

CS/B.Sc.(H) BT/GENETICS/MOLBIO /

MICROBIO/SEM-2/OMB-201/2012

2012

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) Which of the following elements is added to blood during blood glucose estimation to prevent glycolysis ?
- a) Mn^{2+}
 - b) Mg^{2+}
 - c) Fluoride
 - d) Iodide.
- ii) Dietary triglycerides & cholesterol are transported inside the body by
- a) Chylomicron b) VLDL
 - c) LDL d) HDL.
- iii) During β -oxidation, palmitoyl Co-A is acted upon by
- a) very long chain acetyl Co-A dehydrogenase
 - b) short chain acetyl Co-A dehydrogenase
 - c) medium chain acetyl Co-A dehydrogenase
 - d) any of these.
- iv) Which of the following neurotransmitters is synthesized

from tryptophan ?

a) Dopamine b) Serotonin

c) Nor-epinephrine d) Epinephrine.

v) Neurological symptoms such as convulsion, peripheral neuropathy are associated with deficiency of

a) vitamin A b) vitamin B_6

c) vitamin B_2 d) vitamin E .

vi) The pathway used in plants for the oxidation of odd chain fatty acids is

a) TCA cycle

b) glycolysis

c) β -hydroxy-propionate pathway

d) methyl malonate pathway.

vii) Which enzyme is used for the conversion of m -RNA to c -DNA ?

a) Reverse transcriptase b) DNA-polymerase

c) Gyrase d) Transcriptase.

viii) For the conversion of α -ketoglutarate to succinyl-CoA which enzyme is used ?

a) Pyruvate dehydrogenase complex

b) α -ketoglutarate dehydrogenase complex

c) α -ketoglutarate dehydrogenase

d) None of these.

ix) In DNA replication, the Okazaki fragments on the lagging strand are joined together by

a) Helicase b) Gyrase

c) DNA ligase d) DNA-pol-I.

x) The hormone receptor complex through G -protein activates

- a) phospholipase A b) phospholipase B
 c) phospholipase C d) none of these.
- xi) How many "high energy" (~) bonds are utilized in activating the fatty acid, by esterifying it to coenzyme A ?
 a) 3 b) 4
 c) 2 d) 1.
- xii) How many times is the beta-oxidation pathway repeated during oxidation of a 12-C fatty acid ?
 a) 3 b) 5
 c) 6 d) 4.

GROUP – B

(Short Answer Type Questions)

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

2. What is Oxygenic photosynthesis ? How does green sulphur bacteria utilise H₂S during photosynthesis ? 2 + 3
3. Point out the differences between mitochondrial β -oxidation and peroxisomal β -oxidation.
4. Phosphofructokinase is the key enzyme of glycolytic pathway. Explain.
5. Write a short note on Rho-dependent transcription.
6. How does Ca²⁺ act as a second messenger in signal transduction pathways ?

GROUP – C

(Long Answer Type Questions)

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

7. a) Of the six molecules of glucose-6-phosphate that enters HMP shunts, only one molecule is oxidized. Justify with reaction.

b) Why do anti-malarial drugs like primaquine cause haemolytic anemia in Glucose-6-phosphate dehydrogenase deficiency patients ? 9 + 6

8. a) Summarize the steps involved in β -oxidation of an unsaturated fatty acid having one double bond.

b) What are the assumptions made by Michaelis & Menten to derive Michaelis-Menten equation ?

c) What is the utility of Lineweaver-Burk's plot ? 7 + 5 + 3

9. Mention the role of each of the following in metabolism :

i) Pyridoxal Phosphate

ii) Thiamine pyrophosphate

iii) Biotin. 5 + 5 + 5

10. What are the properties of the genetic code ? What is Wobble hypothesis ? Describe the biosynthesis of serotonin. Describe the cell membrane phospholipid second messenger system.

4 + 3 + 4 + 4

11. How is uridine monophosphate produced from glutamine ?

How is deoxyneucleotide diphosphate (dNDP) produced from nucleotide diphosphate (NDP) ? How is dNTP formed ?

6 + 7 + 2

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