Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech.**
PEI6J004

6th Semester Regular Examination 2017-18
BIOMEDICAL INSTRUMENTATION
BRANCH : AEIE, EIE, IEE
Time : 3 Hours
Max Marks : 100
Q.CODE : C436

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 **Answer the following questions : *multiple type or dash fill up type :*** **(2 x 10)**

a) ------ and ------ are some type of standards for medical devices.

b) For medical application the type of thermocouple is usually preferred is
a) T b) J
c) R d) S

c) Photomultiplier tubes are used as
a) source b) detector
c) source and detector d) none of these

d) Mostly Strain gauges in medical field used for --------- measurement.

e) Magneto-encephalograph signal from the brain is
a) Biomagnetic signal b) Bioacoustic signal
c) Bio-optical signal d) Bio-electric signal

f) Contraction of -------- results in generation of action potentials in EMG.

g) Example of an active transducer is-------.

h) -----, ------, -----, ----- parameters describe the dynamic characteristics of physiological transducers.

i) Alpha rhythm of EEG signal of a normal human being is of ------Hz.

j) The key features of instrumentation amplifiers are -----, ------, -----, -----.

Q2 **Answer the following questions : *Short answer type :*** **(2 x 10)**

a) What do you mean by Regulation of Medical devices?

b) What is an evoked potential?

c) What are polarization phenomena in bio-electric electrodes?

d) What is the difference between ECG, EEM and EMG electrodes in term of skin contact impedance?

e) What is the preferred value of CMRR for good medical recording system?

f) Which electrodes are used for EMG?

g) List the components of biosensors.

h) What are the types of photo electric cells?

i) What is refractory period?

j) What is faradic leakage resistance?

Part – B (Answer any four questions)

Q3 **a)** Name five types of bio-signals and explain their origin. **(10)**
Describe with suitable block diagram of a medical instrumentation system?

b) What is the significance of the following parameter in determining the performance of a medical instrument? **(5)**
-input impedance
-frequency response
-signal-to-noise ratio

Q4	**a)**	Draw the diagram for electrode-tissue interface for surface electrodes used with electrode jelly. Explain metal-electrolyte and electrolyte skin interface.	**(10)**
	b)	Define motion contact artifact and explain its origin. What is the common method for reducing motion artifact?	**(5)**
Q5	**a)**	Give a brief description of various types of electrodes used for ECG signals.	**(10)**
	b)	Describe the Electrodes used for EEG.	**(5)**
Q6	**a)**	What is the principle of strain gauge pressure transducer and explain their types briefly.	**(10)**
	b)	What is a 'thermistor' and what are their advantages over other type of temp. Transducer?	**(5)**
Q7	**a)**	What is a Biosensor? Describe with the help of a diagram the blood glucose biosensor.	**(10)**
	b)	Write short note on Photo emissive Cells.	**(5)**
Q8	**a)**	What are the general considerations for Signal conditioners used in medical instrumentation? Explain them in detail.	**(10)**
	b)	Describe the static characteristics of physiological transducers.	**(5)**
Q9	**a)**	List out and describe the various types of preamplifiers used in medical instrument, giving their important application areas.	**(10)**
	b)	Explain the common sources of noise in low level measurements?	**(5)**