

(A constituent unit of MAHE, Manipal)

FIFTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.) END SEMESTER DEGREE EXAMINATIONS, NOVEMBER - 2019

SUBJECT: BIOMEDICAL INSTRUMENTATION [ICE 3102]

TIME: 3 HOURS

MAX. MARKS: 50

Instructions to candidates : Answer ALL questions and missing data may be suitably assumed.

- 1A. What are the advantages of using needle electrodes when compared to surface electrodes? List the types of surface electrodes.
- 1B. Draw and explain functions of different blocks of Electrocardiograph.
- 1C. How we can get truncated waveform in a cardiac defibrillator? Explain with a circuit diagram.
- 1D Explain working of competitive pacemaker with a block diagram.

(2+4+2+2)

- 2A Explain the procedure to remove kidney stone using ultrasound with suitable diagram.
- 2B Discuss in detail 10-20 electrode system used for recording of EEG.
- 2C Draw a typical ECG waveform and mark the different waves and time intervals. What do the different waves indicate? What is the significance of R-R interval in an ECG signal?

(3+4+3)

(3+4+3)

(3+4+3)

(3+3+4)

- 3A Derive an expression relating blood flow rate and induced emf with a suitable diagram.
- 3B What are the characteristics and uses of X-rays? With a block diagram explain different components of CT scanner.
- 3C Write short notes on ventillators and respirators.
- 4A Explain the following terms with respect to NMR imaging i) Free Induction Decay ii) Excitation iii) Emission
- 4B Explain with the help of a block diagram, working of MRI instrumentation system. List two application of MRI imaging system
- 4C With a block diagram explain different components of X-ray tube.
- 5A What is Incubator? Explain different types of Incubators.
- 5B Explain a non-invasive technique used to monitor the serum bilirubin level of a newborn baby.
- 5C Write short notes on the following
 - i) Apnea Monitor
 - ii) Endoscopes
