

B.TECH.
(SEM V) THEORY EXAMINATION 2018-19
BIO-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) Describe the characteristics of receptors.
- b) Describe some circuits based on transduction.
- c) What do you mean by reference electrode? What does it signify?
- d) Define Ion specific electrodes.
- e) Explain motion artifacts.
- f) Describe Electromyogram (EMG).
- g) Discuss the performance of dialysis.
- h) Describe the membranes used for hemodialysis.
- i) What is shielding?
- j) Explain Leakage current.

SECTION B

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

- a) What are flow transducers? Describe the characteristics of flow transducers and explain design considerations for flow transducers.
- b) Explain the properties and applications of Fiber optic chemical transducer. Describe reference electrodes.
- c) Explain the significance & electrical conductivity of electrode jellies and creams. Describe its applications.
- d) Describe the features of portable kidney machine. Explain the working and flow diagram of portable kidney machine. Discuss its advantages.
- e) Explain the open ground problem and describe the safety measures for electrically susceptible patients.

SECTION C

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

- a) Describe the principles of temperature transducers. Explain the major components of temperature transducers and explain its working with applications.
- b) Describe the classification of transducers. Also describe the criteria for selection of appropriate transducer according to application. Describe the Photoelectric transducers.

4. Attempt any one part of the following: 10 x 1 = 10

- a) Describe the various types of electrodes used in biomedical field. Explain the pO₂ electrodes & Transcutaneous pO₂ transducer.
- b) Explain the mechanism for blood gas analysis. Explain ISFET for glucose.

5. Attempt any one part of the following: **10 x 1 = 10**

- a) Distinguish between microelectrodes & needle electrodes. Describe their applications.
- b) What do you understand by Electrocardiogram (ECG)? Explain the properties and main components of ECG and explain its significance in medical diagnosis. Discuss the electrodes for ECG.

6. Attempt any one part of the following: **10 x 1 = 10**

- a) Define the principle of dialysis. Explain different types, functions and working of dialysis.
- b) What is hemodialysis? Draw the block diagram and explain the working of hemodialysis machine. Describe its applications.

7. Attempt any one part of the following: **10 x 1 = 10**

- a) What are electrical shock hazards? Describe the preventive measures to reduce shock hazards. Explain macroshock and microshock.
- b) Describe the radiation hazards and suggest safety measures for its protection.

