Total No. of Questions : 9]

SEAT No. :

P1697

[Total No. of Pages : 3

[5460]-514

T.E. (Mechanical Engg.)

METROLOGY AND QUALITY CONTROL

(2015 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 diagram must be drawn wherever necessary.***
3) ***Assume suitable data if necessary.***
4) ***Use of calculator is allowed.***
5) ***Figure to right indicate full marks.***

Q1) a) Differentiate between Precision & Accuracy with suitable examples. **[5]**

b) Determine the tolerance on hole and shaft for a precision running fit designated by 40H7g6. 40 mm lies in the diameter step of 30-50 mm. $i = 0.45 (D)^{1/3} + 0.001 D$ microns. Fundamental deviation of g shaft $= -2.5D^{0.34}$ State the actual maximum and minimum size of both hole and shaft. IT7 = 16i, IT6 = 10i. **[5]**

OR

Q2) a) Explain any one method of assessing the surface finish. **[5]**

b) Explain tool makers microscope & their application. **[5]**

Q3) a) Explain laser interferometer & its application. **[5]**

b) Write short note on machine vision system. **[5]**

OR

Q4) a) State & explain Taylor's principle of gauge design with example. **[5]**

b) Explain method of measuring effective diameter using two wires with neat sketch. **[5]**

P.T.O.

Q5) a) Explain Jurans triology approach with diagram. **[8]**

b) State seven new quality tools. Explain any three in detail. **[8]**

OR

Q6) a) What is cost of quality? Explain Cost of failure, Cost of appraisal & Cost of prevention. **[8]**

b) What is initial planning for quality? Explain in details. **[8]**

Q7) a) What are advantages of sampling inspection over 100% inspection? Explain the difference between Single sampling & Double sampling plan. **[8]**

b) Following is the record for successive lots of part being produced by plastic molding press. As each lot is come off the line a random sample of 150 pieces were inspected (results are expressed to the nearest 0.1%).Calculate $\bar{p}$, Control limits & plot control chart and comment. **[8]**

Lot no.	Sample size	No. of defectives
1	150	4
2	150	8
3	150	2
4	150	4
5	150	4
6	150	6
7	150	10
8	150	4
9	150	6
10	150	8

OR

Q8) a) Write short note on OC curve & its characteristics. **[8]**

b) Explain single sampling plan with flow chart. For the given data calculate sample size and AOQ for single sampling plan. **[8]**

i) Probability of acceptance for 0.3% defectives in a lot is 0.558

ii) Lot size N = 10000 units

iii) np' = 1.5

iv) Acceptance number c = 1

v) Defectives found in the sample are not to be replaced.

Q9) Write short note on (Any three) : **[18]**

a) 5S

b) Zero defects

c) FMECA

d) TS-16949

e) Quality Audit.

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