

337356(37)

B. E. (Third Semester) Examination, April-May 2020

(New Scheme)

(Mech. Engg. Branch)

MECHANICAL MEASUREMENT & METROLOGY

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) and (d) of each question.

Unit-I

1. (a) Explain in brief about Sensor. 2
- (b) Mention the static performance characteristics of measurement devices. Explain any two static performance characteristics. 7

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- (c) Define Static Calibration. Explain calibration procedures & its significance in measurement system. 7
- (d) The following 10 observations were recorded when measuring a temperature :
- 41.7, 42.0, 41.8, 42.0, 42.1, 41.9, 42.0, 41.9, 42.5 & 41.8°C
- Find : 7
- (i) the mean
- (ii) the standard deviation
- (iii) the probable error of one reading
- (iv) the probable error of mean
- (v) range

Unit-II

2. (a) Define Piezoresistive effect. 2
- (b) Describe the construction and working of Pirani gauge. List its advantages & disadvantages. 7
- (c) A Mcleod gauge has volume of bulb & measuring capillary $V = 100 \times 10^{-6} \text{ m}^3$ & a measuring capillary diameter of 1 mm. Calculate the pressure indicated when the reading of measuring capillary is 30 mm in

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- case approximate formula is used. What is the error if the exact formula is used for measurement of pressure? 7
- (d) Explain the working of total radiation Pyrometer with neat sketch. Write its merits & demerits. 7

Unit-III

3. (a) What do you mean by Vibration? 2
- (b) Explain the working of ultrasonic flow meter along with its advantages & limitations. 7
- (c) Explain the working of seismic transducer. 7
- (d) What is Data Acquisition System? Explain single & multi channel systems in detail. 7

Unit-IV

4. (a) Define Metrology. 2
- (b) Explain with the help of neat sketches the principle & construction of an auto-collimator. 7
- (c) Explain the process of measurement of surface texture. 7

- (d) Discuss the working of tool makers Microscope.
Mention the use of the tool makers Microscope. 7

Unit-V

5. (a) What is the use of Interferometry? 2
- (b) What is the function of a Comparator? Explain any one type of comparator. 7
- (c) Describe the process of measurement of gear tooth. 7
- (d) What is the need of coordinate measuring machine? Explain its construction & application. 7