

2013

ORGANIC MECHANISMS IN BIOLOGY

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) An enzyme found in the liver but not in skeletal muscle is
- a) glycogen phosphorylase
 - b) lactate dehydrogenase
 - c) hexokinase
 - d) glucose-6-phosphate.
- ii) Conversion of 2-phosphoglycerate to phosphoenolpyruvate requires
- a) phosphoglycerate kinase
 - b) aldolase
 - c) pyruvate kinase
 - d) enolase.
- iii) The substrate for the enzyme carbomoyl synthetase I includes
- a) ATP b) bicarbonate
 - c) ammonia d) all of these.
- iv) Amino group derived from amino acid catabolism in the

muscle are released from the cell predominantly as

- a) urea b) alanine & glutamine
- c) alanine & glutamate d) asparagine.

v) Scurvey is produced due to deficiency of

- a) Vitamin *K* b) Vitamin *D*
- c) Vitamin *C* d) Vitamin *B*₁₂.

vi) Daily need of Vitamin *A* in adult man is expressed in

- a) mg b) μg
- c) U d) picogram.

vii) The net gain of ATP molecule resulting from glycolysis is

- a) 2 b) 4
- c) 36 d) 38.

viii) the substrate that enters the Krebs cycle for further metabolism is

- a) ethanol b) acetylc-CoA
- c) pyruvic acid d) ATP.

ix) In electron transport chain, the final acceptor of electrons is

- a) cytochrome *b* b) cytochrome *c*
- c) cytochrome *a*₃ d) none of these.

x) In mammals fatty acid biosynthesis takes place in

- a) peroxysome b) cytosol
- c) mitochondria d) SER.

xi) Pentose phosphate pathway is of greater importance because it produces

- a) NADH b) NADPH
- c) ATP d) acetylc-CoA.

xii) The monosaccharide most rapidly absorbed from the

small intestine is

a) glucose b) fructose

c) mannose d) galactose.

xiii) Glucose is the best substrate for Hexokinase because

a) K_m is higher b) K_m is lower

c) K_m is zero d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Define porphyrias. Why is TCA cycle regarded as a cycle of amphibolic nature ? 2 + 3

3. What do you mean by non-standard amino acid ? Why does the concentration of ketone bodies in the blood increased during prolonged starvation ? 2 + 3

4. Differentiate between ammotelic, uricotelic and ureotelic creatures.

5. What is anomeric carbon ? Write a note on autorotation.

1 + 4

6. Write a note on 'oxidative deamination'.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Distinguish between nucleosides and nucleotides. How is purine synthesis regulated ? "Catabolism of Pyrimidine nucleotide produces alanine." Illustrate. How is uric acid produced from purine nucleotides ? 2 + 3 + 5 + 5

8. What is the difference between de novo and salvage pathway ? How is IMP produced from PRPP ? Mention clearly

the name of different enzymes involved in the synthesis. How IMP gets converted to AMP and GMP ? What is the major site of purine synthesis ? 2 + 8 + 4 + 1

9. How is acetyl-CoA formed from pyruvate ? How is TCA cycle regulated ? What is the significance of TCA cycle ? Discuss glyoxylate cycle. 3 + 5 + 3 + 4

10. Describe in brief different steps in glycolysis mentioning the different enzymes involved. What are the different regulating steps in glycolysis ? How is lactic acid formed from pyruvate in the muscle ? What is anaerobic alcoholic fermentation ?

6 + 4 + 2½ + 2½

11. What are essential and non-essential amino acids ? Give examples. Write a brief note on their synthesis. Discuss the synthesis of heme using glycine. Discuss urea cycle.

3 + 5 + 3 + 4

12. What are hormones ? Discuss their chemical nature. Write the structure of cyclic AMP. What is second messenger system ? Describe in brief the mechanism of hormone action on the membrane receptors and elaborate on the role of cyclic AMP. 1 + 2 + 2 + 4 + 6

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