

B037312(037)

B.Tech. (Third Semester) Examination

Nov.-Dec. 2020

(Mechanical Branch)

MECHANICAL MEASUREMENT and METROLOGY

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

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

Unit-I

1. (a) Define the term : (10) 4
 - (i) Static Sensitivity
 - (ii) Hysteresis

- (b) Explain the generalized measurement system & its elements with neat sketch. 8

[2]

(c) What is Error? Explain various types of errors in measurement systems. 8

(d) During a test when, measurement of temperature were made 100 times with variation of apparatus and procedure. After applying correction for known systematic errors, the following data were obtained.

Temperature 397 398 399 400 401 402 403 404 405
(deg. C)

Frequency 1 3 12 23 37 16 4 2 2

Calculate : 8

- (i) Arithmetic mean
- (ii) Deviations from mean
- (iii) Standard deviation
- (iv) Probable error of one reading
- (v) Standard deviation and Probable error of mean
- (vi) Standard deviation of the standard deviation

Unit-II

2. (a) Define the term : 4

- (i) Static Pressure
- (ii) Dynamic Pressure

B037312(037)

[3]

(b) Explain the construction & working of McLeod gauge. 8

(c) Prove that Gauge factor G_f is given by : 8

$$G_f = 1 + 2\mu + \frac{\delta\rho/\rho}{\delta L/L}$$

(d) Explain the construction & working of total radiation pyrometer. 8

Unit-III

3. (a) What is DAS? 4

(b) Explain the construction & working of seismic transducer. 8

(c) Explain the working of hot wire anemometers. 8

(d) Compare the single and multi channel data acquisition system. 8

Unit-IV

4. (a) Define limits, fits and tolerances. 4

B037312(037)

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[4]

- (b) Explain construction and working of tool maker's microscope. 8
- (c) Write notes on : 8
- (i) Slip gauge
 - (ii) Sine bar
- (d) What do you mean by Roundness? Explain any one method for measurement of roundness. 8

Unit-V

5. (a) Explain the principle of interferometer. 4
- (b) Explain construction and working of optical comparator. 8
- (c) Explain the three-wire method for screw threads effective diameter measurement. 8
- (d) Describe the Parkinson gear tester and state its limitation. 8