Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal 576104)

VII SEMESTER B.Tech.(BME) DEGREE MAKE-UP EXAMINATIONS DEC/JAN 2019-20
SUBJECT: MEDICAL EQUIPMENTS (BME 4103)
(REVISED CREDIT SYSTEM)
Saturday, 28th December 2019: 2 PM to 5 PM

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to Candidates:

1. **Answer all the questions.**
2. **Draw labeled diagrams wherever necessary.**

1.	(a)	Differentiate 'Thorpe' flowmeter from 'Pressure compensated' flowmeter. Discuss the principle of working of gas regulators used in O_2 therapy unit.	01+03
	(b)	(i) List the advantages and disadvantages of body- level and ear-level hearing aids.	01
		(ii) Compare the different types of negative pressure ventilators.	02
	(c)	Identify and explain the therapy unit that can be used in conditions resulting from O_2 deficiency.	03
2.	(a)	Differentiate monopolar and bipolar techniques used in ESU, and explain the principle behind Electrosurgical technique.	01+02
	(b)	(i) Calculate the sound pressure level (in dB) of a subject, given the measured sound pressure is 0.06 Pa and the threshold of normal hearing is 20 µPa.	02
		(ii) Discuss the advantage of using an adaptive variable threshold for apnea detection.	02
	(c)	With a neat figure, explain the closed circuit anesthesia machine with the vaporizer inside the circle circuit.	03
3.	(a)	(i) Explain the parts and working of a wireless endoscope.	03
		(ii) With a neat figure, explain the principle of Extracorporeal shock wave lithotripsy.	03
	(b)	(i) Discuss the advantages of thermography over other imaging modalities.	02
		(ii) Explain the different medical applications of thermography.	02

4. (a) (i) With a neat figure, explain the working principle of Cathode Ray Tube used as display in ultrasound. 04

(ii) Find the attenuation of a 1 MHz ultrasound passing through 3cm of water. 01

(b) (i) It takes 0.2 msec for the sound from ultrasound probe to travel to a baby's heel and back again. If the sound travels at 1540 m/sec inside the body, how far is the baby's foot below the mother's skin. 02

(ii) With a neat figure, explain the coulter counter method for blood cell counting. 03

5. (a) Explain the principle of membrane oxygenators and define percentage saturation of Hb. 03+02

(b) With a neat figure, discuss the parts and working of a hemodialysis machine. 05