CBCS SCHEME

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18MT751

Seventh Semester B.E. Degree Examination, June/July 2023
Bio Medical Signal Processing

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. List the difficulties encountered in biomedical signal analysis and explain any two difficulties in detail. **(08 Marks)**

b. Discuss the sequence of events and waves in cardiac cycle with graphical representation. **(06 Marks)**

c. Explain Einthoven's triangle with a neat diagram. **(06 Marks)**

OR

2 a. With a neat block diagram, explain simple signal conversion system. **(08 Marks)**

b. Explain Electroneurogram (ENG) with graphical representation. **(06 Marks)**

c. Differentiate:
(i) Invasive versus non invasive procedure
(ii) Active versus passive procedure **(06 Marks)**

Module-2

3 a. Prove that the signal averaging improves SNR by a factor of $\sqrt{m}$. **(08 Marks)**

b. Discuss the principal noise canceler model with a neat diagram. **(06 Marks)**

c. Explain typical signal averager with a neat block diagram. **(06 Marks)**

OR

4 a. Discuss different applications of adaptive filtering. **(08 Marks)**

b. What is signal averaging? Discuss the characteristics of signal and noise with neat diagram. **(06 Marks)**

c. Explain the concept of signal averaging as a digital filter. **(06 Marks)**

Module-3

5 a. Explain the concept of static Huffman coding in detail. **(08 Marks)**

b. Discuss convolution in time domain and frequency domain. **(06 Marks)**

c. Explain Fan algorithm with an appropriate example. **(06 Marks)**

OR

6 a. Explain turning point algorithm with an appropriate example. **(08 Marks)**

b. Discuss correlation in time domain and frequency domain. **(06 Marks)**

c. Discuss Fourier transform of a discrete non-periodic signal. **(06 Marks)**

Module-4

7 a. Explain with a neat diagram:
(i) The standard limb leads
(ii) The augmented limb leads **(10 Marks)**

b. Explain about electrodes in the field of electrocardiography. **(06 Marks)**

c. Explain low-pass filter/integrator with a neat circuit diagram. **(04 Marks)**

OR

8 a. Discuss in detail the characteristics of ECG signal with graphical representation. (08 Marks)
b. Explain QRS detector with a neat block diagram. (08 Marks)
c. Explain high-pass filter/differentiator with a neat circuit diagram. (04 Marks)

Module-5

9 a. Describe EEG signal and its characteristics with neat diagram. (10 Marks)
b. Explain adaptive segmentation algorithm in detail. (10 Marks)

OR

10 a. Explain in detail the electrophysiological origin of Brain Waves. (10 Marks)
b. Explain the spectral error measure with neat diagram. (10 Marks)

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