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**M.Sc. (Fourth Semester)
EXAMINATION, May-June, 2022
BIOTECHNOLOGY
Paper Second
(Advanced Techniques in Biotechnology)**

*Time : Three Hours]**[Maximum Marks:80***Note - Attempt all sections as directed.****Section - A****(Objective/Multiple Type Questions)****(1 mark each)****Note- Attempt all questions.****Choose the correct answer :**

1. What are the factors that affect high speed centrifuges?
 - (A) Pressure and temperature
 - (B) Concentration and speed
 - (C) Speed and temperature
 - (D) Pressure and speed

2. In reverse phase chromatography the stationary phase is made
 - (A) Non-Polar
 - (B) Polar
 - (C) Both (A) and (B)
 - (D) None of these
3. Which of the following factors does not influence electrophoretic mobility?
 - (A) Molecular weight
 - (B) Shape of molecule
 - (C) Size of molecule
 - (D) Stereochemistry of molecule
4. In competitive ELISA which is detected in sample?
 - (A) Antigen
 - (B) Antibody
 - (C) (A) and (B)
 - (D) None of the above
5. Which of the following are the components of radio immuno assay?
 - (A) Radiolabeled antigens
 - (B) Monoclonal antibodies
 - (C) Unlabelled antigens
 - (D) All of the above

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6. *Thermus aquaticus* is the source of
- (A) Vent polymerase
 - (B) Primase enzyme
 - (C) Taq polymerase
 - (D) Both (A) and (C)
7. At what temperature does denaturation of DNA double helix takes place?
- (A) 54°C
 - (B) 74°C
 - (C) 94°C
 - (D) 60°C
8. The number of converging lenses that the compound microscope has are
- (A) 3
 - (B) 2
 - (C) 4
 - (D) 5
9. Which microscope is best suited for studying surface details of bacteria and viruses?
- (A) SEM
 - (B) Bright field microscope
 - (C) Confocal microscope
 - (D) TEM

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10. Confocal scanning laser microscope is used to examine
- (A) Fluorescent stained specimen
 - (B) Mutagen stained specimen
 - (C) Cytological stained specimen
 - (D) Biochemical stained specimen
11. Genome wise gene expression analysis is performed using
- (A) DNA microarrays
 - (B) Northern analysis
 - (C) Real time PCR
 - (D) RT-PCR
12. Which of the following is a source used in spectroscopy?
- (A) LASER
 - (B) Tube light
 - (C) Sodium vapour lamp
 - (D) Tungsten lamp
13. Which of the following is not an application of colorimeter?
- (A) Paints
 - (B) Inks
 - (C) Cosmetics
 - (D) Composition detection

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14. Which of the following increase the fluorescence of aromatic compounds?

- (A) Para substitution
- (B) Ortho
- (C) Meta
- (D) All of the above

15. Which of the following are considered to be the lowest form of electromagnetic radiation?

- (A) IR radiation
- (B) Microwaves
- (C) UV radiation
- (D) Radio waves

16. In a flow cytometer the cells lacking both the labels are seen in ----quadrant.

- (A) 1st
- (B) 2nd
- (C) 3rd
- (D) 4th

17. Which fluorescent dye can be used for red fluorescence?

- (A) Rhodamine
- (B) Fluorescein
- (C) Carmine
- (D) DAPI

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18. Which of the following technique is most suitable for detecting the presence of a gene product?

- (A) Dot blotting
- (B) Southern blotting
- (C) Plaque blotting
- (D) Western blotting

19. Which membranes have greater binding capacity than nitrocellulose membranes?

- (A) Sucrose
- (B) Agarose
- (C) Nylon
- (D) Teflon

20. Which of the following is not a DNA sequencing method?

- (A) LMPCR
- (B) Edmans method
- (C) Sangers method
- (D) Maxam Gilbert method

Section - B

(Very Short Answer Type Questions)

(2 marks each)

Note : Attempt All questions. Answer using 2-3 sentences.

1. Define partition coefficient.

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2. Write the steps of gel electrophoresis.
3. Name the enzymes used in PCR.
4. Define negative staining.
5. What does a red spot indicate in microarray?
6. What is nuclear spin?
7. What is a probe?
8. What is chain termination?

Section-C

(Short Answer Type Questions)

(3 marks each)

Note : Attempt all questions. Answer precisely in <75 words.

1. Discuss principle of centrifugation.
2. Explain Dot-ELISA.
3. Write the steps of polymerase chain reaction.
4. Define different components of electron microscope.
5. Define Beer Lambert's law.
6. Write principle of NMR spectroscopy.
7. Name different types of DNA sequencing techniques.
8. Write steps of southern blotting.

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Section-D

(Long Answer Type Questions)

(5 marks each)

Note- Attempt all questions. Answer precisely in 150 words.

1. Write principle and application of autoradiography.
2. Describe the different types of PCR.
3. Describe principle and applications of IR spectrophotometry.
4. Describe the Sanger's method of DNA sequencing.