Question Paper

Exam Date & Time: 21-Nov-2022 (09:00 AM - 12:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

MNIPAL INSTITUTE OF TECHNOLOGY
SEVENTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV/DEC 2022

Biomedical Instrumentation and Equipment [ICE 4064]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1)		Describe various problems encountered in measurement from physiological systems. Compare and contrast them with respect to those of physical systems. Illustrate the measurement of the electrical activity produced by skeletal muscles.[CO3, PO1, PO6, BL2]	(5)
	A)		
	B)	Explain the auscultatory method of blood pressure measurements with suitable waveform and diagrams.[CO2, PO1, BL1]	(3)
	C)	With a neat diagram, explain the difference between unipolar and augmented unipolar limb leads. [CO2, PO1, BL1]	(2)
2)		Draw a typical ECG waveform and mark the different waves and time intervals. Explain the importance of each wave. Also, comment on the significance of R-R interval in an ECG signal. [CO2, PO1, BL2]	(5)
	A)		
	B)	Name any six endoscopes used in the medical field. Also, give their applications.[CO1, PO1, BL1]	(3)
	C)	Mention the frequency range of the beta and the theta waves found in EEG signal. Also, write the characteristics of these waves.[CO3, PO1, PO6, BL1]	(2)
3)		Explain the use of electromagnetic induction principle in the measurement of blood flow. Derive the relationship between blood flow rate and induced e.m.f.[CO2, PO1, BL2]	(5)
	A)		
	B)	Differentiate surface electrodes and needle electrodes.[CO1, PO1, PO2, BL1]	(3)
	C)	What is the working principle of Nerve stimulator? Mention different current waveforms used in nerve stimulator.[CO3, PO1, PO6, BL1]	(2)
4)		Explain the working principle of MRI instrumentation system. List two applications of MRI imaging system.[CO5, PO1, PO6, BL1]	(5)
	A)		
	B)	How are X-rays produced? Explain the working of an X-ray machine with the help of a block diagram.[CO5, PO1, PO6, BL1]	(3)
	C)	Differentiate external and internal defibrillator with suitable diagrams.[CO4, PO1, PO6, BL2]	(2)
5)		Describe various scanning techniques used in computed tomography. How the progressive	(5)

A)	developments in scanning techniques have helped to reduce the scanning time? [CO5, PO1, PO2, BL2]	
B)	What is a heart lung machine? With a schematic, explain the functioning of the same.[CO4, PO1, PO6, BL1]	(3)
C)	Explain the working of an Apnoea monitor. [CO2, PO1, PO6, BL1]	(2)

-----End-----