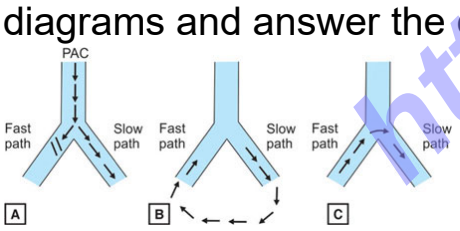
Q15. In the biosphere immense biological diversity exists at all levels of biological organisation. Explain any two levels of biodiversity. **2 Marks**

Q16. List the three hormones produced in women only during pregnancy. What happens to the levels of estrogen and progesterone during pregnancy? **2 Marks**

Q17. Name the diseases and their mode of transmission in human by: **2 Marks**
1. common round worm and
2. filarial worm.

Q18. List the four different human male accessory ducts. **2 Marks**

Q19. Given below are the diagrammatic representations of the replicating fork of DNA in E. coli. Study the diagrams and answer the questions that follow. **2 Marks**



1. Which one of the three diagrams (i), (i) or (iii) is the correct representation of the replicating fork of DNA replication?
2. Explain your answer. Name the enzyme used in E. coli to join the newly synthesised fragments of DNA.

Q20. **2 Marks**
1. `Expand IUD.
2. Why is hormone releasing IUD considered a good contraceptive to space children?

Q21. What does secondary productivity in an ecosystem indicate? List any two factors by which productivity is limited in aquatic ecosystems. **2 Marks**

Q22. Name the bacterium that causes typhoid. Mention two diagnostic symptoms. How is this disease transmitted to others? **2 Marks**

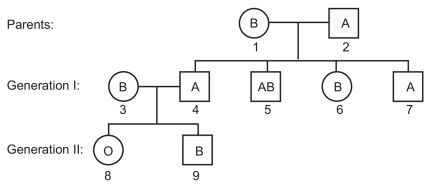
Q23. How do Darwin's finches illustrate adaptive radiation? **2 Marks**

Q24. List the specific symptoms of amoebiasis. Name the causative organism. **2 Marks**

Q25. What is cryopreservation? Give it's one use. **2 Marks**

Q26. Name any two autotrophic microbes and state how they serve as biofertilisers. **2 Marks**

Q27. Study the pedigree chart given below, showing the inheritance pattern of blood group in a family: **2 Marks**



Anwer the following questions:

1. Give the possible genotypes of individual 1 and 2.
2. Which antigen or antigens will be present on the plasma membranes of the R.B.Cs of individuals ‘5" and ‘8’?

Q28. **2 Marks**

1. Write the scientific name of the source organism of the thermostable DNA polymerase used in PCR.
2. State the advantage of using thermostable DNA polymerase.

Q29. Write the ploidy and number of chromosomes in human: **2 Marks**

1. Meiocytes.
2. Gametes.

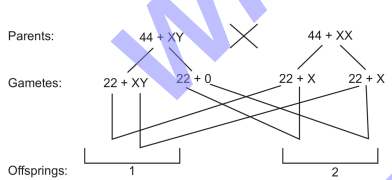
Q30. List the specific symptoms of typhoid. Name it's causative agent. **2 Marks**

Q31. Name two commonly used bioreactors. State the importance of using a bioreactor. **2 Marks**

Q32. How many cells are present in the pollen grains at the time of their release from anther? Name the cells. **2 Marks**

Q33. What is quarantine? Why is quarantine essential before introducing a plant species from another country? **2 Marks**

Q34. Study the cross given below: **2 Marks**

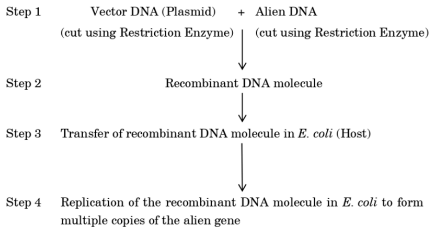


Identify the abnormalities ‘1’ and ‘2’ in the offsprings of a cross done between a couple and distinguish between them.

Q35. A recombinant DNA is formed when sticky ends of vector DNA and foreign DNA join. Explain how the sticky ends are formed and get joined. **2 Marks**

Q36. Name the type of immunity the mother provides the newborn baby. How does it happen? **2 Marks**

Q37. The basic scheme of the essential steps involved in the process of recombinant DNA technology is summarised below in the form of a flow diagram. Study the given flow diagram and answer the questions that follow. **2 Marks**



1. What is the technical term used for Step 4 in the above process?
2. Which of the given two combinations of restriction enzyme should be used in Step 1? Justify your answer.

1. EcoR I to cut the plasmid and Hind III to cut the alien DNA.
2. EcoR I to cut both the plasmid and alien DNA.

Q38. Study the given pedigree chart in which neither of the parents shows the trait but the trait is present in both male and female children. **2 Marks**

1. Write about the trait, also explain the inheritance of such trait in the progeny on the basis of given pedigree chart.
2. Give one example of such trait in human beings.

Q39. Name any two water/ food borne diseases. Mention any two measures essential for controlling these diseases. **2 Marks**

Q40. How has mutation breeding helped in improving the production of mung bean crop? **2 Marks**