Registration No. :

Total number of printed pages – 2

B. Tech

CPME 6401

Seventh Semester (Special) Examination – 2013
METROLOGY, QUALITY CONTROL AND RELIABILITY
### BRANCH : MECH
QUESTION CODE : D 398
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) Name the machines on which the major and minor diameters of screw threads are measured.

   (b) Differentiate hole basis and shaft basis system of fits.

   (c) What do you mean by calibration ?

   (d) Define circularity.

   (e) What is meant by reliability ?

   (f) Name the different elements of spur gear which require inspection.

   (g) Distinguish assignable and random cause of variation.

   (h) What is the heist limit of AQL?

   (i) Show the shape of an ideal sampling plan @ GUNUPUR

   (j) What does an acceptance sampling ensure ?

2. Determine the tolerances on the hole and the shaft for a precision running fit designed by 50 H7/g6. Given that :

   50mm lies between the range of 30–50mm.

   $i = 0.46(D)^{1/3} + 0.001(D)$ micron

   Fundamental deviation for H hole $= 0$

   Fundamental deviation for g shaft $= -2.5D^{0.34}$

   IT7$=16i$ and IT6 $= 10i$

   Determine the actual maximum and minimum sizes of the both hole and shaft and maximum and minimum clearances.   10

P.T.O.
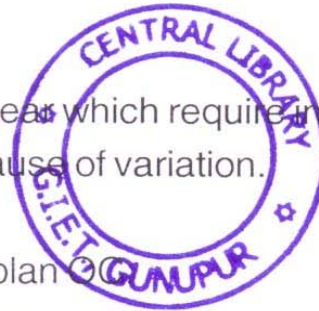
3. (a) Define line standard and classify it depending upon the importance of standard. 5

   (b) Differentiate accuracy and precision. 5

4. Describe two different methods of testing flatness of a surface, stating advantages and limitations of each. 10

5. A lot contains 1000 items out of which 10 are defective is to be inspected. A sample of 36 items is taken and if it contains 0 defective, the lot is accepted. If it contains 1,2 or 3 defectives in first sample then a second sample of 59 items is taken and if total number of defectives in 1st and 2nd samples is less than 3 the lot is accepted. Calculate the probability of acceptance of the lot. 10

6. (a) Describe various sampling techniques. 5

   (b) Explain AOQ and AOQL. 5

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

   (b) Explain and differentiate maintainability and availability. 5

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

   (a) TQM

   (b) Quality circle

   (c) Geometric tolerance

   (d) Sequential sampling plan

   (e) Accuracy