[Total No. of Questions - 9]　　[Total No. of Printed Pages - 3]
(2063)

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B.Tech 4th Semester Examination

Metrology and Inter Chargeability

ME-4001

Time : 3 Hours　　　　　　　　　　　　Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt five questions in all selecting atleast one question from each section A, B, C & D of the question paper. All sub parts of section E are compulsory. All questions carry equal marks.

SECTION - A

1. (a) How slip gauges are manufactured? Name three materials commonly used for gauges. Discuss the merits of each.

   (b) Describe Systematic errors and Random errors. Discuss the means adopted to minimize these errors.　　　**(10+10)**

2. (a) Describe the principle and construction detail of pneumatic measurement system.

   (b) Describe an optical pyrometer.　　**(10+10)**

SECTION - B

3. Explain the following with a neat sketch

   (a) Clinometer

   (b) Autocollimator　　　　　　**(2×10=20)**

4. (a) What points will you keep in your mind in selecting the tolerance between the piston and cylinder of a steam engine?

    (b) What is meant by 50 H 5? What is the fundamental deviation of this hole? Is fundamental deviation a function of the tolerance grade?

    (c) Explain the concept of standardization in Design.   (4+4+12)

SECTION - C

5. (a) Derive an expression of Best Wire Size in thread measurement.

    (b) Define effective diameter of thread and how it is measured by 3-Wire method?

    (c) Describe the different types of errors in thread.   (5+8+7)

6. (a) Explain the working principle of autocollimator and how the straightness is measured?

    (b) Explain the principle and procedure for optical flatness testing.   (10+10)

SECTION - D

7. (a) Explain the principle of measuring gear tooth thickness by Base tangent method.

    (b) Derive an expression for Chordal tooth thickness in constant Chord method.   (10+10)

8. Write Short Notes on:

    (a) Acceptance test for lathe

    (b) Alignment of bearings   (2×10=20)

SECTION - E

9. (i) Distinguish between 'Line Standard' and 'End Standard'.

    (ii) Define the term 'Sensitivity' of an instrument.

    (iii) What is meant by wringing of slip gauges?

    (iv) What are limit gauges?

    (v) What is meant by 'Best size wire' in screw thread measurement?

    (vi) Define the term 'constant chord' of a gear.

    (vii) What are the advantages of laser interferometer?

    (viii) Enumerate any four angular measuring instruments and their accuracies.

    (ix) What are the fundamental methods of measurement? Explain.

    (x) What are the various types of pitch errors on thread components and what is the difference between them?   **(10×2=20)**