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Third Semester B.E. Degree Examination, June/July 2019 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 metrology? State any two objectives of metrology. (04 Marks)
b. What is the difference between accuracy and precision? (04 Marks)
c. Four length bars of basic length 100mm are to be calibrated using a calibrated length bar of 400mm whose actual length is 399.9992mm. It was also found that lengths of bars B, C and D in comparison to A are +0.0002mm, +0.0004mm and -0.0001mm respectively and the length of all the four bars put together in comparison to standard calibrated bar is +0.0003mm longer. Determine the actual dimensions of all the four end bars. (08 Marks)

OR

- 2 a. Describe the steps in wringing of slip gauges. (04 Marks)
b. Build the following dimensions using M87 set slip gauges: i) 49.3825mm ii) 87.3215mm. (06 Marks)
c. With a sketch explain the method of measuring taper angles using sine centre. (06 Marks)

Module-2

- 3 a. Differentiate between interchangeability and selective assembly. (04 Marks)
b. Discuss 'Hole based' and 'Shaft based' system of fits with sketches. (08 Marks)
c. State and explain Taylor's principle of gauge design. (04 Marks)

OR

- 4 a. Mention any three important functional requirements of a comparators. (03 Marks)
b. Explain with sketch a dial indicator. (05 Marks)
c. Explain with a sketch the working of a Solex Pneumatic comparator. (08 Marks)

Module-3

- 5 a. What is best size wire? (02 Marks)
b. How do you find effective diameter of a screw thread using two-wire method? (06 Marks)
c. With a neat sketch show all the terminologies of a spur gear. Explain how concentricity of a gear teeth is measured. (08 Marks)

OR

- 6 a. State any four advantages of lasers. (02 Marks)
b. Discuss the important features and applications of co-ordinate measuring machine. (08 Marks)
c. Sketch and label the parts of laser interferometer. (06 Marks)

Module-4

- 7 a. What is the significance of measurement system? (04 Marks)
b. How errors are classified? Explain each type with example. (07 Marks)
c. Mention any five mechanical and five electrical transducers. (05 Marks)

OR

- 8 a. With an example explain a mechanical intermediate modifying device. (04 Marks)
b. Describe in detail a Ballast circuit. (06 Marks)
c. With a sketch explain any one type oscillograph. (06 Marks)

Module-5

- 9 a. What are the methods of force measurement? Give example. (04 Marks)
b. With the help of neat sketch explain the working principle of prony brake dynamometer. (06 Marks)
c. Give the working principle of pirani gage with neat sketch. (06 Marks)

OR

- 10 a. What are the steps to be taken in the preparation of the specimen and mounting of strain gauges? (06 Marks)
b. Explain with a neat sketch any one mechanical type strain gauge. (06 Marks)
c. State and explain law of intermediate temperatures. (04 Marks)
