Total No. of Questions :9]

SEAT No. :

P3570

[Total No. of Pages :2

[5560]-514

T.E. (Mechanical/ Automobile)

METROLOGY AND QUALITY CONTROL

(2015 Pattern) (Semester - I) (302045)

Time : 2½Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Solve Q.No.1 or 2, Q.No 3 or 4, Q.No.5 or 6, Q.No.7 or 8 & Q.No.9***
3) ***Assume suitable data if necessary.***
4) ***Use of non-programmable calculator is allowed***
5) ***Figures to the right indicate full marks.***

Q1) a) Explain the terms: Calibration & Traceability. **[4]**

b) Write a note on 'LVDT Comparator'. **[6]**

OR

Q2) a) Explain - Adverse effects of Poor Surface Finish. **[4]**

b) Find the shaft & hole dimensions with tolerance for a 85H8e9 pair given the following data with standard notations -85 mm lies in diameter step of 80 to 100 mm. Upper deviation for e shaft= –11D^ 0.41, Tolerance unit, i=0.45(D)^0.33 + 0.001D. IT8=25i & IT9=40i. Show it with a diagrammatic representation. What type of fit it is ? **[6]**

Q3) a) Calculate the effective diameter of metric threads using two wire method: Micrometer reading over standard Cylinder with two wires=15.64mm, Micrometer reading over the gauge with two wires = 15.26 mm, Wire diameter = 2 mm, Thread pitch =2.5mm, Standard cylinder diameter=18mm. **[5]**

b) Explain various errors in Spur gears. **[5]**

OR

Q4) a) Explain any 4 symbols of Geometrical Dimensioning & Tolerancing (GD & T) **[4]**

b) Write a note on NPL Flatness Interferometer. **[6]**

P.T.O.

Q5) a) Enlist Basic & New Seven Quality Tools & explain any 2 of them. **[8]**

b) Comparison between Deming's & Juran's Quality Concepts. **[8]**

OR

Q6) a) Write a note on Quality of Design, Quality of Conformance & Quality of Performance with their co-relationship. **[8]**

b) Explain importance of quality deployment at design & manufacturing & elaborate importance of initial planning for quality. **[8]**

Q7) a) Enlist different types of control charts & their applications/ uses. Elaborate on 'Control Chart Patterns' **[10]**

b) The number of defects found in each sample of paper of 1 square meter area are shown below. Draw appropriate control chart & stare whether the process is under control or not. If sample falling outside control limits is taken out, what are the new control limits. **[6]**

Sample	1	2	3	4	5	6	7	8	9	10	11	12
No. of defects found	5	6	2	5	2	6	6	13	6	5	6	4

OR

Q8) a) Explain the concept of Process Capability & the indices Cp, Cpk & Ppk. **[8]**

b) The lot size N is 2000 in a certain AOQL inspection procedure. The desired AOQL of 2 % can be obtained with any one of the three sampling plans. These are: (i) n=65 c=2, (ii) n=41, c=1 & (iii) n=18, c=0. If a large no. of lots 0.3% defective are submitted for acceptance, what will be the average no.of units inspected per lot under each of these sampling plans?Take Pa= 0.999,0.993&0.947 for plan-i), ii) & iii) respectively **[8]**

Q9) Write note on (Any 3) **[18]**

a) 'House of Quality' matrix

b) FMECA

c) TPM

d) Poka-Yoka

e) Six Sigma

f) 5S

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