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

Question Paper Code: U7301

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Professional Elective

Mechanical Engineering

21MEV301 – SENSORS AND INSTRUMENTATION

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. Which of the following output signal types is NOT typically associated with sensors? CO1-U

   (a) Voltage (b) Current (c) Frequency (d) Mass

2. A sensor that outputs a voltage proportional to the temperature is called: CO1-U

   (a) Digital sensor (b) Analog sensor (c) Passive sensor (d) Capacitive sensor

3. What type of sensor is used for real-time location tracking in devices? CO2-U

   (a)Bluetooth (b)LVDT (c)Synchro (d)Potentiometer

4. Which sensor emits a laser beam to determine distance? CO2-U

   (a)Ultrasonic sensor (b)Reflective beacon (c)Laser Range Sensor (d)GPS

5. What does an inclinometer measure? CO1-U

   (a) Temperature (b) Acceleration (c) Angle of tilt (d) Magnetic field

6. Which type of sensor is typically used for heading detection in navigation systems? CO1-U

   (a) Strain gauge (b) Compass (c) Load cell (d) Optical sensor

7. Which sensor type can detect radiation levels? CO1-U

   (a) Smart sensor (b) Film sensor (c) MEMS sensor (d) Laser sensor

8. Which of the following sensors utilizes laser technology for measurements? CO1-U

(a) Fiber optic sensor (b) MEMS sensor (c) Laser sensor (d) Acoustic sensor

9. A typical application of data acquisition in manufacturing is: CO1-U

(a) Real-time temperature and pressure monitoring

(b) Noise reduction in engines

(c) Signal processing for Wi-Fi

(d) Frequency modulation

10. In multi-channel data acquisition, the use of a multiplexer helps to: CO1-U

(a) Amplify signals (b) Filter noise

(c) Switch between multiple signal inputs (d) Hold the signal

PART – B (5 x 2= 10 Marks)

11. Mention the purpose of measurement. CO1-U

12. Describe the various applications of resolver. CO2-U

13. Describe the significance of Gyroscope? CO1-U

14. Compare on how a thermistor differs from a thermocouple as a temperature sensor? CO1-U

15. Demonstrate the application of static pressure sensors in aerospace applications. CO1-U

PART – C (5 x 16= 80 Marks)

16. (a) Define Insulating material. Also explain its type with temperature stability CO1 - U (16)

Or

(b) Explain in detail the types of static error CO1 - U (16)

17. (a) Compare translational and rotary encoders with necessary sketches. CO2 - U (16)

Or

(b) Explain the working of GPS as range sensors. CO2 - U (16)

18. (a) Describe the construction and working of strain gauge. CO2 - U (16)

Or

(b) Describe the construction and working of load cell. CO2 - U (16)

19. (a) Explain the working principle of photo conductive cell. CO2 - U (16)

Or

(b) Explain the various types of temperature transducer. CO2 - U (16)

20. (a) Explain the applications of DAS in Aerospace industry CO2 - U (16)

Or

(b) Explain the applications of DAS in Manufactureing CO2 - U (16)