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Question Paper Code: 41763

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Mechanical Engineering

14UME603 - ENGINEERING METROLOGY AND MEASUREMENTS

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Scale sensitivity is defined as
 - (a) Ratio of a change in scale reading to corresponding change in pointer deflection
 - (b) Least reading of scale/range of scale
 - (c) Least reading of scale/unit measurable quantity
 - (d) Least count of scale/range of scale
2. Accuracy of measuring equipment is
 - (a) The closeness with which a measurement can be read directly from a measuring instrument
 - (b) A measure of how close the reading is to the true size
 - (c) The difference between measured value and actual value
 - (d) The smallest change that can be measured
3. The number of slip gauges in a set are
 - (a) 87
 - (b) 45
 - (c) 31
 - (d) None of these
4. Plug gauges are used to
 - (a) Measure the diameter of the work pieces
 - (b) Measure the diameter of the holes in work pieces
 - (c) Check the diameter of the holes in work pieces
 - (d) Check the length of the holes in work pieces

5. Gear tooth vernier is used to measure

(a) gear tooth profile	(b) gear tooth thickness
(c) pitch line thickness of gear tooth	(d) module

6. Universal surface gauge is used for

(a) checking straightness	(b) checking flatness
(c) checking parallelism	(d) layout work and inspection

7. Optical fiber operates on the principle of

(a) Total internal reflectance	(b) Tyndall effect
(c) Photo-electric effect	(d) Laser technology

8. CMMs are mainly used in

(a) Design of components	(b) Forward Engineering
(c) Reverse Engineering	(d) Inspection of components

9. Basic principle of Venturimeter is

(a) Moment of momentum principle	(b) Bernoulli's principle
(c) Newton's Principle	(d) Euler's Principle

10. Common materials used for bi-metallic thermometer is

(a) Copper and Nickel	(b) Steel and Nickel
(c) Steel and Copper	(d) Copper and Aluminum

PART - B (5 x 2 = 10 Marks)

11. Distinguish between Line standard and End standard.
12. Write Taylor principle in gauge design.
13. List the various methods used for measuring the gear tooth thickness.
14. What are the advantages of laser interferometer?
15. Give the principle of hot wire anemometer.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain in detail various types of errors that may arise in engineering measurements and the ways to control it. (16)

Or

- (b) (i) State the basic requirements for an instrument to operate accurately. (6)
(ii) Explain the different types of standards. (10)
17. (a) (i) Explain the construction and working principle of Limit Gauge with sketch. (8)
(ii) Explain the gauge design terminology with procedure and neat sketch. (8)

Or

- (b) Explain with a neat sketch, the construction and working of a Autocollimator. (16)
18. (a) How to measure the specifications of the screw thread by using the tool maker's microscope? Discuss in detail. (16)

Or

- (b) Explain about the Tomlinson surface meter. (16)
19. (a) Explain the construction and working principle of AC laser interferometer with neat diagram. (16)

Or

- (b) How are CMMs classified with respect to constructional features? Sketch and state their main applications, merits and demerits. (16)
20. (a) Discuss the working principle, advantages and disadvantages of
- (i) Pitot tube (5)
(ii) Rotameter (5)
(iii) Hydraulic force meter (6)

Or

- (b) Briefly explain the various methods of measuring temperature. (16)

