Code No: R163204D **R16** SET - 1

III B. Tech II Semester Regular Examinations, April/May - 2019

BIO-MEDICAL ENGINEERING

(**Common to** Electronics and Communication Engineering,
Electronics and Instrumentation Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Draw the typical waveform of action potential generated by cardiovascular system.	[2M]
	b)	Define the term 'linearity'.	[2M]
	c)	Draw the Einthoven triangle.	[2M]
	d)	List the types of defibrillators.	[3M]
	e)	What is bio-telemetry?	[3M]
	f)	What are the different shock hazards from electrical equipment?	[2M]

PART -B

2.	a)	What is meant by biometrics? And what are the important factors that are to be considered in medical instrumentation system?	[7M]
	b)	What are the basic objectives of any instrumentation system? Explain.	[7M]
3.		Write notes on	
	a)	Metal plate electrode	[7M]
	b)	Adhesive type electrode	[7M]
4.	a)	What are the different ECG lead configurations? Explain.	[7M]
	b)	Draw the schematic of ECG recorder by showing all building blocks.	[7M]
5.	a)	Explain the operation of Spirometer.	[7M]
	b)	What are the advantages and disadvantages of ventricular asynchronous pacemakers? Explain.	[7M]
6.	a)	Draw the block diagram of a typical radio telemetry single channel system and explain.	[7M]
	b)	Explain how bioelectrical variables are transmitted?	[7M]
7.		Write notes on the following:	
	a)	Arrhythmia monitor	[7M]
	b)	Artifact detection.	[7M]

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Code No: R163204D **R16** SET - 2

III B. Tech II Semester Regular Examinations, April/May - 2019

BIO-MEDICAL ENGINEERING

(**Common to** Electronics and Communication Engineering,
Electronics and Instrumentation Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Write the typical values of amplitudes of following waves: (i) P wave (ii) R wave	[2M]
	b)	Draw the schematic of suction cup electrode.	[2M]
	c)	Draw the typical ECG signal and label it.	[2M]
	d)	What is meant by fibrillation?	[3M]
	e)	List the components of biotelemetry system.	[3M]
	f)	What are the physiological effects of electrical current?	[2M]

PART -B

2.	a)	Give the block diagram of a man-instrument system and explain about each component.	[7M]
	b)	What are the major physiological systems of the body? Briefly explain about each system.	[7M]
3.	a)	What are the different types of transducers that are used for biomedical applications?	[7M]
	b)	Explain the working principle of pO_2 electrode.	[7M]
4.	a)	Draw the Einthoven triangle and explain.	[7M]
	b)	What is vector cardiograph? Explain.	[7M]
5.	a)	What are the different types of pacemaker batteries? Explain briefly.	[7M]
	b)	What is the necessity of ventilators? Explain.	[7M]
6.	a)	Draw the block diagram of radio telemetry system and explain its operation.	[7M]
	b)	Draw the block diagrams of FDM and TDM systems that are used in biotelemetry.	[7M]
7.		Write notes on the following:	
	a)	Doppler ultrasonic blood flow meter	[7M]
	b)	Physiological effects of electrical current	[7M]

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Code No: R163204D **R16** SET - 3

III B. Tech II Semester Regular Examinations, April/May - 2019

BIO-MEDICAL ENGINEERING

(**Common to** Electronics and Communication Engineering,
Electronics and Instrumentation Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	The human body is divided into four physiological systems. What are those systems?	[2M]
	b)	Give the list of different chemical electrodes.	[2M]
	c)	Give the Nernst equation.	[2M]
	d)	What is meant by defibrillation?	[3M]
	e)	What are the limitations of biotelemetry?	[3M]
	f)	What is the application of bio-potential amplifier?	[2M]

PART -B

2.	a)	What are the problems encounter in measuring a living system? Explain.	[7M]
	b)	What is meant by resting and actions potentials?	[7M]
3.	a)	Explain about the pH electrode.	[7M]
	b)	Draw the equivalent circuit of biopotential-electrode interface and explain.	[7M]
4.	a)	What are the different respiratory therapy equipment? Explain.	[7M]
	b)	Explain how blood pressure is measured?	[7M]
5.	a)	Compare external and internal pacemakers.	[7M]
	b)	Give the classification of pacemakers based on the modes of operation.	[7M]
6.	a)	Draw the schematic of Hartley type FM transmitter for the transmission of ECG, EEG and EMG signals.	[7M]
	b)	Write notes on ultrasonic diathermy.	[7M]
7.		Write notes on the following:	
	a)	Method of accident prevention.	[7M]
	b)	Need for isolated power distribution system.	[7M]

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Code No: R163204D **R16** SET - 4

III B. Tech II Semester Regular Examinations, April/May - 2019

BIO-MEDICAL ENGINEERING

(**Common to** Electronics and Communication Engineering,
Electronics and Instrumentation Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Draw the cross-section of a depolarized cell.	[2M]
	b)	Give the list of different microelectrodes.	[2M]
	c)	Draw the lead aVR configuration.	[2M]
	d)	What is meant by pacemaker?	[3M]
	e)	List any three applications of biotelemetry.	[3M]
	f)	List the methods of accident prevention in hospitals.	[2M]

PART -B

2.	a)	What is meant by polarization, depolarization and repolarization? Explain with relative sketches.	[7M]
	b)	Give the waveform of action potential and mention various regions and potentials.	[7M]
3.	a)	Explain about metal microelectrode.	[7M]
	b)	What are the different types of surface electrodes? Explain briefly.	[7M]
4.	a)	Draw the input circuit of modern ECG machine with buffer amplifier.	[7M]
	b)	Explain the working of blood flow meter.	[7M]
5.	a)	What are the types of defibrillators? Explain.	[7M]
	b)	What is the necessity of pacemaker? Explain the working principle of it.	[7M]
6.	a)	What are the components of biotelemetry system? Explain each briefly.	[7M]
	b)	What is the difference between MRI and CT scan? Explain.	[7M]
7.		Write notes on the following:	
	a)	Micro shocks and macro shocks	[7M]
	b)	Biopotential amplifier.	[7M]

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