Total No. of Questions :9]

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SEAT No. :

[Total No. of Pages :2

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## T.E. (Mechanical/Automobile) METROLOGYAND QUALITY CONTROL (2015 Pattern) (Semester - I) (302045)

*Time : 2½Hours]* 

[Max. Marks : 70

[4]

**[6]** 

[4]

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.b) Write a note on 'LVDT Comparator'.

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

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]

OR

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

#### OR

- Write a note on Quality of Design, Quality of Conformance & Quality of **Q6**) a) Performance with their co-relationship. [8]
  - Explain importance of quality deployment at design & manufacturing & b) elaborate importance of initial planning for quality. [8]
- Enlist different types of control charts & their applications/ uses. Elaborate **Q7**) a) on 'Control Chart Patterns' [10]
  - The number of defects found in each sample of paper of 1 square meter b) 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.  $\bigcirc$ [6]

Sample	1	2	3	4	5	6	7	8 ×	9	10	11	12
No. of defects	5	6	2	5	2	6	6	TAX-	6	5	6	4
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# OR

- Explain the concept of Process Capability & the indices Cp, Cpk & **Q8**) a) Ppk. [8]
  - The lot size N is 2000 in a certain AOQL inspection procedure. The b) 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 n thes. ii) respectively the second s 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)
  - 'House of Quality' matrix a)
  - **FMECA** b)
  - TPM c)
  - Poka-Yoka d)
  - Six Sigma e)
  - f) 5S

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