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Reg. No. :

Code No. : 7977

Sub. Code : PMBE 16

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2019.

First Semester

Microbiology – Core

Elective — BIO CHEMICAL TECHNIQUES AND
INSTRUMENTATION

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer :

1. What is the concentration in moles/litre, of the hydrogen ion of pH of a solution is 7
- (a) 7 (b) 7×10^{-7}
(c) 5×10^{-7} (d) 1×10^{-7}

2. The effectiveness or capacity of a buffer solution can be affected by
- (a) Molar concentration of the buffer components
(b) Concentration of the conjugate base to the weak acid.
(c) Both (a) and (b)
(d) Temperature of buffer components
3. The technique "electrophoresis" was first developed by
- (a) Tswett (b) Svedberg
(c) Tirelius (d) Sanger
4. Which one of the electrophoresis technique that used in isoelectric focusing?
- (a) AGE (b) PFGE
(c) 2 DPAGE (d) None of these
5. Ion exchange chromatography is based on the
- (a) Electrostatic attraction
(b) Electrical mobility of ionic species
(c) Adsorption chromatography
(d) Partition chromatography

6. A combination of paper chromatography and electrophoresis involves
- (a) Partition chromatography
 - (b) Electrical mobility of ionic species
 - (c) Both (a) and (b)
 - (d) None of these
7. In an SDS-PAGE
- (a) Proteins are denatured by the SDS
 - (b) Proteins have the same charge to mass ratio
 - (c) Smaller proteins migrate more rapidly through the gel
 - (d) All of the above
8. In a gel filtration column
- (a) Smaller proteins enter the beads are readily
 - (b) Large proteins elute first
 - (c) Both (a) and (b)
 - (d) Large proteins enter the beads more readily

9. What is shielding in NMR?
- (a) Using a curved piece of metal to block an opponents attack
 - (b) Putting metal around on Rf source
 - (c) When the magnetic moment of an atom blocks the full induced magnetic field from surrounding nuclei
 - (d) Blocking parts of a molecule from Rf radiation
10. Coupling causes the peaks in ¹H NMR spectra to be split into
- (a) two peaks
 - (b) multiple peaks equal to the number of hydrogen on surrounding atom
 - (c) multiple peaks equal to the number of carbon atom
 - (d) multiple peaks equal to the number of hydrogen on surrounding atoms plus one

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Briefly explain the structure and principles of pH meter.
- Or
- (b) Write note on the principles and functions of colorimetry.

12. (a) What are the safety aspects in use of centrifuge?

Or

(b) Briefly explain the "centrifugation techniques".

13. (a) Write note on the principles and applications of Ion exchange chromatography.

Or

(b) Write note on the principles and applications of Affinity chromatography.

14. (a) Briefly explain the methods of immune electrophoresis.

Or

(b) Write note on the "auto radiography" technique.

15. (a) What are the technique used to detect and measurement of radioactivity?

Or

(b) Briefly explain the principles and structure of IR spectroscopy.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the principles, structure and applications of mass spectrophotometry.

Or

(b) Briefly explain the principles and structure of flame photometry.

17. (a) Explain the principles of centrifugation? Detailed explanation of density gradient centrifugation.

Or

(b) Briefly explain the preparative and analytical methods of centrifugation.

18. (a) Write an account on Gel electrophoresis.

Or

(b) Briefly explain the principles and applications of PAGE.

19. (a) Explain the principles and application of adsorption chromatography.

Or

(b) Explain the principles and application of HPLC.

20. (a) Briefly explain the structure, principles and application of NMR.

Or

(b) Briefly explain the structure and principles of Raman spectroscopy.
