

Total No. of Questions : 9]

SEAT No. :

P2402

[Total No. of Pages : 2

[5253] - 114
T.E. (Mechanical)
METROLOGY & QUALITY CONTROL
(2012 Pattern)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable data, if necessary.

Q1) a) Draw a neat sketch of Vernier caliper and How to calculate least count of Vernier caliper give one example. **[4]**

- b) Write short notes on- **[6]**
- i) Types of standards.
 - ii) Electrical comparator (LVDT)

OR

Q2) a) write short notes on universal measuring machine **[5]**

b) Explain Angle Dekker with neat sketch. **[5]**

Q3) a) Explain Interferometry applied to flatness testing by using optical flat. **[5]**

b) Determine the dimensions and tolerances of shaft and hole having size of 30H 7f8 fit. (IT7=16i, IT8=25i, D is in a step 18-30mm, Fundamental deviation for f = $-5.5D^{0.41}$) **[5]**

OR

Q4) a) Derive an expression for best wire size for measuring effective diameter. **[6]**

Calculate Effective diameter and best wire diameter for M22×2.5 screw plug gauge by using Floating carriage Micrometer for which reading were taken as

Diameter of standard cylinder 20 mm

Micrometer reading over standard cylinder with two wire is = 15.9334mm

Micrometer reading over pulg screw gauge with two wire is=15.2245mm

- b) Write short notes on Gear tooth vernier caliper. **[4]**

Q5) a) Explain Deming's cycle and 14 point towards quality improvement. **[8]**

- b) Explain seven old quality tools. **[8]**

OR

P.T.O.

- Q6)** a) List Seven Quality Tools and explain with example Parato chart and Cause and effect diagram. [8]
 b) Discuss cost of quality and value of quality? Explain its types. [8]

- Q7)** a) The table given below shows the number of defectives found in inspection of 10 lots of 100 items each. [8]

Lot number	1	2	3	4	5	6	7	8	9	10
Number of defectives	6	3	1	4	3	0	11	5	2	3
Fraction defective	0.06	0.03	0.01	0.04	0.03	0.00	0.11	0.05	0.02	0.03

- i) Determine the control limits for P chart and state whether the process is in control.
 ii) If the point which goes outside the control limits is analyzed and eliminated, what will be the value of new control limits and revised fraction defective
 Total number of defectives = 38.
- b) Explain the following OC curve characteristics [8]
 i) Changing of lot size
 ii) Changing of sample size
 iii) Changing of acceptance number
 iv) Changing of sample size and acceptance number

OR

- Q8)** a) Compare Single and double sampling plan. [8]
 b) Define producer risk; consumer risk and AOQL and AOQ for the given data calculate sample size and AOQ for single sampling plan. [8]
 i) Probability of acceptance for 0.4% defective in a lot is 0.558
 ii) Lot size $N = 10000$
 iii) $np = 1.6$
 iv) Defectives found in the sample are not to be replaced

- Q9)** Explain the following terms (ANY THREE) [18]
 a) KAIZEN
 b) Six Sigma,
 c) FMECA,
 d) TQM,
 e) FIVE 'S'

