

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**

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] |



Code No: RT32045A

R13

SET - 2

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

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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**

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 measure 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
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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**

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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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

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- 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**

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

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III B. Tech II Semester Supplementary Examinations, November/December - 2016

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**

PART -A

- 1 a) What is action potential? What is resting potential? [4M]
 b) Write the nearest equation for membrane resting potential. [3M]
 c) What is spirometer? Explain the principle of operation of it. [4M]
 d) Write short notes on catheterization lab. [4M]
 e) List and discuss various types of ultrasonic imaging display modes. [3M]
 f) Differentiate between micro shock and macro shock. [4M]

PART -B

- 2 a) What are the various problems encountered in measuring a living system? [6M]
 b) Explain briefly various physiological systems of the body. [6M]
 c) With neat waveform explain briefly about ECG. [4M]
- 3 a) Explain different types of electrodes for measuring bioelectric potentials. [9M]
 b) List and discuss briefly various types of transducers for biomedical applications. [7M]
- 4 a) What is the importance of blood flow? Discuss any two methods used to measure blood flow. [10M]
 b) Explain the physiology of respiratory system. [6M]
- 5 a) What is fibrillation? How you correct it? Draw and explain d.c defibrillator. [8M]
 b) Explain the following i) electroretinogram ii) electrooculogram [8M]
- 6 a) Explain how telemetry can be done for ECG measurement during exercise. List the advantages of telemetry. [8M]
 b) Explain the working principle of CT scan with block diagram. [8M]
- 7 a) Discuss strip chart recorders and galvanometric recorders with suitable diagrams. [8M]
 b) Explain various methods of accident prevention with diagrams. [8M]



III B. Tech II Semester Regular Examinations, April - 2016
BIO-MEDICAL ENGINEERING
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Time: 3 hours

Maximum Marks: 70

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- 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**

PART -A

- | | | |
|---|--|------|
| 1 | a) What is meant by action potential? | [3M] |
| | b) What is an Electrode? | [4M] |
| | c) Write about the Mechanics of Breathing. | [4M] |
| | d) What is diagnosis? | [4M] |
| | e) Write about the Therapeutic Uses. | [4M] |
| | f) Define a Monitor. | [3M] |

PART -B

- | | | |
|---|---|-------|
| 2 | a) Discuss in detail the biological cell with a suitable figure. | [8M] |
| | b) Explain in detail the 'cell action potential' with the help of typical waveform. | [8M] |
| 3 | a) Give the salient features of needle electrodes. | [3M] |
| | b) List out various bio medical electrodes and give their applications. | [8M] |
| | c) Give the applications of needle electrodes. | [5M] |
| 4 | a) With a neat block diagram explain the mechanical activities of the heart. | [8M] |
| | b) Describe the electrical conduction system of a heart. | [8M] |
| 5 | a) Write about the Elements of Intensive-Care Monitoring. | [8M] |
| | b) Explain about the Patient Monitoring Displays. | [8M] |
| 6 | a) Describe about the CAT Scan. | [10M] |
| | b) Write the applications of CAT Scan. | [6M] |
| 7 | a) Explain about the various Physiological Effects. | [10M] |
| | b) Give examples of the Physiological Effects of electrical current. | [6M] |

Code No: RT32045A

R13

SET - 2

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BIO-MEDICAL ENGINEERING
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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**

PART -A

- 1 a) What is bioelectric potential? [3M]
- b) What is the principle of transconduction? [4M]
- c) Write about the Respiratory Therapy. [4M]
- d) What are Defibrillators? [4M]
- e) Write about the Ultrasonic Imaging. [4M]
- f) Define a Recorder. [3M]

PART -B

- 2 a) What are the problems encountered in measuring a living system? [4M]
- b) Explain the Physiological System of the Body. [8M]
- c) What are evoked responses? [4M]
- 3 a) Write about the Electrodes for ECG. [5M]
- b) Write about the Electrodes for EEG. [5M]
- c) Explain about the Electrodes for EMG. [6M]
- 4 a) Describe the operation of ultrasonic blood flow meter. [8M]
- b) Explain why reflectance type is preferred than transmittance type. [8M]
- 5 a) With a neat diagram explain about the Calibration and Repair ability of Patient-Monitoring Equipment. [8M]
- b) Explain about the Organization of the Hospital for Patient-Care Monitoring. [8M]
- 6 a) Discuss about the MRI. [10M]
- b) Mention the applications of MRI. [6M]
- 7 a) What are Biopotential Amplifiers? Explain. [10M]
- b) What are the applications of biopotential amplifiers. [6M]



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

PART -A

- 1 a) Mention the sources for bioelectric potential. [3M]
- b) What is Respiration sensor? [4M]
- c) Explain about Measurement of Blood Flow. [4M]
- d) What are Audiometers? [4M]
- e) Define a Radio-Isotope. [3M]
- f) What are Shock Hazards? [4M]

PART -B

- 2 a) What are Resting potentials? [4M]
- b) With a neat sketch explain the function of nerve cell. [8M]
- c) Write about the ECG. [4M]
- 3 a) What are pulse sensors? [3M]
- b) Explain about the Transducers for Biomedical Applications. [8M]
- c) Mention the applications of pulse sensors. [5M]
- 4 a) Explain how blood flow can be measured using electromagnetic blood flow meter. [8M]
- b) Give the advantages and disadvantages of various excitations on signals. [8M]
- 5 a) What are the advantages of lithium battery as energy source in permanent pacemaker? [8M]
- b) In what way demand pacemaker is different from stand by pacemaker. [8M]
- 6 a) Give a brief note on The Components of Biotelemetry System. [10M]
- b) Write the applications of Biotelemetry System. [6M]
- 7 a) Explain about the Isolated Power Distribution System. [10M]
- b) What are methods of accident prevention?. [6M]



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SET - 4

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- 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**

PART -A

- 1 a) Write about the Age of biomedical engineering. [3M]
- b) What are transducers with digital output? [4M]
- c) What is Plethysmography? [4M]
- d) What are Stimulators? [4M]
- e) Write the frequency range of ultrasonic. [4M]
- f) Define a recorder. [3M]

PART -B

- 2 a) What are evoked responses? [4M]
- b) Explain the features of different block of an EEG machine. [8M]
- c) List the specifications of an EEG amplifier. [4M]
- 3 a) What are Biochemical Transducers? [3M]
- b) With a neat diagram explain about the Basic Transducer Principles. [8M]
- c) Mention the applications of Biochemical Transducers. [5M]
- 4 a) Describe about the Physiology of the Respiratory System. [8M]
- b) Explain in detail various Respiratory Therapy Equipment. [8M]
- 5 a) Describe the driven RL system in the case of ECG. [8M]
- b) Why is the SA node called as natural pacemaker? [8M]
- 6 a) Discuss about the various Implantable Units. [10M]
- b) Explain how telemetry can be used for measurement of ECG during exercise. [6M]
- 7 a) What are the various Shock Hazards from Electrical Equipment? [10M]
- b) Give a brief note on Methods of Accident Prevention. [6M]

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