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18AE36

Third Semester B.E. Degree Examination, Feb./Mar. 2022 Measurements and Metrology

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. What is Metrology? What are the objectives of metrology? (08 Marks)
b. With a neat figure discuss two material length standards. (12 Marks)

OR

- 2 a. With neat figure explain wringing of slip gauges. (12 Marks)
b. List the slips to be wrung together to produce an overall dimensions of 92.357mm using two protection slips of 2.500mm size. Show the slip gauges combination. (08 Marks)

Module-2

- 3 a. What is a fit? Discuss types of fits with figures. (10 Marks)
b. Determine the tolerances on the hole and the shaft for a precession running fit designated by 50H7g6. Given :
i) 50mm lies between 30-50mm
ii) Fundamental deviation of 'g' shaft is $= -2.5D^{0.34}$
iii) IT7 = 16i
IT6 = 10i (10 Marks)

OR

- 4 a. Discuss on the gauges used for Hole and shafts. (10 Marks)
b. With a neat figure discuss Third system of gauge maker's tolerance for hole and shaft. (10 Marks)

Module-3

- 5 a. With a neat figure, explain construction and working of sigma comparator. (10 Marks)
b. With a neat figure discuss on Zeiss Ultra-Optimeter. (10 Marks)

OR

- 6 a. What is best size wire? Derive an expression for best size wire. (10 Marks)
b. What is the principle behind pneumatic comparators? Discuss the construction and working on Back pressure type pneumatic comparators. (10 Marks)

Module-4

- 7 a. With a block diagram, discuss on the generalized measurement system. (10 Marks)
b. Define the following with respect to measurement
i) Least count ii) Sensitivity iii) Hysteresis iv) Error v) Accuracy. (10 Marks)

OR

- 8 a. Discuss on elasting members used to sense the pressure. (10 Marks)
b. With a neat figure explain piezo-electric transducer. (05 Marks)
c. Discuss construction and working of electrokinetic transducer. (05 Marks)

Module-5

- 9 a. Derive an expression for sensitivity 's' of equal arm analytical balance. (10 Marks)
b. What is thermocouple? Explain two laws of Thermocouple. (10 Marks)

OR

- 10 a. Derive an expression for vacuum pressure in the McLeod gauge and explain construction and working or McLeod gauge. (10 Marks)
b. What is a pyrometer? Discuss construction and working of optical pyrometer. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.