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BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DBME – FOURTH SEMESTER EXAMINATION

BIOMEDICAL INSTRUMENTATION

Time : 3 Hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. State physiological signals, their amplitude and frequency ranges.

2. List the constraints while measuring physiological variables.

3. Write the applications of LVDT.

4. State Seebeck and Peltier effect.

5. State the principle of photo-voltaic transducer.

6. Define the term offset voltage.

7. Write the advantages of chopper amplifier.

8. Draw the circuit diagram of differential amplifier using op-amp.

9. Write the applications of thermal recorders.

10. Classify recorders based on the frequency response.

PART—B

8×5=40

Instructions : (1) Answer **all** questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. *(a)* Explain the static characteristics of medical instrumentation system.

(OR)

(b) Explain any four constraints while measuring physiological variable.

12. *(a)* Explain the working principle of variable capacitance transducer.

(OR)

(b) Explain the constructional details and operating principles of strain gauge.

13. *(a)* Explain the electrode-skin interface.

(OR)

(b) Explain the equivalent circuit of a surface electrode in contact with skin.

14. *(a)* Explain the circuit diagram of carrier amplifier.

(OR)

(b) Explain the working of optical coupled isolation amplifier.

15. *(a)* Explain the working principle of an ink-jet recorder.

(OR)

(b) Explain the significance of CRO in biomedical field.

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) The question carries **ten** marks.

(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. Design instrumentation amplifier using op-amp and derive its gain.

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