Total No. of Questions : 10]

### P2926

SEAT No. :

[Total No. of Pages : 2

# [5669] 515

T.E. (Mechanical) (Semester - I)

METROLOGY AND QUALITY CONTROL

## (2015 Pattern)

*Time : 2<sup>1</sup>/<sub>2</sub> Hours*]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 Or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8 and Q.9 or Q.10.
- 2) Neat diagrams must be drawn whenever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.
- **Q1**) a) Define Calibration of Measuring Instruments. Explain the need of calibration with suitable example [5]
  - b) Explain Hole basis and Shaft basis system of fits with neat sketch and which system is preferred by industry. [5]

### OR

- Q2) a) Define Accuracy and precision. State sources of errors and explain measures to Minimize errors in measurement.
  - b) Design ring gauge for inspection of 30f8 shaft. Use following data 30 nm lies in the diameter step of 18-30, IT 8 = 25i, FD for f shaft is  $= -5.50^{0.41}$ .

Q3) a) Explain the Principle and working of Autocollimator with diagram. [5]

b) Explain dial type high pressure differential Pneumatic Comparator. State advantages of Pneumatic Comparator over Mechanical Comparator. [5]

#### OR

Q4) a) Derive an expression for Best size of Wire for Effective Diameter Measurement of screw Thread. [5]

Explain Parkinson gear tester with neat sketch. b) [5]

*P.T.O.* 

[5]

- Explain primary texture and secondary texture with suitable examples of **Q5**) a) each. [6]
  - Explain machine vision system and its applications with example. [10] b) OR
- Draw symbol for surface roughness and state any three surface *Q6*) a) roughness grades with their Ra values in microns. [6]
  - Explain with example non contact automatic measurement systems used b) in industry. [10]
- Define Quality with example. Explain Cost of poor Quality with example.[8] **Q7**) a) Explain any two New QC tools. [8] b)

#### OR

- Explain Inward Quality Assurance in Manufacturing Industry. **Q8**) a) [8]
  - Explain Quality Circle and the tool root cause analysis used in Quality b) Circle. [8]

*Q9*) a) Explain OC curve.

- Differentiate between variable data and attribute data with suitable b) examples. [4]
- $\bar{\mathbf{x}}$  and R control charts are maintained for a dimension of a component. c) The data is collected. The subgroup size for the calculations is taken as 5. The values of  $\overline{\mathbf{x}}$  and  $\overline{\mathbf{R}}$  are calculated for each subgroup. The values of summation of x and R are for 25 subgroups are 614.8 and 126 respectively. Compute the control limits for  $\bar{X}$  chart  $\bar{R} = 2.32\sigma$ . [8]

#### OR

The given table shows the number of defectives found in inspection of *Q10*)a) 10 lots of 100 items each. Determine the control limits for appropriate chart and state whether the process is in control. [12] Draw the control chart.

8 Lot No. 3 5 9 1 2 4 10 6 No. of 3 5 3 1 4 2 3 6 Defective

What is process capability? Explain with example. b) 

[6]

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[6]