| Reg. No. | | | | | | | | | | |
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# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

*A Constituent Institution of Manipal University*

**FIFTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)**

**END SEMESTER EXAMINATIONS, NOV - 2017**

## SUBJECT: BIOMEDICAL INSTRUMENTATION [ICE 3102]

Duration: 3 Hour Max. Marks:50

**Instructions to Candidates:**

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

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| **1A** | With an equivalent circuit of biopotential electrode interface, explain how biopotentials are measured with two electrodes and also list different types of biopotential electrodes. | 4 |
| **1B** | What are different lead configurations used in ECG? Use Einthoven's triangle to explain the same. | 3 |
| **1C** | With neat sketch, explain the procedure of measuring EEG using 10-20 electrode system. | 3 |
| **2A** | What is synchronous pacemaker? List the different types and explain the working of atrial synchronous pacemaker with its block diagram and waveform. | 3 |
| **2B** | What is fibrillation? Explain the working of dual peak dc defibrillator with necessary figures. | 3 |
| **2C** | With necessary waveform, explain all the lung volumes and lung capacities with the specific values. | 4 |
| **3A** | Explain the principle of dialysis in artificial kidney. Draw the block diagram of artificial kidney and explain its functioning. | 3 |
| **3B** | Describe the working of Ultrasonic Doppler shift blood flow meter with its block diagram and derive an expression for measuring blood velocity using the same. | 4 |
| **3C** | Explain the working of different components present in model of heart-lung machine with its block diagram. | 3 |
| **4A** | Describe magnetic resonance phenomenon. Draw and explain the working of different components in MRI instrumentation | 4 |
| **4B** | What is stimulator? Describe the working of Electrodiagnostic/ therapeutic stimulator with the block diagram | 3 |
| **4C** | Draw the diagram of X-ray machine and elaborate the working of each component. | 3 |
| **5A** | What is computed tomography? Draw the block diagram of CT machine and mention the function of each part. | 4 |
| **5B** | List the different blocks in bedside monitoring system and explain the working of individual component with suitable diagram. | 3 |
| **5C** | What is lithotripsy? Explain various steps involved in extracorporeal shock wave lithotripsy with the diagram. | 3 |