Reg. No.					



## MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal 576104)

### V SEMESTER B. TECH DEGREE END-SEMESTER EXAMINATIONS JANUARY 2021

### SUBJECT: BIOMEDICAL INSTRUMENTATION II (BME 3152)

(REVISED CREDIT SYSTEM)

# Saturday, 2<sup>nd</sup> January 2021: 2 PM to 5 PM

#### TIME: 3 HOURS

MAX. MARKS: 50

Instructions to Candidates:					
<ol> <li>Answer ALL questions.</li> <li>Draw diagram wherever necessary.</li> </ol>					
1.	(a)	Identify and explain the therapy unit that can be used in conditions resulting from $O_2$ deficiency.	(5)		
	(b)	What are the problems caused by hyperbilirubinemia? Explain how the levels of bilirubin can be monitored in neonates non-invasively.	(3)		
	(c)	Write a note on the channels and valves of endoscopes. What is the diameter (range) of the routine upper endoscope?	(2)		
2.	(a)	Explain the principle and the instrumentation involved in the Atomic absorption spectroscopy	(5)		
	(b)	What are the different signs used to identify the depth of anesthesia.	(3)		
	(c)	Differentiate cutting mode from coagulation mode in Electrosurgical unit.	(2)		
3.	(a)	With a neat figure, explain the parts and working of a thermography equipment. Also, compare the different detectors used in thermographs	(5)		
	(b)	Explain the steps involved in signal processing and scan conversion process in an ultrasound equipment.	(3)		
	(c)	Discuss the advantages of thermography over other imaging modalities.	(2)		
4.	(a)	With a neat figure, explain the hemodialysis machine in detail.	(5)		

	(b)	What are the problems encountered due to direct contact of blood and gas in an oxygenator. Which type of oxygenator can be used to avoid these problems, explain the same in detail.	(3)
	(c)	Calculate the power dissipated in 0.2 m <sup>3</sup> of tissue having a resistivity of 1.6 x 103 $\Omega$ m (Given the current density to be 0.36 A/m <sup>2</sup> ).	(2)
5.	(a)	What are the drawbacks of the microscopic method of blood cell counting? With a neat figure, explain how laser can be used to count the blood cells.	(5)
	(b)	Explain the B-mode and M-mode of ultrasound scan in detail along with few medical applications of the same.	(3)
	(c)	Compare percutaneous ultrasonic lithotripsy from water-bath lithotripsy	(2)