



SEVENTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER EXAMINATIONS, NOV - 2017

SUBJECT: BIOMEDICAL EQUIPMENTS [ICE 4016]

Duration: 3 Hour

Max. Marks:50

Instructions to Candidates:

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

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| 1A | Draw an audiogram indicating normal and abnormal hearing level. What is cochlear implant? Explain with the help of a block diagram. | 5 |
| 1B | With a block diagram, explain how polyvinylidene difluoride (PVDF) is used to detect apnea in infants. | 3 |
| 1C | Distinguish between pure tone audiometer and speech audiometer. | 2 |
| 2A | Explain the working of microprocessor controlled ventilator with the help of a block diagram. | 5 |
| 2B | What is a pneumotachometer and what for it is used? Explain the construction and working of Fleisch pneumotachometer. | 3 |
| 2C | Classify the ventilators based on the type of safety limit. | 2 |
| 3A | What is 'M' mode display in an ultrasound system? Name the instrument used in medical practice based on M-mode display. Describe its working with the help of a block diagram. | 5 |
| 3B | What are the hazards associated with the use of electro surgery units? How can high frequency circuit hazards be minimized? Explain with the help of a diagram. | 3 |
| 3C | Name two main applications of helium-neon laser? | 2 |
| 4A | Why a humidifier is used in anesthesia machine? What are the various major sub-systems in an anesthesia machine? Explain the function of each | 5 |
| 4B | What is the principle of dialysis in the artificial kidney? Explain three types of dialyzers construction and principle of operation. | 3 |
| 4C | Differentiate between incubator and radiant warmer | 2 |
| 5A | Explain the following: <ul style="list-style-type: none"> I. Non-invasive technique used to monitor the serum bilirubin level. II. Membrane and Film Oxygenator III. volumetric infusion pump | (2+2+2) |

- 5B** What is the basis of thermal imaging system? Draw a diagram showing spectral distribution of infrared emission from human skin with respect to visible range. 2
- 5C** Differentiate the mechanical and tissue heart valves. 2
