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Roll No. ....

**C52**

**B. Tech. EXAMINATION, 2020**

(Third Semester)

(B Scheme) (Re-appear Only)

(BME)

BME203B

INTRODUCTION TO BIOMEDICAL  
ENGINEERING

*Time : 2½ Hours]*

*[Maximum Marks : 75*

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Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

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**Note :** Attempt *Four* questions in all. All questions carry equal marks.

1. (a) What is an Instrumentation System ?  
Draw the block diagram of a Generalized Instrumentation System and briefly explain the function of each block.  
(b) Define and explain the following terms with reference to Measuring Instrument :
  - (i) Hysteresis
  - (ii) Drift
  - (iii) Reproducibility.
2. (a) What are the different standard inputs for studying the dynamic response of a system ? Define and sketch these.  
(b) What is a second order system ? Draw and briefly discuss the step response of a second order system.
3. (a) Draw and briefly discuss the circuit of an instrumentation amplifier. What are the advantages of an instrumentation amplifier ?

- (b) What is linear variable differential transformer (LVDT) ? Briefly discuss, how the magnitude and direction of the displacement of core of an LVDT is detected.
4. Briefly discuss the basic principle of working and applications of the following transducers/ technique (any *two*) :
- (a) Piezoelectric transducers
  - (b) Radiation thermometry
  - (c) Strain Gauges.
5. (a) What do you mean by electrode skin interface and motion artifacts ? What are the uses of the electrode paste applied during biomedical signal recording ?
- (b) Draw the equivalent electrical circuit of a biopotential electrode and explain its electrical nature. How is bioelectric potential measured ?

6. Briefly discuss the following with their advantages and disadvantages :
- (a) Surface Electrodes
  - (b) Needle Electrodes
  - (c) Polarizable and non-polarizable electrodes.
7. (a) What are X-rays ? How can its various properties be exploited in medical imaging ?
- (b) What is MRI ? Briefly explain the principle of operation of MRI. What are the advantages of MRI ?
8. Write short notes on any *two* of the following :
- (a) Electrocardiogram
  - (b) Electrical properties of nerves
  - (c) Tomographic Imaging.