

Sl. No. of Ques. Paper : 2086 **GC-3**
Unique Paper Code : 32493901
Name of Paper : Tools and Techniques in Biochemistry (SEC-1)
Name of Course : B.Sc. (Hons.) Bio-Chemistry (CBCS) Skill Enhancement Course
Semester : III
Duration : 2 hours
Maximum Marks : 50

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt all questions.

1. (i) Define the following terms:
 - (a) Buffer
 - (b) Chromophore
 - (c) PPM
 - (d) Mole fraction
 - (e) Quantum yield
 - (f) Beta particles.
 - (ii) Differentiate between the following:
 - (a) Molar absorption coefficient and specific extinction coefficient
 - (b) Lambert's law and Beer's law
 - (c) Normality and molarity
 - (d) Safety hazards by Lasers and UV radiation.
 - (iii) Which of these compounds would be the best buffer at pH 5.0 and why?
 - (a) Formic Acid ($pK_a = 3.8$)
 - (b) Acetic Acid ($pK_a = 4.76$)
 - (c) Ethylamine ($pK_a = 9.0$)
 - (iv) What is the relationship between the absorbance of light and the concentration of an absorbing solution? Show graphically. 6,8,2,4
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2. (i) Write the role of the following in a spectrophotometer:
 - (a) Light source
 - (b) Monochromator

- (c) Photomultiplier tube
- (d) Detector.
- (ii) Explain the relationship between pH and pKa.
- (iii) What are intrinsic and extrinsic fluors? Write an example of each along with their application in biology. 6,5,4
3. (i) What are virtual labs? Mention any *two* advantages of virtual labs over wet labs.
- (ii) Write short notes on the following (any *five*):
- (a) Functioning of pH meter
- (b) Properties of a good buffer system
- (c) Safety measures in laboratories. 3×5=15
- (iii) A solution of the nucleotide base uracil, in 1 cm cuvette has an absorbance at λ_{\max} (260 nm) of 0.65. Pure solvent in a matched quartz cuvette has an absorbance of 0.07. What is the molar concentration of the uracil solution? Assume that the molar extinction coefficient ϵ is $8.2 \times 10^3 \text{ M}^{-1} \text{ cm}^{-1}$. 3,9,3