

Reg. No.

Question Paper Code

11907

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Sixth Semester

Instrumentation and Control Engineering

(Common to Electronics and Instrumentation Engineering)

20ICPC602 - BIOMEDICAL INSTRUMENTATION

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART -A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|--|-------------------------------|
| 1. Mention the basic components of biomedical systems. | 2,K1,CO1 |
| 2. Why is skin temperature lower than systematic temperature measured orally? | 2,K2,CO1 |
| 3. Calculate the cardiac output in ml/minutes of a person if his heart rate is 70bpm and stroke volume is 65 ml. | 2,K2,CO2 |
| 4. How will you measure the GSR from a subject. | 2,K2,CO2 |
| 5. Define electrode. Name the types of electrodes used in bipolar measurement. | 2,K1,CO3 |
| 6. Enlist the electrodes used for recording ERG. | 2,K1,CO3 |
| 7. Interpret the need for endoscopes and mention some of its types. | 2,K2,CO4 |
| 8. Outline the principle of thermograph. | 2,K2,CO4 |
| 9. List the types of electrodes used in a defibrillator? | 2,K1,CO5 |
| 10. Specify the different type of oxygenators used in heart lung machine? | 2,K1,CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Explain the mechanism of generation of action potential and write the necessary equations and mention the different stages of action potential. 13,K2,CO1
- OR**
- b) Give a brief note on the following:
- (i) Ultrasonic transducers. 7,K2,CO1
- (ii) Piezo electric transducers. 6,K2,CO1
12. a) Describe the various indirect methods of blood pressure measurements with necessary diagrams. 13,K2,CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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OR

- b) (i) Examine the measurement of pH of blood using PH meter. 6,K2,CO2
(ii) Describe the plethysmograph method of measuring the total lung capacity. 7,K2,CO2

13. a) (i) Inspect in detail about the 10-20 lead system of recording EEG. 8,K2,CO3
(ii) Outline the typical recording setup of EMG. 5,K2,CO3

OR

- b) What are the methods by which the electrical safety of the patient in the hospital is ensured? Discuss in detail. 13,K2,CO3

14. a) Explain the principle of fluoroscopic technique with a neat diagram. 13,K2,CO4
What is the need for interfacing image intensifier with the fluoroscopic instruments? Explain it with the suitable diagram.

OR

- b) Discuss the details of the design of the bio-telemetry circuit and what are the uses of bio-telemetry. 13,K2,CO4

15. a) Draw the block diagram of arterial and ventricular triggered pacemaker and explain its operation. 13,K2,CO5

OR

- b) Evaluate the principle of dialysis in the artificial kidney. Explain the construction and principle of different types of dialyzers. 13,K2,CO5

PART - C (1 × 15 = 15 Marks)

16. a) Explain in detail metal microelectrode and non metallic micro electrode used to measure the bio electric potentials near or within a single cell. 15,K3,CO3

OR

- b) Elaborate in detail the pacing modes of cardiac pacemakers with necessary diagrams. 15,K3,CO5