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MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL

A Constituent Institution of Manipal University

SIXTH SEMESTER B.TECH. (INSTRUMENTATION & CONTROL ENGG.)

END SEMESTER EXAMINATIONS, JUNE 2017

SUBJECT: BIOMEDICAL INSTRUMENTATION [ICE 322]

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ❖ Answer **ANY FIVE FULL** questions.
- ❖ Draw labeled diagram wherever necessary.

- 1A. What is Synapse? Explain polarization, depolarization and repolarization of a cell within the body. 5
- 1B. With a block diagram, explain the functions of basic components of the Man Instrument system 3
- 1C. With the help of a neat sketch, label the structure of neuron. 2
- 2A. How heart lung machine can be used in open heart surgery? With a neat diagram, explain the working of heart lung machine and peristaltic pump 5
- 2B. What do you understand by 'Fibrillation'? Explain any one type of defibrillators with associated circuitry and waveforms. 3
- 2C. Differentiate between external and internal defibrillator electrodes. (2 difference) 2
- 3A. Explain the extracorporeal and intracorporeal dialysis with a neat schematic diagram. 5
- 3B. What is oximetry? Write an explanatory note on methods available for oximetry. 3
- 3C. Mention differences between Demand type & Atrial Synchronous pacemaker 2
- 4A. Define "blood pressure". Describe blood pressure measurement by direct and indirect measurement method. 5
- 4B. Explain working principle of electromagnetic blood flow meter with suitable diagram. 3
- 4C. In an electro- surgical unit, if power dissipation in 0.2 m^3 of tissue is 41.6 W , then calculate the current density. Assume tissue resistivity as $1.6 \times 10^3 \Omega \text{m}$. 2
- 5A. Justify that MRI is superior to any other imaging systems. Explain how longitudinal magnetization is developed in MRI? 5
- 5B. Describe principle of computerized Axial Tomography and compare it with conventional X-Ray imaging system. 3
- 5C. List the major differences between the fluoroscopy and radiography. 2
- 6A. Write a short note on: 5
 - a. Endoscopes
 - b. Neonatal Instrumentation
- 6B. What is lithotripsy? What are the advantages and disadvantages of lithotripsy? 3
- 6C. List two advantages of incubators 2