Reg. No. : | | | | | | | | | | | | |

Question Paper Code : X10815

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Fifth/Seventh Semester
Civil Engineering
OAN551 – SENSORS AND TRANSDUCERS
(Common to Automobile Engineering/Industrial Engineering and Management/ Materials Science and Engineering/Robotics and Automation Engineering/Food Technology/Information Technology/Pharmaceutical Technology/Computer Science and Engineering/Computer and Communication Engineering/Manufacturing Engineering/Marine Engineering/Mechatronics Engineering/Production Engineering/ Biotechnology/Aerospace Engineering, Mechanical Engineering (Sandwich))
(Regulations 2017)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. State the types of instrumental errors.
2. Differentiate accuracy and precision.
3. Define the principle of operation of RVDT with neat sketch.
4. State the principle of operation of LIDAR.
5. Define Hall effect.
6. What are the advantages of magnetic sensors ?
7. Define Photovoltaic effect.
8. Enumerate the components of the fiber optic sensors.
9. State the function of sample and hold circuits in DAQ system.
10. List the role of data logging system in aerospace applications.

PART – B **(5×13=65 Marks)**

11. a) Discuss in detail the desirable and undesirable static characteristics of transducers. **(13)**

(OR)

b) Enumerate the sensor calibration techniques and explain the salient features of static calibration technique in detail. **(13)**

12. a) Analyse the working principle of bluetooth range sensor with neat sketch. **(13)**

(OR)

b) Explain the principle of operation of any two types of encoders with neat sketch. **(13)**

13. a) Evaluate the principle of operation of load cell for the measurement of force. **(13)**

(OR)

b) Discuss the principle and operation of a gyroscope. **(7)**
Compare Free gyroscope and single-axis restrained gyroscope. **(6)**

14. a) Discuss in detail the principle of operation of different types of pressure sensors with neat sketch. **(13)**

(OR)

b) State the advantages of using LASER in flow measurement and explain working principle of LASER Doppler Velocimeter with neat sketch. **(3+10)**

15. a) Explain the working principle and applications of an instrumentation amplifier with neat diagram and deduce the expression for gain. **(10+3)**

(OR)

b) Explain the purpose of using a pyroelectric IR sensor in microwave oven. Discuss the operation of water level sensor used in washing machines. **(7+6)**

PART – C **(1×15=15 Marks)**

16. a) Deduce the limiting error of two resistors connected in series and parallel combinations having resistance values of 48 ohms ± 5% and 82 ohms ±10%, respectively. **(15)**

(OR)

b) Analyse the different standards involved in Smart Transducer interface and justify the requirement of standardization. **(15)**

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