

**B. Tech Third Year : 5<sup>th</sup> Semester**  
**BIOMEDICAL INSTRUMENTATION, DEC., 2012**  
**(FOR 5 EC 6.1 BRANCH OF ENGINEERING)**

**Times : 3 Hours**

**Min. Passing Marks : 24**

**Total Marks : 80**

*Instructions to Candidates : Attempt overall 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 may suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

**UNIT-I**

- (a) What is meant by pulmonary and systemic blood circulation? Draw an engineering equivalent of the heart showing blood circulation throughout the body. [10]
- (b) What are various types of transducers used in medical instrumentation system? Also mention their principle of operation. [6]

**OR**

- (a) Explain human respiratory system with a suitable diagram. [8]
- (b) What is the working principle of strain gauges? Describe different types of strain gauges used in medical equipments. [8]

**UNIT-II**

- (a) Define 'Blood Pressure'. How blood pressure can be measured in blood vessels using indirect measurement method? [10]
- (b) What does 'EMG' mean? Why a normal EMG wave form looks like a noise waveform? [6]

**OR**

- (a) Draw a block diagram of EEG machine. Describe function of each element. [8]
- (b) Describe working principle of electromagnetic blood flow meter with suitable diagram. [8]

**UNIT-III**

- (a) What do you mean GSR? Explain measurement of GSR by a suitable diagram. [10]
- (b) Compare ultrasonic, X-Ray and MRI imaging techniques. [6]

**OR**

- (a) What is meant by diagnostic X-Rays? Explain the generation of X-Rays with a suitable diagram. [8]
- (b) Describe colorimeter method of determining chemical concentration. [8]

**UNIT-IV**

- (a) What types of instruments are normally available in an Intensive care unit? [6]
- (b) Explain landline telemetry system with a suitable diagram. How it is different from radio telemetry. [10]

**OR**

- (a) What are the applications of a computer for a cardiac patient? [6]
- (b) What are the various physiological effects electric current on human body? Also explain why? [10]

**UNIT-V**

- (a) What are various types of pacemakers? Describe Asynchronous type pace maker with a suitable diagram. [6]
- (b) How a long duration, short amplitude pulse can be obtained from a dc defibrillator? [6]

**OR**

- (a) What are different types of ventilators used in medical application? Explain briefly. [8]
- (b) What is meant by 'Diathermy'? What are various types of diathermy used? Explain in brief. [8]