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CS/R Tach(	FCF)/SFM_8/FC_80/R/2012

# CS/B.Tech(ECE)/SEM-8/EC-804B/2012 2012

## **MEDICAL ELECTRONICS**

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

# GROUP - A ( Multiple Choice Type Questions )

<ol> <li>Choose the correct alternatives for the foll</li> </ol>	wing :	•
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 $10 \times 1 = 10$ 

- i) Which device measure blood pressure?
  - a) Ultrasonography
- b) Stethoscope
- c) Sphygmomanometer
- d) None of these.
- ii) Which one is the piezo-electrical substance?
  - a) Nickel

b) Chromium

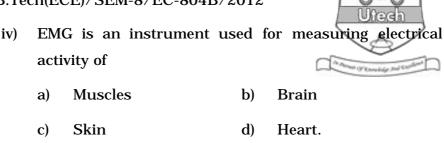
c) Quartz

- d) Phosphorous.
- iii) Which one can measure temperature?
  - a) LVDT

- b) Thermistor
- c) Strain gauge
- d) None of these.

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- v) A typical EMG signal ranges from
  - a) 0·1 to 0·5 mV
     b) 0·1 to 5 mV
     c) 1 to 5 mV
     d) 1 to 0·5 mV.
- vi) 14.EEG machines have notch filters to eliminate
  - a) Noise
  - b) Undamped oscillations
  - c) Frequency interference
  - d) Muscle artifacts.
- vii) The appropriate diagnostic investigation in a patient presenting with chest pain is
  - a) blood pressure measurements
  - b) lateral chest x-ray
  - c) CT scan
  - d) ECG.
- viii) In Doppler effect the shifted frequency is expressed as
  - a)  $\Delta f = 2V/\lambda$
- b)  $\Delta f = V/2\lambda$
- c)  $\Delta f = 2\lambda/V$
- d)  $\Delta f = \lambda / V$ .



- ix) The heart sounds are recorded by
  - a) Electro cardiograph b) Endoscope
  - c) Phono cardiograph d) Angio cardiograph.
- x) EMG waveform appears very much like
  - a) Triangular wave b) Random noise signal
  - c) Irregular wave d) Saw tooth wave.

#### **GROUP - B**

### (Short Answer Type Questions)

Answer any *three* of the following.  $3 \times 5 = 15$ 

2. What do you mean by thermal sensor ? Define Thermocouple. How does RTD measure temperature ?

1 + 1 + 3

- 3. Explain Vitreo-retinal functions.
- 4. Explain the electrical system of heart.
- 5. Describe working function of Biopotential amplifier with proper circuit diagram.
- 6. How could you measure blood glucose by Doppler Ultrasonography?

#### **GROUP - C**

## (Long Answer Type Questions)

Answer any *three* of the following.  $3 \times 15 = 45$ 

7. What is Arrhythmia? What are the types of Arrhythmia? What are the causes of Arrhythmia? List some of the symptoms of arrhythmia. Give brief description of different components of ECG cycle with proper diagram.

$$1 + 2 + 2 + 2 + 8$$

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- 8. What do you mean by image processing? What are the advantages of MRI over CT scan? Explain the working procedure of MRI machine. 2 + 3 + 10
- 9. Classify the Biomedical Instruments. Give basic Layout of Biomedical Instrumentation and explain it. Explain the construction and working principle of CT scan. 2 + 5 + 8
- 10. a) Describe blood glucose measurement by Doppler ultrasonography.
  - b) Explain working principle of spirometer. 10 + 5
- 11. Write short notes on any *three* of the following :  $3 \times 5$ 
  - a) Need for Medical Electronics
  - b) Electrochemical sensors
  - c) Optical sensors for blood oxygen measurement
  - d) Piezo-electric material
  - e) Working Principle of an EEG Recorder.

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