KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 4th Year 2nd Term Examination, 2020
Department of Computer Science and Engineering
CSE 4241
Biomedical Engineering

TIME: 1.5 hours FULL MARKS: 120

N.B. i) Answer **ANY TWO** questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.

SECTION A

(Answer **ANY TWO** questions from this section in Script A)

1. a) "Biomedical Engineering is an interdisciplinary field" – justify the statement and hence, mention the contributional scopes of CSE students/graduates in the diverse fields of Biomedical engineering. (14)
   b) Define action and resting potential. Describe the generation process of action potential in the living excitable cells using suitable diagram. (16)

2. a) Write down the full form of ECG, EEG, EMG, and EOG. Distinguish these biosignals interms of their originating organ, voltage and frequency ranges. (09)
   b) What are the ECG signal processing steps of Pan-Tompkins algorithm for real time heart beat (QRS) detection? (06)
   c) What do you mean by computed tomography (CT)? Mention the technical features of different generations of CT. (15)

3. a) Write down the components of X-ray tube along with their functions. Why are the collimator and grid used in X-ray imaging? (10)
   b) Draw the general networking systems for developing integrated interconnectivity among various units/workstations inside and outside of a healthcare organization. (12)
   c) Define eHealth. List different standards used in eHealth and explain any one of them in brief. (08)

SECTION B

(Answer **ANY TWO** questions from this section in Script B)

4. a) Define Bioinformatics and mention its sub-disciplines. What is the main role of a bio informatician in present biological research and development area? (09)
   b) Consider the following two strings: (12)

      ALGO
      TEST

      (i) What is the optimal alignment?
      (ii) What is the cost/score of the optimal alignment?
   c) Given is a set of multiple aligned sequences. Compute the sequence profile for this set. (09)

      ATAATAC
      ATAATAG
      ATAATTC
      ATATTAC
      ATAATAA

5. a) "Protein act as messenger" – justify the statement with example(s) (10)
   b) What is sequence Motif and PROSITE? Write down the steps to find the motif on PROSITE? (12)
   c) What is BLAST and FASTA? Make a relationship between FASTA and BLAST. (08)

6. a) Define term propensity value. What steps does Chou-Fasman method performs to predict the secondary structure of protein? (13)
   b) Explain the difference between homology and similarity. How is similarity used to infer homology? (10)
   c) What is meant by gene prediction? What is the ultimate goal of gene prediction? (07)