Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

SEVENTH SEM B.TECH (INSTRUMENTATION & CONTROL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: BIOMEDICAL EQUIPMENTS [ICE 433]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.

1A.	How the clinically essential potentials can be evoked from the human brain in order to assess any pathology in the auditory cortex? Explain in detail.	**5**
1B.	What is the normal audio range? Write a note on an implantable hearing aid which uses bone conduction to transmit the sound signals.	**3**
1C.	What is a bionic ear? Draw an audiogram indicating normal and abnormal hearing level.	**2**
2A.	With a neat block diagram, describe the working of electrosurgical machine. Also explain any two modes of operation of the Electro Surgical Unit.	**5**
2B.	Explain CO_2 method of respiration rate measurement	**3**
2C.	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 X 10^3 Ωm.	**2**
3A.	Draw the energy level diagram and explain the construction and working of Ruby laser. Also mention its applications.	**5**
3B.	With a block diagram, explain how polyvinylidene difluoride (PVDF) is used to detect apnea in infants.	**3**
3C.	It takes 0.2 msec for the sound to travel from the ultrasound probe to a baby's heel and back again. If the sound travels at 1500m/sec inside the body, how far is the baby's foot below the mother's skin?	**2**
4A.	Mention any two flammable anesthetics. Describe the working of anesthesia equipment.	**5**
4B.	With neat figures, explain the two types of caged ball valves in detail.	**3**
4C.	List the basic requirements associated with an ideal heart-lung machine.	**2**
5A.	Draw and explain how blood leakage and temperature of dialysate is controlled in a hemodialyser?	**5**
5B.	List the basic requirements associated with an ideal heart-lung machine.	**3**
5C.	Differentiate the mechanical and tissue heart valves.	**2**
6A.	What is hematocrit? Explain the electrical conductivity method for blood cell counting.	**5**
6B.	Write a note on programmable volumetric controller used in the infusion pumps.	**3**
6C.	Give four medical applications of Thermography.	**2**