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Inviailator's Signature :	

CS/B.TECH (ECE-N)/SEM-8/EC-804B/2011

2011 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)

1.	Choose the correct	alternatives	for any	ten	of the	following
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 $10 \times 1 = 10$

- i) The typical signal voltage for ECG is
 - a) 1mV

b) 10mV

c) 20mV

- d) 25mV.
- ii) Which one is the piezo-electrical substance?
 - a) Nickel

b) Chromium

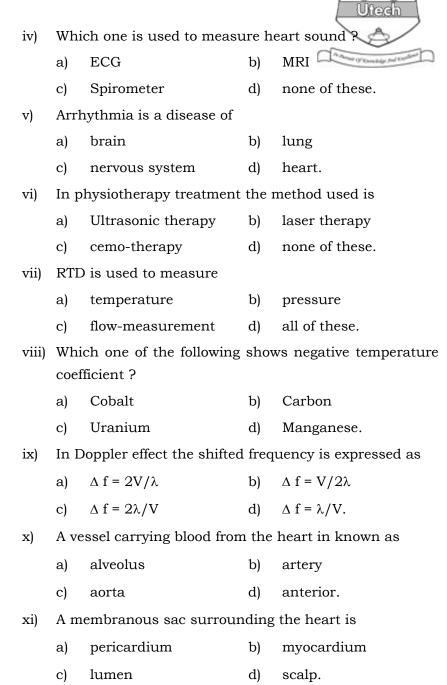
c) Quartz

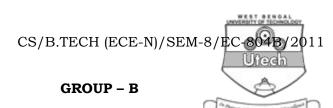
- d) Phosphorus.
- iii) Which one can measure temperature?
 - a) LVDT

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

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(Short Answer Type Questions)

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

- 2. What are the basic purposes of the safety measures used with electrically susceptible patients?
- 3. Distinguish between sensor and transducer. Make a comparison between thermocouple & thermistor. 3 + 2
- 4. Explain vitreo-retinal function.
- 5. Define cardiac output measurement. Give the reason for decreasing the cardiac output. 2 + 3
- 6. Define TLC, VC, RV, IC and FRC.

GROUP - C

(Long Answer Type Questions)

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

- 7. a) Draw the waveform of the Action Potential and explain the following:
 - i) Action potential
 - ii) Resting potential
 - iii) Absolute refractory period
 - iv) Relative refractory period.
 - v) Conduction velocity.
 - b) Explain the various classifications of Biopotential Electrodes.
 - c) Define spirometer.

8 + 5 + 2

5

5

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- 8. a) What is the need of compensation techniques in medical instrumentation?
 - b) Classify and give brief descriptions of different compensation techniques.
 - c) What are the generalized static characteristics of medical instrumentation system? 2 + 8 + 5
- 9. a) What are the electrodes used for ECGs?
 - b) Draw the block diagram of EGC machine and explain different blocks.
 - c) What are the precautions should be taken to achieve good ECG display in the presence of electrosurgery interference?
 - d) What is pacemaker?

2 + 8 + 3 + 2

- 10. a) What is CT-scan?
 - b) Describe briefly on different generations of CT-scan system.
 - c) Describe with block diagram, MRI-imaging system.

2 + 6 + 7

11. Write short notes on any three of the following:

 3×5

- a) USG
- b) Biopotential amplifier.
- c) EEG
- d) Blood pressure measurement
- e) Biosensors for bacteria detection
- f) Electrochemical sensor.

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