

**Code No: RT32045A**

R13

SET - 1

### III B. Tech II Semester Regular/Supplementary Examinations, April - 2017

**BIO-MEDICAL ENGINEERING**  
(Electronics and Communication Engineering)

Time: 3 hours

Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. Answering the question in **Part-A** is compulsory

3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- |   |    |  |      |
|---|----|--|------|
| 1 | a) | What is the basic principle of biomedical instrumentation? | [4M] |
|   | b) | Explain the term “Gauge factor”.                           | [4M] |
|   | c) | Draw the ECG amplifier.                                    | [3M] |
|   | d) | What is Diathermy? Explain.                                | [3M] |
|   | e) | What are properties of Ultrasound?                         | [4M] |
|   | f) | Explain about isolated power distribution system.          | [4M] |

**PART -B**

- |   |    |   |      |
|---|----|---|------|
| 2 | a) | How the bioelectric potentials are measured? Name some of the equipments using such measurement.                  | [4M] |
|   | b) | Explain polarization, depolarization and re polarization.   | [8M] |
|   | c) | Discuss the propagation of action potentials.   | [4M] |
| 3 | a) | What is the difference between active and passive transducer? Explain working principle of any active transducer. | [8M] |
|   | b) | Explain about pulse sensor and respiration sensor.  | [8M] |
| 4 | a) | Draw different ECG lead configurations and explain recording of ECG.  | [8M] |
|   | b) | Write in detail about the Respiratory therapy Equipment.  | [8M] |
| 5 | a) | Compare and contrast pacemakers and defibrillators.   | [8M] |
|   | b) | What are the elements of intensive care monitoring? Explain about patient monitoring displays.                    | [8M] |
| 6 | a) | Explain the working principle of CT scan with neat block diagram.   | [8M] |
|   | b) | Explain the principle of CAT scan and compare its visualization method with conventional method.                  | [8M] |
| 7 | a) | Discuss the physiological effects of electrical current.  | [8M] |
|   | b) | Explain about the shock hazards of electrical equipment.  | [8M] |

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**SET - 2**

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**BIO-MEDICAL ENGINEERING**  
(Electronics and Communication Engineering)

Time: 3 hours

Maximum Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. Answering the question in **Part-A** is compulsory  
3. Answer any **THREE** Questions from **Part-B**  
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**PART -A**

- 1 a) Draw the block diagram of man-instrument system. [3M]  
b) What are active transducers? Explain. [4M]  
c) Write different clinical applications of ECG. [3M]  
d) Draw the block diagram of patient care monitoring system. [4M]  
e) What are the Noninvasive methods? [4M]  
f) Draw and explain the equipotential grounding system. [4M]

**PART -B**

- 2 a) Discuss about problems encountered in measuring a living system. [8M]  
b) Explain clearly about the Electromyogram (EMG). [8M]
- 3 a) Discuss four different types of transducers, explaining what they measures and their principles. [8M]  
b) What are the various effects of a transducer on various biomedical measurements? Discuss. [8M]
- 4 a) Discuss in detail the blood pressure measurement by indirect method. [8M]  
b) Draw the Plethysmograph and explain how the blood volume is recorded. [8M]
- 5 a) Explain the operation of pacemaker and why it is needed? [8M]  
b) What is Laparoscopy? Describe Laparoscopic system used in surgery and its benefits over normal surgery. [8M]
- 6 a) What are the components of a bio-telemetry system? What are the applications of telemetry in emergency patient monitoring? [8M]  
b) What is ultrasonic imaging? Compare ultrasonic diagnosis with X-ray diagnosis. [8M]
- 7 a) What are different methods of accident prevention? Discuss in detail. [8M]  
b) Discuss about shock hazards and their prevention methods. [8M]

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**SET - 3**

**III B. Tech II Semester Regular/Supplementary Examinations, April - 2017**

**BIO-MEDICAL ENGINEERING**

**(Electronics and Communication Engineering)**

Time: 3 hours

Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. Answering the question in **Part-A** is compulsory

3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- 1 a) List the components of the Man-Instrument system. [4M]
- b) What is piezoelectric effect? [4M]
- c) Write about the Physiology of Respiratory System. [3M]
- d) Draw the block diagram of bedside patient monitoring system. [3M]
- e) What do you understand by bio-telemetry? What are its advantages? [4M]
- f) What are the physiological effects of electrical current? [4M]

**PART -B**

- 2 a) What is EEG? Why is it much more difficult to recognize than ECG? How can certain characteristic EEG Waveforms be related to sleep? [8M]
- b) Explain about resting and action potential. [8M]
- 3 a) List and discuss various types of transducers used for biomedical applications. [8M]
- b) Discuss in detail about pulse sensors? [8M]
- 4 a) What is the importance of blood flow? Discuss the biomedical instruments that are used to measure the blood flow. [8M]
- b) Explain the ultrasonic method of blood flow measurement. [8M]
- 5 a) What do you understand by myoelectric arms? Explain underlying principle with example. [8M]
- b) Explain the working principle of Electro-retinogram with a block diagram. [8M]
- 6 a) Explain how four physiological parameters are monitored and telemetered simultaneously. [8M]
- b) Draw the block diagram of a system to send an electrocardiogram from an ambulance to a hospital by telemetry and explain. [8M]
- 7 Write short notes on the following [8M]
  - i) Isolated power distribution system [8M]
  - ii) Methods of accident prevention

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**R13****SET - 4****III B. Tech II Semester Regular/Supplementary Examinations, April - 2017****BIO-MEDICAL ENGINEERING**  
**(Electronics and Communication Engineering)**

Time: 3 hours

Maximum Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. Answering the question in **Part-A** is compulsory  
3. Answer any **THREE** Questions from **Part-B**  
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**PART -A**

- |   |    |  |      |
|---|----|--|------|
| 1 | a) | What are resting and action potentials?                          | [4M] |
|   | b) | What is thermoelectric effect?                                   | [3M] |
|   | c) | What is Plethysmography?   | [3M] |
|   | d) | What are the warning devices to be used in intensive care units? | [4M] |
|   | e) | What are the principles of Ultrasonic Measurement?               | [4M] |
|   | f) | Write about accident prevention methods.                         | [4M] |

**PART -B**

- |   |     |   |      |
|---|-----|---|------|
| 2 | a)  | Explain the propagation of action potential with neat diagrams.   | [8M] |
|   | b)  | Explain about ECG and EEG.  | [8M] |
| 3 | a)  | What is the difference between active and passive transducer? Explain the working of any active transducer. | [8M] |
|   | b)  | Write in detail about any two respiratory sensors.  | [8M] |
| 4 | a)  | Draw the Cardiovascular System and discuss various characteristic features of ECG amplifiers?               | [8M] |
|   | b)  | Explain clearly the method of heart sound measurement.  | [8M] |
| 5 | a)  | Discuss clearly at least two Electrophysiological tests of eye.   | [8M] |
|   | b)  | Name the instrument used for eye pressure measurement and explain with a neat diagram.                      | [8M] |
| 6 | a)  | Discuss the process of Ultrasonic imaging in detail.  | [8M] |
|   | b)  | Draw the Components of Biotelemetry System and explain.   | [8M] |
| 7 |     | Write short notes on the following  | [8M] |
|   | i)  | Shock hazards from electrical equipment   | [8M] |
|   | ii) | Physiological effects of electrical current   | [8M] |

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