

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 gellies 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.

