



Name :
Roll No. :
Invigilator's Signature :

**CS/B.Tech/BME/SEM-7/BME-701/2012-13
2012**

BIOSIGNAL PROCESSING

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) Auto-correlation function is an
- a) Even function b) Odd function
- c) Energy function d) none of these.
- ii) Cepstral analysis is a process of
- a) Convolution b) Cross-correlation
- c) Auto-correlation d) De-convolution.
- iii) What is the frequency range of alpha (α) wave ?
- a) 0.5 – 3.5 Hz b) 7.5 – 12.5 Hz
- c) 3.5 – 7.5 Hz d) 0 – 40 Hz.



- iv) The amplitude range of EEG signal is
- a) 10 – 100 V b) 10 – 1000 μ V
c) 10 – 100 μ V d) 10 – 1000 mV.
- v) Cross-correlation technique is used for
- a) QRS detection
b) R-R interval detection
c) S-T segment detection
d) P-wave detection.
- vi) The data compression technique AZTEC stands for
- a) Arrhythmia Zone Time-Epoch Coding
b) Amplitude Zone Transversal-Epileptic Coding
c) Altitude Zone Transversal-Epoch Coding
d) Amplitude Zone Time-Epoch Coding.
- vii) CORTES stands for
- a) Coordinate-Resolution-Time Encoding System
b) Coordinate-Reduction-Time Encoding System
c) Coordinate-Reduction-Time Epoch System
d) Coordinate-Rational-Time Encoding System.
- viii) EEG signal is a signal.
- a) Biphasic b) Monophasic
c) Random d) Deterministic.



GROUP - C
(Long Answer Type Questions)

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

7. What is the principle of Adaptive Filtering ? Explain the operating principle of Adaptive Noise Canceller. How do you remove the power line interference in Electrocardiography ?

5 + 5 + 5

8. Describe the ECG QRS detection technique.

9. Write down both the data reduction techniques of AZTEC algorithm. How CORTES algorithm overcomes the limitations of TP and AZTEC algorithms ? Reconstruct the original signal by the following AZTEC coded data :

{ 15, 80, 5, 100, - 8, - 200, - 5, 150, 25, 150 }. $7 + 3 + 5$

10. Write down the least-mean-square algorithm for one weight case with a neat sketch. Describe the different sleep characteristics of EEG. Briefly explain the hypnogram model parameters.

5 + 5 + 5

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