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MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal 576104)

I SEMESTER M.Tech.(BME) DEGREE END SEMESTER EXAMINATIONS, NOVEMBER 2019 SUBJECT: BIOMEDICAL INSTRUMENTATION (BME 5154) (REVISED CREDIT SYSTEM) Tuesday, 19th November 2019: 2 pm to 5 pm

TIME: 3 HOURS

MAX. MARKS: 50

Instructions to Candidates:					
 Answer all the questions. Draw labeled diagrams wherever necessary. 					
1.	(a)	Describe unipolar limb and chest lead systems used in ECG.	03		
	(b)	Discuss the working principle of Silver/Silver chloride electrode (Ag/AgCl).	02		
	(c)	Illustrate and interpret in detail the equivalent circuit for an electrode- skin interface.	05		
2.	(a)	State the principle of Nd-YAG laser operation.	03		
	(b)	Explain the working principle of a basic hemodialyzer system with block diagram	05		
	(c)	Describe the components of scavenging unit in an anesthesia machine.	02		
3.	(a)	Show the importance of kt/V calculation for dialysis adequacy in hemodialysis with an example.	03		
	(b)	Explain the working principle of electrosurgical unit with block diagram	05		
	(c)	Elaborate the principle of counter current flow in relation to the working of oxygenators.	02		
4.	(a)	Explain the working principle of atrial synchronous pacemaker with block diagram	03		
	(b)	Discuss the principle and advantages of laser scanning confocal microscopy imaging.	05		
	(c)	Explain two different schemes for the placement of resuscitation electrodes in a defibrillator.	02		

5.	(a)	Demonstrate the difference between T1 and T2 weighted Magnetic Resonance Imaging with an example of brain imaging.	05					
	(b)	Describe the working principle of microbolometer for thermal imaging.						
	(c)	Differentiate the different types of magnets that can be used in MR imaging.	02					