

Total No. of Questions : 10]

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SEAT No. :

[Total No. of Pages : 2

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**T.E. (Mechanical) (Semester - I)**  
**METROLOGY AND QUALITY CONTROL**  
**(2015 Pattern)**

Time : 2½ 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. [5]

b) Design ring gauge for inspection of 30f8 shaft. Use following data 30mm lies in the diameter step of 18-30, IT 8 = 25i, FD for f shaft is  $-5.5D^{0.41}$ . [5]

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]

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

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Q5) a) Explain primary texture and secondary texture with suitable examples of each. [6]

b) Explain machine vision system and its applications with example. [10]

OR

Q6) a) Draw symbol for surface roughness and state any three surface roughness grades with their Ra values in microns. [6]

b) Explain with example non contact automatic measurement systems used in industry. [10]

Q7) a) Define Quality with example. Explain Cost of poor Quality with example. [8]

b) Explain any two New QC tools. [8]

OR

Q8) a) Explain Inward Quality Assurance in Manufacturing Industry. [8]

b) Explain Quality Circle and the tool root cause analysis used in Quality Circle. [8]

Q9) a) Explain OC curve. [6]

b) Differentiate between variable data and attribute data with suitable examples. [4]

c)  $\bar{X}$  and R control charts are maintained for a dimension of a component. The data is collected. The subgroup size for the calculations is taken as 5. The values of  $\bar{X}$  and R are calculated for each subgroup. The values of summation of  $\bar{X}$  and R are for 25 subgroups are 614.8 and 120 respectively. Compute the control limits for  $\bar{X}$  chart  $\bar{R} = 2.32\sigma$ . [8]

OR

Q10) a) The given table shows the number of defectives found in inspection of 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.

Lot No.	1	2	3	4	5	6	7	8	9	10
No. of Defective	6	3	1	4	3	0	5	5	2	3

b) What is process capability? Explain with example. [6]

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