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**Question Paper Code: 55503**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Fifth Semester

Electronics and Instrumentation Engineering

15UEI503 - BIOMEDICAL INSTRUMENTATION

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The main advantage of instrumentation amplifier is CO1- R  
(a) Low input impedance (b) High bias and offset currents  
(c) High CMRR (d) Low slew rate
2. \_\_\_\_\_ electrode is used for the measurement of more than one ions CO1-U  
present in the physiological measurement.  
(a) Glass (b) Micro  
(c) Body surface (d) Specific ion
3. The Lead vector for lead I, II, III in ECG is CO2-U  
(a) 0, 60, 120 Deg (b) 30, 60, 0 Deg (c) 0, 30, 60 Deg (d) 30, 60, 90 Deg
4. Johnson Noise is otherwise called as \_\_\_\_\_ noise. CO2- R  
(a) SHOT (b) Flicker (c) Thermal (d) Environmental
5. Which one of the following condition will not a cause of respiratory CO3- R  
alkalosis?  
(a) Fever (b) Anxiety  
(c) Laryngeal obstruction (d) Salicylate toxicity
6. Homeostatic regulation of the cardiovascular system is designed to CO3- R  
maintain \_\_\_\_\_  
(a) Constant blood volume (b) Constant arterial blood pressure  
(c) Constant cardiac output (d) Constant venous blood pressure

7. If the defibrillator detects fibrillator, the capacitors with the device charged up to \_\_\_ CO4- R  
 (a) 100 V (b) 250 V (c) 375 V (d) 750 V
8. Biological tissues are coagulated by thermal means if the requisite temperature is maintained at CO4 -R  
 (a) 67°C (b) 60°C (c) 70°C (d) 77°C
9. Which of the following is not a factor determining spatial resolution? CO5 -R  
 (a) Frequency (b) Transmit intensity (c) Pulse interval (d) Acquisition
10. X-ray machines operating at tube voltages in the range of CO5- R  
 (a) 100KV (b) 600 KV (c) 1000KV (d) 400KV

PART – B (5 x 2= 10Marks)

11. If the net flow of ionic change in an action potential goes up only to charge the membrane capacitance ( $C = 1\mu\text{F}/\text{cm}^2$ ) calculate the net micro moles transferred per unit action potential rising from  $-50\text{ mV}$  to  $+65\text{ mV}$ ? CO1 -Ana
12. List the different types of needle electrode. CO2- R
13. Define cardiac output. CO3- R
14. Define defibrillator analyzers. CO4- R
15. Analyze the biological effects of NMR imaging. CO5-Ana

PART – C (5 x 16= 80Marks)

16. (a) Explain in detail about the electrical activities associated with bioelectric signals. CO1- U (16)
- Or
- (b) What is the diameter of the tip of micro electrode? Why it should be so small explain? CO1-U (16)
17. (a) Illustrate the 10-20 lead configuration measurement of EEG measurement, with neat sketch. CO2- U (16)
- Or
- (b) Explain the electrode configuration, recording methods and waveforms of EMG. CO2- U (16)
18. (a) Illustrate the any two methods of respiratory rate measurement CO3-U (16)

Or

(b) Explain the any two methods of blood pressure measurement. CO3-U (16)

19. (a) Analyze the physiological effects of electric current on human body. CO4- U (16)

Or

(b) Explain the important safety consideration in all bio-equipped devices in hospitals. CO4-U (16)

20. (a) Explain in detail about Computer Tomography with neat sketch CO5- U (16)

Or

(b) Explain the working principle of X – Ray machine. CO5- U (16)

