

5E3112-P

B. Tech. (Sem. V) (Main / Back) Examination, December - 2011
Electronics & Communication
5EC6.1 Biomedical Instrumentation (Common with 5A15)

Time : 3 Hours]

**[Maximum Marks : 80
[Min. Passing Marks : 24**

Instructions to Candidates :

Attempt any five questions selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL

2. NIL

UNIT - I

- 1 (a) Explain various elements of control nervous system with a suitable diagram.
- (b) Describe selection criteria of transducers and electrodes in medical applications with examples.

OR

- 1 (a) Describe the problems encountered in measurement of physiological system. Explain how these differ from physical systems.
- (b) What are body surface electrodes ? Describe in brief with suitable examples.

UNIT - II

- 2 (a) Describe in detail with the principle involved of electrodes used for measurement of ECG, EMG and EEG.
- (b) Explain working principle of electromagnetic blood flow meter with suitable diagram.

OR

- 2 (a) Define "blood pressure". Describe blood pressure measurement by direct and indirect measurement method.
- (b) Differentiate between leads and electrodes. Explain various lead configurations with the help of ECG waveforms.

UNIT - III

- 3 (a) Explain the working principle for measurement of partial pressure of Oxygen (PO₂) in the blood and describe suitable scheme for it.
- (b) Describe principle of computerised Axial Tomography and compare it with conventional X-Ray imaging system.

OR

- 3 Write short notes on (any four) :
- (i) GSR measurement
 - (ii) Hemoglobin measurement
 - (iii) Chromatography
 - (iv) Endoscopy
 - (v) MRI
 - (vii) Medical use of isotopes.

UNIT - IV

- 4 (a) What are the various elements of an Intensive Care Unit (I.C.U) ? Explain each in brief.
- (b) Explain a basic bio-telemetry system with suitable diagram along with its advantages and disadvantages.

OR

- 4 What are the various physiological effects of electric current on human body ? Explain various methods of electrical accident prevention in medical instrumentation systems.

UNIT - V

- 5 (a) What do you understand by 'Fibrillation' ? Explain capacitive discharge type d.c. defibrillators with associated circuitry and waveforms.
- (b) Explain "Diathermy". Describe shortwave diathermy process with suitable diagram.

OR

- 5 Write short notes (any two) :
- (i) Heart lung machine
 - (ii) Hemodialysis
 - (iii) Cardiac pace makers
 - (iv) Applications of lasers.

