(6 pages) Reg. No. : .....

Code No. : 30723 **Sub. Code : EEMI 21/ FEMI 21**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2025.

Second Semester

Microbiology

Elective –BIO INSTRUMENTATION

(For those who joined in July 2023 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. pH is defined as ————

(a) $pH = Log_{10}[H^+]$

(b) $pH = Log_{10}[OH^-]$

(c) $pH = -Log_{10}[OH^-]$

(d) $pH = -Log_{10}[OH^+]$

2. Centrifugal force is defined as

(a) $F = mw^2r$ (b) $F = wm^2r$

(c) $F = mc^2r$ (d) None of the above

3. In calomel electrode one of the chemical used is

(a) HCl (b) AgCl

(c) Ag (d) Hg

4. The wavelength range for UV spectrum of light in UV-spectroscopy

(a) 400 nm-700 nm (b) 700 nm to 10 nm

(c) 1000 nm-1100 nm (d) 100 nm to 400 nm

5. The stationary phase used in HPLC is

(a) Silica (b) Alumina

(c) Both (a) and (b) (d) None

6. The electrophoresis apparatus consists of

(a) Gel, buffer chamber and fire pack

(b) Buffer chamber and electrophores is unit

(c) Electrophoresis unit and gel separator

(d) Power pack and electrophoresis unit

7. MRI stands for ————————

(a) Magnetic Radial Imaging

(b) Magnitude Radio Imaging

(c) Magnetic Resonance Imaging

(d) None

8. Recording electrical activities associated with brain is known was

(a) ECG (b) EEG

(c) EMG (d) MRI

9. Geiger Muller counter is used to detect

(a) Radioactive contamination

(b) Food contamination

(c) Water contamination

(d) None

10. In flame emission photo meters, the measurement of ———————— is used for qualitative analysis

(a) Colour of the flame

(b) Intensity of the flame

(c) Velocity of the flame

(d) Frequency of the flame

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Explain the structure and principle of Hot air oven.

Or

(b) Write short notes on preparation of molar solutions with suitable examples.

12. (a) Differentiate IR and Mass spectro photometry.

Or

(b) Write the principle and application of NMR spectroscopy.

13. (a) Explain the mobile phases in chromatography.

Or

(b) Write the experimental procedure of column chromatography.

14. (a) Comment on ECG. Add a note on its significance.

Or

(b) Give the principle and application of MRI and CT scans.

15. (a) Define scintillation. Briefly explain the role of scintillation counter in measuring radioactivity.

Or

(b) Briefly explain the principle and significance of spectrofluorimeter.

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 basic principles of centrifugation of different types and their significance.

Or

(b) Explain in detail about pH meter. Add add a note on calibration and operating principle of pH meter.

17. (a) Explain the principle of Beer-Lambert's law. Add a note on limitations of Beer-Lambert's law.

Or

(b) Describe the instrumentation and application of spectrophotometer.

18. (a) Explain the principles and application of paper chromatography and Ion exchange chromatography.

Or

(b) State the principle and application of PAGE.

19. (a) Briefly summarize the principle, instrumentation and application of imaging techniques EEG and EMG.

Or

(b) Describe the instrumentation and application of PET scanning.

20. (a) State the principles and applications of flame photometry.

Or

(b) Briefly explain the significance and limitations of GM counter.

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