



Name :

Roll No. :

Invigilator's Signature :

**CS/M.Sc.(GE)/SEM-1/MSGEN-105/2009-10
2009**

BIOPHYSICS AND BIOCHEMISTRY

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) Value of ϵ for $n \rightarrow \pi^*$ transition is in the order of
 - a) 10^4
 - b) 10^2
 - c) 10^3
 - d) 10.
- ii) Decrease of wavelength is termed as
 - a) bathochromic shift
 - b) hyperchromic shift
 - c) hypsochromic shift
 - d) hypochromic shift.
- iii) Nuclear spin transition absorb radiation at
 - a) UV region
 - b) radio frequency region
 - c) IR region
 - d) visible region.
- iv) The sugar found in milk is
 - a) lactose
 - b) glucose
 - c) galactose
 - d) fructose.



- v) Fructose 1, 6 biphosphate is formed by the action of
- Phosphofructokinase-1
 - Phosphofructokinase-2
 - Fructose biphosphate isomerases
 - Fructose 1, 6 biphosphatase.
- vi) Cyclic AMP concentration is decreased by the influence of the hormone
- Insulin
 - Ephinephrine
 - Testosterone
 - Progesterone.
- vii) Which of the following enzymes is required for the hexone monophosphate shunt pathway ?
- Glucose-6-phosphate dehydrogenase
 - Glucose-6-phosphatase
 - Aldolase
 - Phosphorylase.
- viii) Calcitonin is antagonist to
- serotonin
 - parathyroid hormone
 - tri iodo thyronine
 - thyroxine.
- ix) The second messenger other than cyclic AMP for many hormones is
- cGMP
 - IP_3
 - ATP
 - UTP.
- x) The histone protein is consisting of
- 3 subunits
 - 2 subunits
 - 4 subunits
 - 8 subunits.



- xi) Regulatory enzyme of glycolysis is
- Glucosinase
 - Fructose-1, 6-diphosphatase
 - Aldolase
 - Pyruvate kinase.
- xii) In SEM, the electrons collected by detector are
- Transmitted
 - Scattered
 - Both (a) & (b)
 - Confocal microscopy.

GROUP – B

(Short Answer Type Questions)

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

- Define with example chromophore and bathochromic shifts ? How will you differentiate between $n \rightarrow \pi^*$ and $\pi \rightarrow \pi^*$ though both appear in visible region ? $3 + 2$
- Write the application of ^1H NMR in predicting structure of biomolecules ?
- Discuss the regulation of TCA cycle in brief.
- Differentiate between mitochondrial and peroxisomal β -oxidation.
- Define motif and domain of protein structure ? What do you mean by domain shuffling ? Explain with example. $2 + 3$

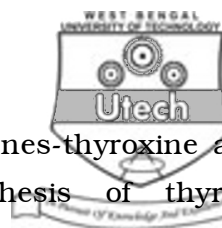
GROUP – C

(Long Answer Type Questions)

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

- Give with explanation a schematic diagram of spectrophotometer. What is the disadvantage of prism as a monochromator ? What set-up can remove this problem ? Write the advantage of TMS as a reference in chemical shift. Write the number of NMR peak for acetone.

$5 + 2 + 2 + 3 + 3$



8. Draw the structure of two thyroid hormones- thyroxine and tri-iodothyroxine. Discuss the biosynthesis of thyroid hormones. Describe their function. 4 + 6 + 5
9. a) "Glucose is mainly metabolized in liver when in fed condition." Explain why.
b) Some individual even die if they take small amount of alcohol. Explain why.
c) How is acetyl CoA formed from pyruvate by pyruvate dehydrogenase complex ? Show each step. 5 + 5 + 5
10. a) Discuss signal transduction by a G-protein-coupled receptors (GPCR).
b) How is nitrous oxide generated ? How is signal transduced in this case ?
c) Discuss the functions of parathyroid hormones. 5 + 5 + 5
11. Write down the total potential energy term associated in a molecule. What is torsional angle ? Which law governs the dynamics of a molecule ? What do you mean by energy minimization of a biomolecule ? Write the name of the algorithm used. What is IMMUNOGOLD electron microscopy ? In GROMACS what is the use of "pdb2gmsx" commands ? Write brief description of how tissue fixing is done in TEM. 4 + 1 + 1 + 3 + 1 + 2 + 3
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