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Question Paper Code: 93B06

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

Third Semester

Biomedical Engineering

19UBM306 - SENSORS AND MEASURING TECHNIQUES

(Regulation 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

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|-----------------------------------------------------------------|-------|
| 1. Define Transducer | CO1 U |
| 2. Differentiate transducer and inverse transducer | CO1 U |
| 3. Define strain | CO2 U |
| 4. What are the 2 types of temperature coefficients | CO2 U |
| 5. Photo multiplier –state the naming reason | CO3 U |
| 6. Define Dark Resistance of Photo transducer | CO3 U |
| 7. List the basic components of measuring Bridge circuit | CO4 U |
| 8. What is impedance, can we measure impedance using DC Bridge? | CO4 U |
| 9. What are the applications of CRO? | CO5 U |
| 10. Define Deflection sensitivity of CRO | CO5 U |

PART – B (5 x 16= 80Marks)

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|----------------------------------------------------------------------------------------------|--------|------|
| 11. (a) (i) With necessary diagram explain the basic functional blocks of a measuring system | CO1- U | (8) |
| (ii) List the various types of Instruments | CO1- U | (8) |
| Or | | |
| (b) Explain Static and dynamic characteristics of a transducer | CO1- U | (16) |
| 12. (a) (i) Explain in detail different types of Strain gauge with neat diagram | CO2- U | (8) |
| (ii) With necessary diagram explain the principle and working of thermocouple | CO2- U | (8) |

Or

- (b) (i) Derive the equation for gauge factor CO2- App (8)
(ii) Explain how LVDT is used for measuring displacement and direction with neat diagrams CO2- U (8)
13. (a) (i) With necessary diagrams Explain the following transducers CO3- U (8)
(i) Phototube
(ii) Photo multiplier
(iii) Photovoltaic Cell
(ii) What is scintillation counter, how it is used as a transducer for measurement CO3- U (8)
- Or
- (b) (i) With neat diagram explain Ultrasound transducer CO3- U (8)
(ii) Write short notes on Nano sensors CO3- U (8)
14. (a) (i) Which bridge is used for measuring frequency, Explain CO4- Ana (8)
(ii) A highly sensitive galvanometer can detect a current as low as 0.1nA. This galvanometer is used in a Wheatstone bridge as a detector. Each arm of the bridge has a resistance of 1K Ω . The input voltage applied to the bridge is 20V. Calculate the smallest change in resistance which can be detected. The resistance of the galvanometer can be neglected as compared with the internal resistance of bridge CO4- App (8)
- Or
- (b) Explain two different types of Schering Bridge for Inductance measurements and Derive their balancing equations CO4- U (16)
15. (a) With neat diagram explain dual beam and dual trace CRO CO5- U (16)
- Or
- (b) (i) With necessary diagrams explain the vertical and horizontal deflection system of a CRO CO5- U (8)
(ii) Write short notes on Magnetic Tape Recorders CO5- U (8)