

Time: 2 ½ Hours

Total Marks: 75

1. Attempt **all** questions.
2. **All questions** carry **equal** marks.
3. Draw **neat labeled diagrams** wherever necessary.
4. Use of **log tables** and **non-programmable calculator** is **allowed**.
5. For **Q.2, Q.3 and Q.4** attempt A and B **OR** C and D.

Q.1 Do as directed: (Any fifteen)**15**

1. State true or false: Nucleic acids absorb light at 260 nm through the adenine residues.
2. State true or false: After release of DNA from the cell, further purification requires removal of contaminating proteins, lipids, carbohydrates, and cell debris which is achieved by a mixture of Phenol and chloroform.
3. Fill in the blank: In Southern blotting, the double stranded DNA fragments in the gel must be denatured and transferred to a _____ membrane.
4. Explain the role of restriction endonucleases.
5. Fill in the blank: Proteins are separated using _____ electrophoretic technique.
6. Fill in the blank: Taq DNA polymerase enzyme from _____ has facilitated the process of molecular diagnostics.
7. In paternity testing, if a man lacked the allele that must have come from the baby's father, then the DNA typing data would have proved that he is not the father; this is known as _____ result.
8. Give an example of chelator present in master mix.
9. Fill in the blank: The type of PCR control which ensures that the enzyme is active, the buffer is optimal, the primers are priming the write sequences, and the thermal cycler is cycling appropriately is called as _____.
10. Fill in the blank: _____ is used to increase the effectiveness of UV light to decontaminate and maintain pre-PCR area.
11. Fill in the blank: The *Tth* polymerase is isolated from _____.
12. Give an example of: Monovalent cations present in PCR master mixture
13. Define the term 'amplicons'.
14. What is the significance of thermocyclers?
15. State true or false: Presence of quasi species of HIV is due to the error-prone nature of the reverse transcriptase enzyme.
16. Fill in the blank: It is the time period between exposure to HIV and before seroconversion is known as _____.
17. State true or false: Pace-2 is a second generation hybridisation assays used for *N.gonorrhoeae*.
18. Fill in the blank: _____ gene analysis is done to detect fragile X diagnostic.
19. Fill in the blank: Intrapartum transmission of *N.gonorrhoeae* produces _____ condition in neonates.
20. Fill in the blank: _____ is the process of determining an individual's DNA characteristics, which are as unique as fingerprints.

- Q. 2 A** What is molecular diagnostics? Explain in detail the of mutation detection techniques in molecular diagnostics. **08**
- Q. 2 B** Elaborate on FISH as a hybridisation technique. **07**
- OR**
- Q. 2 C** Discuss the organic and inorganic method for isolation of DNA. **08**
- Q. 2 D** Explain western blotting in detail. **07**
- Q. 3 A** Give working principle of qRT PCR. **08**
- Q. 3 B** Discuss any three components of PCR. **07**
- OR**
- Q. 3 C** What is the function of DNA polymerase in PCR? What are the different types of DNA polymerases used in PCR method? **08**
- Q. 3 D** How to control contamination in PCR? **07**
- Q. 4 A** Discuss uses of genetic testing. **08**
- Q. 4 B** Elaborate on HIV and clinical significance of viral load in the serum sample. **07**
- OR**
- Q. 4 C** How RFLP is used to detect sickle cell anaemia? **08**
- Q. 4 D** Explain clinical significance of *N.gonorrhoeae*. **07**
- Q. 5** Write Short notes on **any three** of the following **15**
- Northern blotting.
 - Any one method for labelling of a probe.
 - Reverse Transcriptase PCR.
 - Mispriming.
 - Any one commercial assay available to detect HIV1 virus.