Karunya University
(Karunya Institute of Technology and Sciences)
(Declared as Deemed to be University under Sec.3 of the UGC Act, 1965)

End Semester Examinations - 2015-16 Even Semester - May 2016

15EI2003 Biomedical Sensors and Transducers

Set A

Time : 3 hrs
Total Marks: 100

1. a. Describe the Circulatory Reflex initiated by the Baroreceptors with a neat diagram. (10)

   b. Portray and explain the formation of receptor potential in a Pacinian Corpuscle and propagation of action potential through the sensory pathways. (10)

OR

2. a. Elaborate on the perception of taste. How does different receptors respond to different tastes? Give a neat portrayal of the sensory pathway. (13)

   b. How sound waves travel through the ear? Describe in few words with a neat diagram. (7)

3. a. Illustrate with necessary diagrams to show how a capacitive transducer is used to detect Infrared radiation to form a CO_2 analyzer.(12)

   b. Draw the Diode Twin-T Circuit and explain its method of measuring the unknown capacitance. (8)

OR

4. a. Describe the basic working principle of a strain gauge. Explain the catheter type transducer used for blood pressure measurement with suitable diagrams. (8)

   b. What is the necessity of Bridge circuits in biomedical transducers? Draw the Wheatstone's bridge and derive the expression for balance condition. (6)

   c. Describe the working of resistive potentiometers. Explain any two biomedical application of potentiometers with suitable diagrams.(6)

5. a. Describe the working of LVDT and explain any two medical application of LVDT with suitable diagrams.(10)

   b. Portray the input-output characteristics of RTD, Thermistor and Thermocouple.(5)

   c. Briefly explain any one method of measuring stroke volume using capacitance change principle.(5)

OR

6. a. Describe the working of differential capacitor pneumotachograph with suitable diagrams.(7)

   b. Define Curie Point of a Piezo-electric crystal. Elaborate on any two biomedical application of piezo-electric transducer. (7)

   c. Write notes on capacitance measurement using resonant circuit.(6)

7. a. Describe the Amperometric type of biosensor with a neat illustration. (7)

   b. Explain the different methods by which the antibodies are immobilized in order to develop a bio receptor. (7)

   c. Describe the optical type of transducer used in a biosensor. How is absorption measured? (6)

OR

8. a. Elaborate on electrode – electrolyte interface and the generation of half-cell potential. What could be the reason for electrode offset voltage? Justify. (10)

   b. Draw the equivalent circuit of an electrode and explain in detail about metal plate electrode and suction electrode with neat diagrams. (10)

9. Compare and contrast between Biopotential electrodes and Biochemical electrodes. Illustrate with neat diagrams the working of pH electrode and PO_2 electrode. Mention the use of Ion specific electrodes. (20)

Wishing you All the Best
