Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

PEME 5405

Seventh Semester Back Examination – 2014

METROLOGY, QUALITY CONTROL AND RELIABILITY

BRANCH : MECH

QUESTION CODE : L 181

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) Distinguish between the 'airy points' and the points of minimum deflection.

   (b) Thread micrometre is used for which purpose ?

   (c) Define control limit.

   (d) Differentiate between Tolerance and Allowance.

   (e) Define double sampling plan.

   (f) Why is it essential to estimate the reliability ?

   (g) What do you mean by parametric design ?

   (h) Show the shape of an ideal sampling plan OC.

   (i) Differentiate the nominal dimension and actual dimension.

   (j) What do you mean by interference fit ?

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) Describe how external taper can be measured using a sine bar. 5

   (b) Explain Tylor's principle applied to design limit gauges. 5

4. (a) Explain the AOQ and AOQL. 4

   (b) Describe briefly about different control charts. 6

P.T.O.

5. A double sampling plan is as follows :

Select a sample of 2 from a lot of 20. If both the articles are good, accept the lot. If both are defective, reject the lot. If one is good, take a second sample of one article. If the article in the second sample is good, accept the lot.

If a lot of 25% defective is submitted, what is the probability of the acceptance ? Use the combinatorial formula to evaluate the probability. 10

6. (a) Lots of 3000 crank shafts are submitted for inspection by ultra-sonic testing for internal flaws. Prepare a sequential sampling using the following data : 5

AQL = 0.10

LTPD = 0.30

Procedure's risk (Rp) = 0.05

Consumer's risk (Rc) = 0.10

(b) Discuss the signal to noise ratio. How is it used in the taguchi method ? What is an adjustment parameter and how it is used ? 5

7. (a) Define reliability and methods of arranging the components in the system of reliability. 5

(b) Describe the acceptance sampling plan based on life tests. 5

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

(a) Interchangeability

(b) ANOVA

(c) Markov model

(d) Circularity

(e) Control charts for fraction.
