

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (R,S), MAY 2024**ROBOTICS AND AUTOMATION****(2020 SCHEME)****Course Code : 20RBT312****Course Name: Sensors and Transducers****Max. Marks : 100****Duration: 3 Hours****PART A*****(Answer all questions. Each question carries 3 marks)***

1. Illustrate the working of Global Positioning System.
2. How proprioceptive sensors differ from exteroceptive sensors?
3. Define Proximity Sensing.
4. Explain the working principle of a laser range finder.
5. Enumerate the process of masking in Image processing.
6. Explain the working principle of CCD camera.
7. What are Piezoelectric transducers?
8. Differentiate analog and digital transducers with examples.
9. State Seebeck effect with a neat diagram.
10. How flow rate is measured in Venturi Tube?

PART B***(Answer one full question from each module, each question carries 14 marks)*****MODULE I**

11. a) Explain the following sensor specifications with neat sketches.
(i) Hysteresis (10)
(ii) Non linearity
(iii) Accuracy
b) Explain the working of a compass sensor with applications. (4)

OR

12. a) Explain the working of an optical absolute encoder. How the number of tracks and sectors of absolute encoder is related to the resolution of the encoder? (10)
b) List the applications of Inertial Measurement Unit. (4)

MODULE II

13. a) Differentiate between Contact and Non-Contact Sensors. (4)

- b) List the sensors used to detect closeness of objects and explain how it is computed? (10)

OR

14. a) Explain the working of Semiconductor displacement sensors with proper diagram. List down its applications. (10)
b) Explain the applicability of an IR sensor to distinguish between black and white colours. (4)

MODULE III

15. a) What is Thresholding in vision systems? (4)
b) Which are the elements of a vision sensor? How will you extract features using vision sensor? (10)

OR

16. a) Illustrate the working of a Machine Vision System with a neat diagram and list down its applications. (8)
b) Explain the working of a Kinect Sensor and its applications. (6)

MODULE IV

17. a) What are transducers? What are its classifications? (5)
b) With neat diagrams explain the following transducers (i) Position transducer (ii) Velocity transducer (iii) Force Transducer. (9)

OR

18. a) What is LVDT? What are the parameters that can be measured by this? Describe with a neat diagram how displacement is measured using LVDT. (10)
b) Illustrate the working of any one type of accelerometers. (4)

MODULE V

19. What are Thermistors? Explain how temperature is measured using Thermistors. Describe different types of Thermistors. (14)

OR

20. Explain the working of following transducers with neat diagram: (i) Pressure transducer (ii) Level transducer (14)
