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Question Paper Code: 1064197

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV/ DEC 2024

Fourth Semester

Electronics and Communication Engineering

U20EC412 - SENSORS AND TRANSDUCERS

(Regulation 2020)

Time: Three Hours

Maximum: 100 Marks

Answer ALL questions

PART – A

(10 x 2 = 20 Marks)

1. Define a measurement system.
2. Why is it important to select a suitable transducer for a specific application?
3. How does a strain gauge work in measuring mechanical strain?
4. How does a piezoelectric transducer convert mechanical energy into electrical energy?
5. Define a load cell and describe its working principle.
6. Define a current sensor and explain its role in measuring electrical current.
7. What is a photoconductive cell and how does it work?
8. What is the function of tactile sensors in robotics?
9. What is the basic principle of amplification in electronic circuits?
10. How are filtering circuits used in home appliances?

PART – B

(5 x 16 = 80 Marks)

11. (a) Explain the concept of measurement and the elements of a measurement system. Discuss the importance of each element in ensuring accurate measurements.(16)

(OR)

- (b) Compare and contrast the static and dynamic characteristics of measurement systems. Discuss the significance of each in real-world applications. (16)

12. (a) Explain the working principle and applications of LVDTs and Eddy current transducers in position and displacement measurement. Include a discussion on their advantages and limitations. (16)

(OR)

- (b) Explain the principles and applications of Hall effect and optical transducers in measuring physical parameters such as magnetic fields and light intensity. (16)

13. (a) Explain the principle of a strain gauge and discuss its working mechanism, types, and common applications. (16)

(OR)

- (b) Explain the principle of operation of a gyroscope and its different types. Discuss its role in inertial measurement systems and other applications. (16)

14. (a) Design a small-scale solar-powered sensor system using photovoltaic cells. Describe how the system would operate, considering factors like sunlight intensity and sensor power requirements. (16)

(OR)

- (b) Design a laser-based sensor system for distance measurement in autonomous vehicles. Discuss how the laser sensor's data would be used in real-time navigation and obstacle detection. (16)

15. (a) Explain the working of a sample-and-hold circuit. Analyze its significance in analog-to-digital conversion systems, particularly in data acquisition systems. (16)

(OR)

- (b) Apply your knowledge of data acquisition, logging, and filtering to design an environmental monitoring system for air quality. (16)

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