



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Tech(BME-NEW)/SEM-4/BME(PH)-401/2012**

**2012**

**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 × 1 = 10

- i) The frequency range of ECG signal is
  - a) 150 - 200 Hz
  - b) 100 - 150 Hz
  - c) 0.05 - 100 Hz
  - d) 50 - 100 kHz.
- ii) Which of the following is a natural radio isotope ?
  - a)  $^{16}\text{O}$
  - b)  $^{14}\text{N}$
  - c)  $^{238}\text{U}$
  - d) None of these.
- iii) Approximate range of "let go" current for male is
  - a) 2 - 8 mA
  - b) 40 - 60 mA
  - c) 9 - 30 mA
  - d) none of these.



- iv) In case of atrial flutter
- a) interval between  $T$  and  $P$  waves completely disappears
  - b) interval between  $P$  and  $Q$  waves completely disappears
  - c) interval between  $S$  and  $T$  waves completely disappears
  - d) none of these.
- v) One of the macromolecules of cell membrane is
- a) phospholipid
  - b) ammonia
  - c) sodium
  - d) strontium sulphate.
- vi) The amount of extra cellular body fluid is
- a)  $1/3$  of TBW ( total body water )
  - b)  $1/4$  of TBW ( total body water )
  - c)  $2/3$  of TBW ( total body water )
  - d)  $3/4$  of TBW ( total body water ).
- vii) The normal pH of body is
- a) 8.1
  - b) 7.4
  - c) 6.4
  - d) 8.9.
- viii) Alpha block occurs in
- a) ECG
  - b) EEG
  - c) EMG
  - d) EOG.



- ix) Differences in concentration of ions on opposite sides of a cell membrane is called
- Membrane potential
  - Membrane pump
  - Transmembrane pump
  - None of these.
- x) The ratio of the volume of  $O_2$  taken and  $CO_2$  given out during respiration is called
- Respiratory quotient
  - TCA cycle
  - Glycolysis
  - $\beta$  oxidation.

**GROUP - B**

**( Short Answer Type Questions )**

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

- With the help of a block diagram, explain the functioning of a visual colorimeter.
- What do you mean by fluorescence and phosphorescence in terms of photochemistry ?
- Classify carbohydrate with example.
- Give a brief outline of the recording procedure of EMG signal.
- What is Ultracentrifugation ? Explain electrophoresis.  $2 + 3$
- Explain the function of body fluid ? How the acid-base balance of our body is maintained ?  $2 + 3$



**GROUP - C**

**( Long Answer Type Questions )**

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

8. Define radioactivity with the help of law of radioactivity decay. Briefly describe a procedure for production of radioisotopes. Give a brief outline of interaction of radiation with matter. Discuss about the electrical properties of excitable cell membrane.  $3 + 4 + 4 + 4$
9. What do you mean by macroshock and microshock in the physiological measurement ? Briefly discuss about the recording procedure of EEG signals and give a brief outline of medical significance of EEG waveforms. Draw an equivalent electrical circuit of cell membrane. What is Electro-Retino Gram ( ERG ) ?  $3 + ( 4 + 2 ) + 3 + 3$
10. Briefly describe the procedure of 12-leads ECG recording. What is the medical significance ( diagnostic importance ) of ECG waveform ? What is bipolar method of body impedance.
11. What do you mean by primary, secondary, tertiary and quaternary structures of protein ? Why are proteins called amphoteric ?  $10 + 5$
12. Write the process of translation. Describe the process of DNA replication.  $7 + 8$

