R09

Set No. 2

II B.Tech II Semester Examinations, APRIL 2011 BIOTRANSDUCERS AND APPLICATIONS **Bio-Medical Engineering**

Time: 3 hours

Code No: R09221102

Max Marks: 75

Answer any FIVE Questions All Questions carry equal marks ****

- 1. Explain the basic principle of phonocardiography? How can you measure phonocardiographic signals by using variable inductance pressure transducer? [15]
- 2. (a) What is the importance of monitoring the biological signal. Explain with an example?
 - (b) Describe how a diabetic patient can be monitored and controlled by automated systems. [7+8]
- 3. Describe PN junction temperature transducer with circuit diagram and derive the relation ship between temperature and output voltage. $\left[15\right]$
- 4. (a) Explain in detail about Fick and rapid injection indicator dilution method.
 - (b) Write short notes on water filled plethysmography. |7+8|
- (a) Discuss on the physiological pressures where it is required to measure and also 5.elaborate on its importance.
 - (b) Discuss on the effect of gravitational force on the pressure. [7+8]
- 6. (a) Explain in detail the displacement transducer.
 - (b) Give a detailed account of translational accelerometers. [7+8]
- 7. Explain the term CMRR and the antilog amplifier with relevant mathematical relation. [15]
- 8. Compare the functions of AM, FM, PWM and its uses in the telemetry system.

[15]

R09

Set No. 4

[7+8]

II B.Tech II Semester Examinations, APRIL 2011 BIOTRANSDUCERS AND APPLICATIONS Bio-Medical Engineering

Time: 3 hours

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Max Marks: 75

Answer any FIVE Questions All Questions carry equal marks *****

- 1. (a) What are the different sources of error in the bridge measuring circuit of thermoresistive transducer, explain how they can be minimized?
 - (b) What is peltier effect? Explain the different laws of thermocouple. [7+8]
- 2. (a) What is the use of dilution techniques in medical diagnosis.
 - (b) Describe thermodilution method.
- 3. (a) Discuss on the dynamic pressure requirement for measuring and recording.
 - (b) Discuss on the relative pressures present at different parts of circulatory system. [7+8]
- 4. What are the types of errors present at the time of measurement? Explain the methods to eliminate the errors present at the time of measurement. [15]
- 5. With neat sketches describe the various methods of force measurement and give their applications in medical field. [15]
- 6. With a neat circuit explain the function of instrumentation amplifier with the help of three operational amplifiers and also discuss its applications in the biomedical field. [15]
- 7. (a) Explain displacement transducer based on ultrasonic method.
 - (b) Describe velocity transducer based on Doppler system method. [7+8]
- 8. Discuss on the functions of the bio signal transmitters and receivers with the help of block diagram. [15]

 $\mathbf{R09}$

Set No. 1

II B.Tech II Semester Examinations, APRIL 2011 BIOTRANSDUCERS AND APPLICATIONS **Bio-Medical Engineering**

Time: 3 hours

Code No: R09221102

Max Marks: 75

Answer any FIVE Questions All Questions carry equal marks ****

- 1. (a) Explain displacement transducer based on ultrasonic method.
 - (b) Describe velocity transducer based on Doppler system method. [7+8]
- 2. (a) Discuss the pressure measurement in the small vessels.
 - (b) Discuss on various types of indirect pressure measurement. [7+8]
- 3. (a) Write a note on factors influencing the choice and design of transducers in biomedical parameters.
 - (b) Discuss on the various types of bioelectric amplifiers [7+8]
- (a) Explain working principles of various inductive transducers. 4.
 - (b) A thin constantan wire stretched taut has a length of 30mm and a cross sectional area of 0.01 mm² the resistance is 1.5 Ω . The force applied to the wire is increased such that the length is increased by 10 mm and the crosssectional area decreases by 0.0027 mm² find the change in resistance. [7+8]
- 5. (a) Derive the temperature voltage characteristics for a P-N junction diode.
 - (b) Derive the sensitivity relation for thermistor. [7+8]
- 6. Explain the functions of bio signal transmitters and receivers with the help of block diagrams. [15]
- 7. (a) Explain in detail the intravascular thermistor probe technique with relevant figures.
 - (b) Discuss on various types of flow probe design and its uses. [7+8]
- 8. Explain the concept of multi point calibration in adaptive measurement systems with neat sketch. [15]

R09

Set No. 3

II B.Tech II Semester Examinations, APRIL 2011 BIOTRANSDUCERS AND APPLICATIONS Bio-Medical Engineering

Time: 3 hours

Code No: R09221102

Max Marks: 75

Answer any FIVE Questions All Questions carry equal marks *****

- 1. (a) With a neat block diagram explain the measurement of unknown velocity using Mossbauer effect.
 - (b) Describe the effect of sensitivity on source absorber characteristics in this method. [7+8]
- 2. (a) Explain the term water filled plethysmography.
 - (b) What is the use of dilution technique in medical diagnosis? Describe thermo dilution method. [7+8]
- 3. (a) Explain the theory behind P-N junction diode thermometer.
 - (b) What is Seebeck effect and Peltier effect? Explain how measurement is done using Seebeck effect. [7+8]
- 4. (a) Explain a medical instrumentation system with block diagram.
 - (b) What are the different types of problems that appear in a practical measurement system? [7+8]
- 5. (a) Explain the principle involved in bioelectric amplifiers.
 - (b) describe the differentiator circuit with neat sketch and also derive the output voltage. [7+8]
- 6. (a) Explain the principle of a strain gauge.
 - (b) Derive the gauge factor of a strain gauge. [7+8]
- 7. (a) Explain the direct hydraulically coupled catheter type pressure transducer.
 - (b) Explain the diaphragm displacement type pressure transducer. [7+8]
- 8. (a) Discuss on the choice of radio frequency and also its frequency allocations for medical applications.
 - (b) Discuss on the various standards required for medical applications and also the importance of the bio-telemetry. [7+8]

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