



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech/BME/NEW/SEM-4/BME(PH)-401/2013

2013

BIOPHYSICS & BIOCHEMISTRY

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

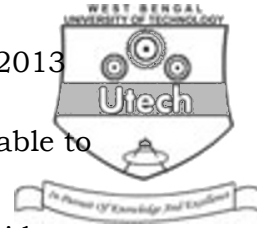
*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

- i) Frequency range of alpha (α) wave in EEG signal is
 - a) 0.4 Hz to 6 Hz
 - b) 13 Hz to 22 Hz
 - c) 8 Hz to 12 Hz
 - d) none of these.
- ii) The amount of ATP generated in glycolysis pathway is
 - a) 2
 - b) 5
 - c) 36
 - d) none of these.
- iii) The size of colloidal particle is
 - a) 5 nm
 - b) 1 nm
 - c) 500 nm to 1000 nm
 - d) $< 1 \text{ nm to } > 100 \text{ nm}$.



- iv) The lock and key hypothesis is applicable to
- a) enzyme b) colloid
- c) suspension d) none of these.
- v) Centrifugation is a process that involves the use of
- a) gravitational force b) centrifugal force
- c) tangential force d) none of these.
- vi) Functional conformation of an enzyme depends on its
- a) Primary structure b) Secondary structure
- c) Tertiary structure d) Quaternary structure.
- vii) In DNA there are three hydrogen bonds between
- a) A and T b) T and C
- c) G and T d) G and C.
- viii) Which is composed of lipid bilayer and protein layer ?
- a) Plasma b) CSF
- c) Plasma membrane d) Nucleus.



- ix) *P* wave of ECG denotes
- a) depolarisation of ventricle
 - b) repolarisation of ventricle
 - c) depolarisation of auricle
 - d) repolarisation of auricle.
- x) Cell separator is used for
- a) RIA
 - b) ELISA
 - c) plasmapheresis
 - d) filtration.

GROUP – B

(Short Answer Type Questions)

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

2. What are the physiological effects of electric current ? What is 'let go' current ? 4 + 1
3. State the law of radioactive decay. What is half-life period ? 3 + 2
4. How can you measure the conductivity of biological fluid in laboratory ?
5. Write down the different properties of colloid.
6. Briefly discuss the skin-electrode interface and draw an equivalent electrical circuit of this system.
7. What do you know about the biochemical structure of DNA ?



GROUP – C

(Long Answer Type Questions)

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

8. What are the major characteristics of enzyme ? Explain the mechanism of enzyme action. What are the factors that affect enzyme activity ? $3 + 6 + 6$
9. What is 'Gibbs-Donnan' effect ? How do facilitated diffusion, primary and secondary active transports play important role in the movement of substances through biological membrane ? $6 + 3 + 3 + 3$
10. Classify carbohydrates. Write down the different functions of it. Explain the process of glycolysis with different steps. $2 + 5 + 8$
11. Write the biochemical structure of plasma membrane. What is membrane voltage ? How does plasma membrane function as a combined resistor and capacitor ? Write important properties of cell membrane. $5 + 2 + 4 + 4$
12. What are the differences between competitive inhibition and allosteric inhibition ? How do double helical complementary strands of DNA help in the replication process of it ? $6 + 9$
13. Write short notes on any *two* of the following : $2 \times 7\frac{1}{2}$
 - a) Plasmapheresis
 - b) Ultracentrifugation
 - c) RIA
 - d) Phosphorescence.

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