

Name :
Roll No. :
Invigilator's Signature :

**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 H_2S 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 Ca^{2+} act as a second messenger in signal transduction pathways ?

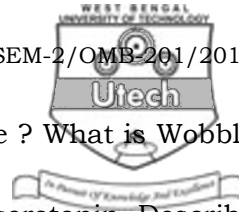


GROUP – C

(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 neucleotide diphosphate (NDP) ? How is dNTP formed ?

6 + 7 + 2

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