



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

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

END SEMESTER DEGREE EXAMINATIONS, NOVEMBER - 2019

SUBJECT: BIOMEDICAL EQUIPMENTS [ICE 4016]

TIME: 3 HOURS

MAX. MARKS: 50

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

- 1A. Explain the terms inspiratory and expiratory reserve volumes with respect to a human lung.
- 1B. What are the different modes of operation of ventilators? Explain briefly.
- 1C. With the help of a neat block diagram explain the principle and working of cochlear implants. (2+3+5)
- 2A. Explain how evaluation of air and bone conduction of sound assists the clinical diagnosis of hearing problems.
- 2B. What are the main elements of a Laser unit? Enumerate the factors that contribute to the Laser properties.
- 2C. With the help of a neat diagram explain the principle of surgical diathermy. (2+3+5)
- 3A. List any two medical applications of Ruby Laser.
- 3B. Explain pulse echo system with the help of a neat block diagram. What are its applications?
- 3C. With the help of a neat block diagram, explain the principle and functioning of artificial kidney. (2+4+4)
- 4A. What are the basic components of lithotripsy machine? Explain each one briefly.
- 4B. What is an incubator? Explain how proportional controllers are used for controlling temperature in incubators.
- 4C. What are the basic elements required for intensive care monitoring in cardiac care units? (4+3+3)
- 5A. What is infrared thermography? Mention its advantages.
- 5B. Describe the different types of infusion pumps.
- 5C. With the help of a neat block diagram explain the principle and functioning of Coulter counter method for blood cell counting. (2+3+5)
