V(5th Sm.)-Biochemistry-G/SEC-A-1/CBCS

2021

BIOCHEMISTRY — GENERAL

Paper : SEC-A-1

(Tools and Techniques in Biochemistry)

Full Marks : 80

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

1. Answer *any ten* questions :

- (a) Define molarity.
- (b) Write down the Stern-Volmer equation.
- (c) What is the unit of molar extinction coefficient?
- (d) What is the relation between pH and pOH?
- (e) What is the need to wear gloves while working in a biochemistry laboratory?
- (f) Define chromophore with an example.
- (g) What is λmax ?
- (h) Write down the equation of Beer's-Lamberts law.
- (i) What type of lamps are used as light sources in Uv-VIS spectrophotometer?
- (j) What is the relation between normality and molarity of a solution?
- (k) What is the relation between absorbance and transmittance?
- (l) What is plane polarized light?
- (m) What is photobleaching?
- (n) What is the effect of temperature of pH of a particular solution?
- 2. Answer any four questions :
 - (a) What are the safety measures one needs to take while working with hazardous chemicals in a laboratory?
 - (b) What are the different properties of a buffer? Give two examples of 'good buffers'. 4+1
 - (c) Prepare a standard curve from a stock of 10ml of BSA solution of concentration 10mg/100ml. 5
 - (d) What will be the epsilon value of an unknown protein solution having 45μ M concentration when it shows absorption at 280nm of 0.3 when taken in a quartz cuvette of path length of 1cm? 5

Please Turn Over

2×10

V(5th Sm.)-Biochemistry-G/SEC-A-1/CBCS

- (e) Write in brief the principle of fluorescence spectroscopy.
- (f) (i) What is buffer capacity?
 - (ii) What are the (a) H^+ ion concentration, (b) pH of a 0.001 M solution of HCL? 1+4
- (g) What are the advantages of a double beam Spectrophotometer over a single beam Spectrophoto meter? 5

(2)

- 3. Answer any four questions :
 - (a) (i) Derive Henderson-Hasselbach equation.
 - (ii) A mixture of 20mM acetic acid and 0.30 M Sodium acetate is given. Calculate the pH of the medium if the pKa of the acetic acid is 4.76. 6+4
 - (b) Write down the principle and procedure of estimation of concentration of unknown protein solution by Lowry method.
 - (c) Write short notes on :
 - (i) Biological Hazard
 - (ii) Chemical Hazard
 - (iii) Mechanical Hazard
 - (iv) Electrical Hazard.
 - (d) (i) What are the limitations of Lambert-Beer Law?
 - (ii) Draw a schematic diagram of Uv-visible spectrophotometer.
 - (e) (i) Draw the Jablonski Energy diagram for fluorescence spectroscopy.
 - (ii) What is Fluorescence quenching? Give one example of internal and external quencher.
 - (iii) A solution containing of 10^{-5} M ATP has a transmission of 70.2% at 260 nm in a 1 cm cuvette. Calculate the (A) transmission of the solution in a 3 cm cuvette. (B) Absorbance of the solution in 1 cm. cuvette. 3+(2+1)+(2+2)
 - (f) (i) Write in brief the principle of Uv-visible spectroscopy
 - (ii) Write the working principle of a pH meter.

5+5

5

5+5

 $2^{1/2} \times 4$

4+6