

QP Code : 12764

(2½ Hours)

[Total Marks :75

- N.B. : (1) All questions are compulsory.
(2) Internal choices have been given.
(3) Figures to the right indicate full marks.

1. (A) Fill in the blanks(any three):- 3
 - (i) Glycolysis in the anaerobic conditions leads to _____ production.
(a) Pyruvate (b) Lactate (c) Malate
 - (ii) HMP shunt occurs in the_____
(a) Cytosol (b) Mitochondria (c) Golgi complex
 - (iii) _____is considered to play a catalytic role in citric acid cycle.
(a) Succinic acid (b) α -Ketoglutarate (c) Oxaloacetate
 - (iv) Gluconeogenesis is regulated by_____
(a) Glucagon (b) Lactate (c) Both 'a' and 'b'
 - (v) Glycogen phosphorylase is a key enzyme in_____
(a) Gluconeogenesis(b) Glycogenesis (c) Glycogenolysis
 - (vi) Pyruvate is converted to acetyl CoA by_____
(a) Oxidative (b) Reductive (c) Both 'a' and 'b'
decarboxylation decarboxylation
- (B) Define and explain(any one):- 2
 - (i) Gluconeogenesis
 - (ii) Glycogenesis
- (C) Write short notes on (any one):- 4
 - (i) Glyoxylate pathway
 - (ii) Oxidation of pyruvate to acetyl CoA
- (D) Elaborate on (any one):- 6
 - (i) TCA with reactions
 - (ii) HMP shunt with reactions
2. (A) Fill in the blanks(any three):- 3
 - (i) The NADH shuttle used by skeletal muscles and brain is_____
(a) Malate-Aspartate shuttle
(b) Glycerol phosphate shuttle
(c) Both 'a' and 'b'
 - (ii) _____explains the dependence of electron transfer on ATP synthesis in mitochondria.
(a) Proton-motive force
(b) Rotational catalysis
(c) Chemiosmotic theory

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(iii) Q cycle results in the passage of electrons through _____ in ETC.

- (a) Complex IV
- (b) Complex III
- (c) Complex V

(iv) Iron-sulphur proteins are characteristic of the _____ cycle.

- (a) ETC
- (b) EMP
- (c) Both 'a' and 'b'

(v) _____ inhibits cytochrome oxidase.

- (a) Cyanide
- (b) Rotenone
- (c) Amytal

(vi) Photosystem II contains a reaction centre chlorophyll called _____

- (a) P700
- (b) P680
- (c) P600

(B) Define and explain (any one):-

2

- (i) Free energy
- (ii) Photophosphorylation

(C) Discuss in detail (any one):-

4

- (i) Malate-Aspartate shuttle
- (ii) Dark reaction and light reaction of photosynthesis

(D) Elaborate on (any one):-

6

- (i) Z scheme of photosynthesis
- (ii) Structure of ATP synthase

3. (A) Fill in the blanks (any three):-

3

(i) The stationary phase in reverse phase partition chromatography is _____ supported by a matrix.

- (a) Non-polar compound
- (b) Polar compound
- (c) Water

(ii) $V_e = V_o + \text{_____} \times V_i$

- (a) R_f
- (b) K_d
- (c) aW_r

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- (iii) In GLC, a stationary phase of silicon grease is supported on_____.
 (a) Celite
 (b) Sephadex
 (c) Resin
- (iv) In the detection of component,_____ is useful if unsaturated compounds are being investigated.
 (a) Iodine vapour
 (b) Ninhydrin
 (c) H_2SO_4 in ethanol
- (v) In TLC, for charged lipids,_____solvents are used.
 (a) Polar
 (b) Non-polar
 (c) Both 'a' and 'b'
- (vi) If K_d is_____, moderately moving zones are obtained.
 (a) Greater than 1
 (b) 1
 (c) Less than 1
- (B) Define and explain (any **one**):- 2
 (i) Stationary phase
 (ii) Ion exchangers
- (C) Write short notes on (any **one**):- 4
 (i) Principle of HPLC
 (ii) Application of gel filtration chromatography
- (D) Elaborate on (any **one**):- 6
 (i) Adsorption chromatography
 (ii) Paper chromatography

4. (A) Fill in the blanks(any **three**):- 3

- (i) The active form of vitamin D in humans is_____.
 (a) Ergocalciferol
 (b) Cholecalciferol
 (c) Dehydrocholesterol
- (ii) Riboflavin consists of sugar alcohol attached to_____.
 (a) Flavin
 (b) Chromane
 (c) Pyridine
- (iii) pI value of lysine is_____.
 (a) 5.97
 (b) 2.34
 (c) 9.74

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(iv) The isoelectric pH of glycine is calculated by arithmetic mean of pK_1 and _____.

(a) pK_2

(b) pK_3

(c) pK_R

(v) _____ takes part as coenzyme in transamination.

(a) Pyridoxine

(b) Flavin

(c) Biotin

(vi) In titration curve, the relatively flat zone observed is called _____.

(a) Titration zone

(b) Acceptor zone

(c) Buffering zone

(B) Define and Explain the following (any one):-

(i) Vitamins

(ii) FAD

(C) Write short notes on (any one):-

(i) Role of vitamin A in vision

(ii) Coenzyme form of vitamin B1

(D) Discuss in detail (any one):-

(i) Working of glass electrode and its applications

(ii) Titration curve of aspartate

5. (A) Justify any one of the following:-

(i) Citric acid cycle is amphibolic

(ii) Glycolysis in humans is highly significant.

(B) Elaborate on (any one):-

(i) Uncouplers of ETC

(ii) Electron carriers in photosynthesis

(C) Explain any one of the following:-

(i) Application of ion exchange chromatography

(ii) Principle of affinity chromatography

(D) Attempt any one of the following:-

(i) Physiological role of vitamin E

(ii) Calculate the pH of a mixture of 0.1M acetic acid and 0.2M sodium acetate ($pK_a = 4.76$).

(E) Write True or False (any three):-

(i) Glyceraldehyde-3-phosphate is formed at the end of phase I of glycolysis.

(ii) Transketolases form part of gluconeogenesis.

(iii) Ubiquinone is also known as CoQ10.

(iv) Affinity chromatography relies on differences in the physical properties of the molecules to be separation of buffers.

(v) Henderson-Hasselbalch equation is used for preparation of buffers.

(vi) Riboflavin and Lactoflavin are different biomolecules.