Registration No. :

Total number of printed pages – 2

B. Tech

PEME 5405

Seventh Semester Examination – 2013
METROLOGY, QUALITY CONTROL AND RELIABILITY

BRANCH : MECH

QUESTION CODE : C- 228

Full Marks – 70

Time : 3 Hours

Answer Question No. **1** which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions :   2 × 10

    (a) Differentiate straightness and flatness.

    (b) Define tolerance and limit of size.

    (c) What is the purpose of a thread micrometer ?

    (d) Distinguish between unilateral and bilateral tolerance with example.

    (e) What do you mean by interference fit ?

    (f) What is the difference between Type I and Type II errors ?

    (g) Define bath tub curve.

    (h) What do you mean by system reliability ?

    (i) What is geometrical tolerance ?

    (j) What is Taguchi loss function ?

2. Distinguish between line standard and end standard. How are end standards derived from line standard ? Give examples of these two type standards.   10

3. (a) Define surface roughness. Describe different methods used for measuring surface roughness.   5

    (b) Describe a method to find out the flatness of a surface plate.   5

P.T.O.

4   The fundamental tolerance for quality *IT6* is 10i and subsequent tolerance grades are based on R5 series (In R5 series, the subsequent tolerance grades are obtained by multiplying the preceding grade of tolerance with 1.5849). For size of 35mm, i= 16 and the fundamental deviations for 'H' and 'f' are 0 and 25 micron respectively.

(a)   Determine the limits of tolerance for a hole and shaft 35H8/f7. Draw a diagram of this fit.   5

(b)   Up to what range of size this diagram will be applicable and why ?   5

5.   Draw OC and AOQ curves for n=200, c=2 and determine AOQL   10

6.   (a)   Name different types of acceptance sampling plans.   3

(b)   A process has a good control when controlled between 3-sigma control limits of 118 and 124. The sample size is 4.   7

(i)   What is the standard deviation of the process ?

(ii)   What are the control limits on R-chart ?

7.   (a)   Using Markov model briefly explain the availability of single repairable system.   5

(b)   Describe the sequential acceptance sampling plan based on MTTF.   5

8.   Write short notes on any **four** :   2.5 × 4

(a)   Interchangeability

(b)   Non-conforming control chart

(c)   Life tests

(d)   Quality circle

(e)   Accuracy and precision.