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Total Number of Pages: 2

B.TECH
PEEC5416

7th Semester Regular / Back Examination 2015-16
BIOMEDICAL INSTRUMENTATION

BRANCH: BIOTECH, CSE, IT

Time: 3 Hours

Max marks: 70

Q.CODE: T579

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

- Q1** Answer the following questions: **(2 x 10)**
- a) Write the diagnostic importance of Biomedical Signal?
 - b) What is a Transducer?
 - c) Expand the following abbreviations (any four).
ECG, EEG, EMG, ERG, EOG
 - d) Write classification of EEG signal for diagnosis of brain activity.
 - e) Distinguish between active and passive transducers.
 - f) List a few names of commonly employed temperature sensors used in biomedical instrumentation.
 - g) What is the purpose of using Recorders in biomedical instrumentation system?
 - h) List a few Biological Functions often needed for diagnosis using Patient Monitoring System for diagnosis purposes.
 - i) What is Doppler effect?
 - j) Distinguish between Gross Shock and Micro-Current Shock.
- Q2** a) Write advantages of using (i) Intelligent medical instrumentation system and (ii) PC based medical instrumentation system. **(5)**
- b) List types of standards for Regulation of medical devices. How these devices are classified into various Classes based on potential hazards posed by the devices? **(5)**
- Q3** a) Explain the origins and signal wave patterns of the following bioelectric signals. (i) ECG (ii) EEG **(5)**
- b) Describe the effects of Motion Artefact in recording ECG signal. Suggest methods of reducing these effects. **(5)**
- Q4** a) Describe principle of pressure measurement using Strain Gauge. **(5)**
- b) What is a Thermistor? Write the expression of Resistance-Temperature relationship. Write few advantages of using Thermistor for body temperature measurement. **(5)**

- Q5 a)** Write the importance of the following signal conditioning devices. **(5)**
(i) Signal Amplifier (ii) Frequency Analyzer
- b)** With suitable example, distinguish the objectives of using (i) Signal Analysis Techniques and (ii) Signal Processing Techniques. **(5)**
- Q6 a)** Briefly describe principles of methods of Heart Rate measurement. **(5)**
- b)** Write the normal values of Blood Pressure in human Blood Circulation system. Distinguish the principles of measurement between Direct method and Indirect method of Blood Pressure measurement. **(5)**
- Q7 a)** Write basic principles of operations of the following devices. **(5)**
(i) Electromagnetic Blood Flow meter.
(ii) NMR Blood Flow meter.
- b)** Briefly describe various effects of Electric Current on human body. **(5)**
- Q8** Answer any TWO from the following. **(5 x 2)**
- a)** Phenomena involving Electrode Tissue interface and its Equivalent Circuit.
- b)** List various Writing Systems used in biomedical instrumentation system. Mention few important characteristics of Writing System.
- c)** List types of Leakage Currents which may be observed in medical instrumentation devices.