

5E3112

Roll No. : _____

Total Printed Pages : **3****5E3112**

B. Tech. (Sem. V) (Main/Back) Examination, December - 2013
Applied Electronics & Instrumentation
5AI5 Biomedical Instrumentation (Common with AI and EC)

Time : **3 Hours**][Total Marks : **80**[Min. Passing Marks : **24**

*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) rtuonline.com

1. _____ **NIL** _____ 2. _____ **NIL** _____

UNIT - I

- 1 (a) What are the factors involved in the movement of ions across the cell membrane in the steady state condition ? Explain. 8
- (b) Describe the working of human nervous system with schematic diagram. 8

OR

- 1 (a) Explain the factors that influence the design and application of a medical instrument system. 8
- (b) Explain the electrode theory. Discuss the selection criteria for transducers and electrodes. 4+4=8

UNIT - II

- 2 (a) What is Electrocardiogram ? Explain the functioning of ECG machine with the help of neat block diagram. Explain how it acquired all 12 lead configurations. 2+4+2=8



- (b) Describe an ultrasonic blood flow meter and find expression for blood flow.

8

OR

- 2 (a) Explain the origin and applications of following biopotentials :
 (i) ENG
 (ii) ERG
 (iii) EEG

4×3=12

- (b) A patient's blood pressure is measured as 120 mm Hg systolic and 80 mm Hg diastolic. What is the mean arterial pressure ?

4

UNIT - III

- 3 (a) Explain the types and principles of chromatography. Discuss its medical applications.

5+3=8

- (b) What is meant by NMR signal ? Explain the working of MRI imaging system.

3+5=8

OR

- 3 (a) Explain the working principle of spectrophotometer. Discuss its applications in clinical laboratory.

5+3=8

- (b) Explain the following :

- (i) Medical use of isotopes.
 (ii) Endoscopy.

4+4=8

UNIT - IV

- 4 (a) Describe the possibilities of occurrence of microshock hazards in a hospital.

8

- (b) Explain biotelemetry system. Discuss its applications.

4+4=8

OR



- 4 (a) Briefly explain various elements of intensive care units in hospitals. 8
- (b) Discuss in brief, the various real time computer applications in biomedical engineering. 8

UNIT - V

- 5 (a) What is the need of pacemakers ? Explain any one synchronous pacemaker in detail. 2+6=8
- (b) Explain diathermy. Describe shortwave diathermy process with suitable diagram. 2+6=8

OR

- 5 (a) Explain the functioning of heart-lung machine. Discuss the role of instrumentation in it. 5+3=8
- (b) Explain the following :
- (i) Medical applications of LASER
- (ii) Hemodialysis. 4+4=8

