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Sub Code: NIC 802

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**B TECH**  
**(SEM VIII) THEORY EXAMINATION 2017-18**  
**BIOMEDICAL INSTRUMENTATION**

*Time: 3 Hours**Total Marks: 100***Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 10 = 20**

- a) What are bioelectric potentials? Explain the resting and action potential.
- b) Explain Polarization, Repolarization and depolarization,.
- c) Explain the physical potentials ECG, EMG, EEG, ERG.
- d) Explain the significance of electrodes and leads.
- e) What do you mean by intensive care monitoring?
- f) Describe the function of a humidifier.
- g) What is ophthalmology?
- h) Describe Electro-oculogram.
- i) What are prosthetic devices?
- j) Explain in brief the functioning of hearing aids.

**SECTION B****2. Attempt any three of the following: 10 x 3 = 30**

- a) Explain Needle Electrodes and Microelectrodes. Also explain the functioning of a biomedical transducer.
- b) What is a pace-maker? Give the classification of various pace-makers. Also explain demand type pace-maker. Explain the working of a defibrillator.
- c) Describe the physiology of the respiratory system. Explain the respiratory therapy equipments: Ventilators & Respirators
- d) Explain the working of tonometer for eye pressure measurement. Explain Electroretinogram.
- e) Explain implantable units of bio-telemetry. Explain how telemetry can be used for the measurement of ECG during exercise.

**SECTION C****3. Attempt any one part of the following: 10 x 1 = 10**

- (a) Discuss the components of a man instrumentation system with suitable diagram. Explain the problems encountered while measuring a living system.
- (b) Discuss and explain the various surface electrodes. Discuss the various elements of intensive care monitoring.

4. Attempt any *one* part of the following: 10 x 1 = 10
- (a) Discuss the cardiovascular system. How is the ECG signal generated, propagated and distributed? What are the transducers used to measure ECG?
- (b) Write short notes on any two of the following:
- (i) ECG –Single channel, three channels & Vector Cardiographs.
  - (ii) Holter recording
  - (iii) Heart sound measurement.
5. Attempt any *one* part of the following: 10 x 1 = 10
- (a) Describe the physiology of the nervous system. Explain the phenomenon of neural communication.
- (b) Write short notes on any two:
- (i) Spirometer
  - (ii) Heart sound measurement
  - (iii) Nebulizers
6. Attempt any *one* part of the following: 10 x 1 = 10
- (a) Write short notes on any two:
- (i) X-ray & Radio-isotope diagnosis and therapy
  - (ii) CAT-Scan OR MRI.
  - (iii) Emission computerized tomography
- (b) Explain Eco-cardiography and Eco-encephalography. How they are used for the diagnosis of eye disorders.
7. Attempt any *one* part of the following: 10 x 1 = 10
- (a) Explain the purpose and functioning of a Myoelectric arm in detail.
- (b) Explain the various components of a Bio-telemetry system. Discuss also, some Laser applications in medicine