Reg. No. :

Question Paper Code:R3706

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

Third Semester

Mechanical Engineering

R21UME306-MEASUREMENTS AND INSTRUMENTATION

(Regulations R2021)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The degree of closeness of the measured value of a certain quantity   CO1-U
    with its true value is known as _____

    (a) Accuracy   (b) Precision   (c) Standard   (d) Sensitivity

2. The ability by which a measuring device can detect small differences   CO1-U
    in the quantity being measured by it, is called its

    (a) Damping   (b) Sensitivity   (c) Accuracy   (d) None of the above

3. The following is not used to measure angles _____   CO1-U

    (a)Bevel protectors   (b) Calibrated levels (c) Clinometers   (d) Optical flats

4. Which method gives accurate results when effective diameter is   CO1-U
    measured without considering the thread angle?

    (a) Two wire method   (b) Three wire method

    (c) Best wire size   (d) All of the above

5. Which of the following is a contact type of automated inspection   CO1-U
    method?

    (a) Inspection probe   (b) Laser scanning   (c) Electric field   (d) All of the above

6. Which of the following image processing approaches is the fastest,   CO1-U
    most accurate, and flexible?

    (a) Photographic   (b) Electronic   (c) Digital   (d) Optical

7.   Bourdon tube sensors are used for the measurement of   CO1-U

     (a) Gauge pressure   (b) Condensation temperature

     (c) Concentration of suspended materials in air   (d) Humidity

8.   Which of the following is used as indication instrument in a liquid   CO1-U
     expansion system?

     (a) Bellows   (b) Bourdon tube   (c) Ammeter   (d) Thermometer

9.   A typical data acquisition system consists of _____   CO1-U

     (a) op amps   (b) sensors   (c) rectifiers   (d) transistors

10. Sensors produce frequency which is counted by _____   CO1-U

     (a) a chemical counter   (b) a mechanical counter

     (c) an electronic counter   (d) a basic counter

PART – B (5 x 2= 10 Marks)

11. Define Repeatability.   CO1 -U

12. List any four angular measuring instruments.   CO1 -U

13. What are the benefits of using CMM?   CO1 -U

14. What is the working principle of thermocouple?   CO1 -U

15. Compare sensor and transducer.   CO1 -U

PART – C (5 x 16= 80 Marks)

16. (a)   Draw the block diagram of generalized measurement system and   CO1 -U   (16)
           explain different stages with examples.
                                    Or
     (b)   Describe the detailed notes on: CO1 -U   (16)
           (i) sensitivity.
           (ii) Calibration
           (iii) Precision
           (iv) Interchangeability
           (v) Accuracy and
           (vi) Repeatability

17. (a)   Explain the working principle of angle Dekkor with a neat sketch. CO2 -U   (16)
           Also write the applications of angle Dekkor.
                                    Or
     (b)   Explain the working principle of mechanical comparator and   CO2 -U   (16)
           Pneumatic comparator

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18. (a) Explain the construction & working of any two types of Bridge CO1 -U (16)
    type CMM.

<center>Or</center>

    (b) Describe in details of the function and application of Machine CO1 -U (16)
    vision system.

19. (a) Explain with a neat diagram construction and working of a DC CO1 -U (16)
    cradled dynamometer.

<center>Or</center>

    (b) Discuss the working principle of bourdon tube pressure gauge CO1 -U (16)

20. (a) Describe with neat block diagram describe about the digital data, CO2 -U (16)
    acquisition System.

<center>Or</center>

    (b) Discuss in brief on the following. CO2 -U (16)
    (i) Resistive transducer
    (ii) Capacitive transducer &
    (iii) Inductive Transducers

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