CBCS SCHEME

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15MEB406

Fourth Semester B.E. Degree Examination, June/July 2018
Mechanical Measurements and Metrology

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

1 a. What is a material standard? List out the advantages of wavelength standard **(06 Marks)**

b. Explain about subdivisions of standards. **(04 Marks)**

c. A calibrated meter bar has an actual length of 1000.0008mm. It is to be used in the calibration of two bars A and B each having a length of 500mm when compared with meter bar $L_A + L_B$ was found to be shorter by 0.0004mm. In comparing A with B it was found that A was 0.0006mm longer than B. Find the actual length of A and B. **(06 Marks)**

OR

2 a. How do you specify sine bar and explain why it is not preferred to measure greater than 45°. **(05 Marks)**

b. What are slip gauges? Explain about wringing of slip gauge and care of slip gauge. **(05 Marks)**

c. Using M112 set, of slip gauges build the following dimension with protector blocks at both ends of 2mm blocks individually i) 29.758 ii) 57.895. **(06 Marks)**

Module-2

3 a. Define:
- i) Basic hole
- ii) Selective assembly
- iii) Allowance
- iv) Tolerance
- v) Fundamental deviation **(05 Marks)**

b. Why shaft basis system is not preferred? **(03 Marks)**

c. Design the gauges to check $50C_7$ the F.D. for $C = 0.52D^{0.2}$. The diameter falls in the step of 30-50mm. The quality for grade 7 is 16i where $i = 0.45\sqrt[3]{D} + 0.001D$. **(08 Marks)**

OR

4 a. Illustrate with a neat sketch, the working of Zeiss optimeter. **(06 Marks)**

b. Classify the different comparator and explain the functional requirements. **(04 Marks)**

c. Differentiate measuring instruments, gauges and comparators. **(06 Marks)**

Module-3

5 a. Explain the three wire method to find the effective diameter of screw thread. **(06 Marks)**

b. List out the various methods of measuring the gear tooth thickness explain any one of it. **(08 Marks)**

c. What do you mean by pressure angle of a Gears? **(02 Marks)**

OR

6 a. List the various coordinates measuring machines. Sketch, and explain coordinate measuring machine. **(06 Marks)**

b. With a neat sketch explain about laser interferometer. **(06 Marks)**

c. List out applications of tool makers microscope. **(04 Marks)**

Module-4

7 a. Define: i) Accuracy ii) Precision iii) Loading effect iv) Calibration v) Error. **(05 Marks)**

b. Explain the working of generalized measurement system with block diagram taking one of the examples. **(06 Marks)**

c. Discuss briefly about LVDT. **(05 Marks)**

OR

8 a. Discuss briefly about electronic amplifiers. **(08 Marks)**

b. What are terminating devices? Explain in detail CRO. **(08 Marks)**

Module-5

9 a. Sketch a proving ring and explain how it is used for force measurement. **(05 Marks)**

b. How are dynamometers classified? Explain with a sketch rope brake dynamometer. **(05 Marks)**

c. With a neat sketch explain Mcleod gauge used for pressure measurement. **(06 Marks)**

OR

10 a. Discuss about temperature compensation in strain gauges. **(06 Marks)**

b. List out materials used for thermocouples. **(04 Marks)**

c. Explain the working principle of optical pyrometer. **(06 Marks)**

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