Register Number .....

B.E. DEGREE EXAMINATIONS: NOVEMBER 2009

Fifth Semester

MECHANICAL ENGINEERING

U07ME503: Engineering Metrology and Measurements

Time: Three hours **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. The ease with which observations can be made accurately is referred to as

(a) Readability (b) sensitivity (c) Accuracy (d) precision

2. Sensitivity and range of measuring instrument have

(a) Direct relationship (b) linear relationship

(c) Inverse relationship (d) no relationship

3. Which of the following instruments is most accurate?

(a) Vernier caliper (b) screw gauge

(c) Optical projector (d) slip gauges

4. Optical flats are made of

(a) Quartz (b) glass (c) Plastic (d) steel

5. V-block is used in the work piece to check

(a) Roundness of a cylinder work (b) roughness

(c) Hardness (d) taper on a job

6. A sine bar is specified by

(a) Its total length (b) the size of the rollers

(c) The center distance between the two rollers (d) weight of the bar

7. Gear tooth vernier is used to measure

(a) Circular pitch (b) depth of tooth

(c) Pitch line thickness of the tooth (d) tooth thickness

8. Which one of the following is the least accurate measuring device?

(a) air gauge (b) screw gauge

(c) Steel scale (d) vernier

9. The two slip gauges in precision measurement are joined by

(a) Clamping (b) wringing (c) Slipping (d) sliding

10. Optical micrometer is used to measure

(a) Small linear displacements

(b) set very small displacements by rotating to large angle of glass block

(c) Check parallelism

(d) surface roughness

PART B (10 x 2 = 20 Marks)

11. What is Range of measurement?

12. Define system error and correction.

13. How do you calibrate the slip gauges?

14. List out any four angular measuring instrument used in metrology.

15. Name the various types of pitch errors found in screw.

16. What are the applications of toolmaker's microscope?

17. What is interferometer?

18. What are the different types of geometrical tests conducted on machine tools?

19. What are load cells?

20. What is thermocouple?

PART C (5 x 14 = 70 Marks)

21. (a) Explain the various systematic and random errors in measurements?

(OR)

(b) What is the need of calibration? Explain the classification of various measuring meth

22. (a) With neat sketch explain the construction and working principle of electrical compar

(OR)

(b) Explain the working principle of autocollimator and briefly explain its application

23. (a) How to measure the pitch of the screw thread by using the tool maker's microscope? Discuss in detail.

(OR)

(b) Explain the working of Tomlinson surface meter with a neat sketch.

24. (a) With neat sketch explain the various types of CMM based on its construction.

(OR)

the working principle of machine vision system.

n the working principle of rotometer.

(OR)

in the working principle of thermo couples. State its applications.

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