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Reg. No. : | | | | | | | | | | |

Question Paper Code: 99422

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Elective

Electronics and Communication Engineering

19UEC922– Biomedical Instrumentations

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The bio electric generator of heart is situated at CO1-U

   (a) Aortic value (b) SA node (c) AV node (d) The brain

2. Which amplifier has a limited frequency response? CO2-U

   (a) differential amplifier (b) dc amplifiers

   (c) accoupled amplifiers (d) carrier amplifiers

3. Electrodes to measure EEG are placed on _____ CO3-U

   (a) forehead (b) scalp (c) cheek (d) ears

4. The efficiency of X-rays machines is about _____ CO4- U

   (a) 80% (b) 50% (c) 20% (d) about 1%

5. Each of the following are well-known examples of circuit protection devices, EXCEPT: CO2- U

   (a) ground Fault Circuit Interrupters (GFCI). (b) circuit breakers

   (c) capacitors. (d) fuses.

PART – B (5 x 3= 15 Marks)

6. What do you mean by photoelectric effect?. CO1- U

7. Draw EINTHOVEN TRIANGLE and how it is used in ECG measurement CO2- App

8. What are the applications of EEG? CO3- U

9. What is mean by PET? CO4- U

10. What is the need for earthing of medical instruments? CO5- U

PART – C (5 x 16= 80 Marks)

11. (a) A differential capacitor consists of three metal plates each with an area of 3 cm2in air. Compute the equilibrium capacity for an equilibrium displacement of 1.5 mm. also calculate the sensitivity of this transducer when it is connected with the bridge having ac bias of 15 volts. CO1- App (16)

Or

(b) Calculate the half cell potential drop from the aluminium to the silver assuming that both the metals are immersed in an electrolyte and separated by a large distance. Given: Half cell potentials of aluminium and silver are -1.7V and +0.8V respectively at 25Celsius. CO1- App (16)

12. (a) In case of ultrasonic blood flow meter, using transit time method, the timer in that flow meter gives the difference between upstream and downstream transit times as 1.7 nanoseconds and the angle between the direction of the flow and the central axis of the ultrasonic beam is about 15degree. The perpendicular distance between the transmitting and receiving transducers situate on the blood vessel is about 2 cm. the ultrasonic velocity in blood is 1500m/s. Calculate the velocity of the blood flow in that vessel. CO2- App (16)

Or

(b) In the case of indicator dilution method for the cardiac output measurement, 10 mg of indicator dye injected. The area under the dilution curve is found to be 150 mgs/litre. Calculate the cardiac output per minute. CO2- App (16)

13. (a) Describe the EEG electrode lead system with unipolar, bipolar and average modes of measurement. CO3- App (16)

Or

(b) Describe the 10-20 electrode system used in EEG and give the uses of EEG waveforms. CO3- App (16)

14. (a) Justify the following statements: MRI is superior than the other imaging techniques. CO4- U (16)

Or

(b) Discuss in detail about applications of LASER in medicine. CO4- U (16)

15. (a) Explain how the electrical hazards protection can be provided in the biomedical instrumentation systems. CO5- U (16)

Or

(b) Explain the electrical nature of natural pacemaker. CO5- U (16)