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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