Total No. of Questions : 12]

SEAT No. : ____

P1602

[Total No. of Pages :3

[5058]-19
T.E. (Mech./Auto.)
MECHANICAL
Metrology & Quality Control
(2008 Pattern) (Semester - II)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer 3 questions from Section - I and 3 questions from Section - II.***
2) ***Answers to the sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***
6) ***Use of electronic pocket calculator is allowed.***

SECTION - I

Q1) a) Describe the following term: **[8]**

i) Line standard and End standard

ii) Accuracy and precision

b) Define straightness and flatness. Explain with neat sketch method of checking straightness of straight edge by wedge method. **[8]**

OR

Q2) a) Explain following terms **[8]**

i) Sine bar and sine center.

ii) Angle Dekkor

b) Explain Solax pneumatic comparator with neat sketch. **[8]**

Q3) a) What is interferometer. Explain Interferometry applied to flatness testing. **[8]**

b) What is Taylor's principle? Determine the dimensions and tolerances of shaft and hole having size of 25H8 h7 fit. **[10]**

(IT7 = 16i, IT8 = 25i, D is in a step 18-30 mm)

OR

P.T.O.

Q4) a) Design a workshop gauge for Go and NOGO gauge suitable for 25 H8. (IT8 = 25i, D is in a step 18-30 mm) **[10]**

b) Write short notes on: **[8]**

i) Tomlinson's surface meter

ii) Gear tooth vernier caliper

Q5) a) Derive the relation for width W and depth H by constant chord method. Calculate chord length and its distance below tooth tip for a gear of module 4 mm and pressure angle 20 degree. **[8]**

b) Derive an expression for best wire size for measuring effective diameter. Calculate diameter of best size of wire for M25 × 2.5 screw. **[8]**

OR

Q6) Write Short notes on : **[16]**

a) Recent trends in metrology.

b) Co-ordinate measuring machine.

c) Pitch errors in screw threads.

d) Lasers in metrology.

SECTION - II

Q7) a) Difference between: **[8]**

i) Quality Policy and Quality Assurance.

ii) Quality of conformance and Quality of performance.

b) Explain the concept of Juran's Trilogy approach. **[8]**

OR

Q8) a) Explain the Pareto Analysis and Cause and Effect diagram. **[8]**

b) Explain DR. Edward Deming's PDCA and PDSA cycle for quality control. **[8]**

Q9) a) Explain the Quality circle and JIT concept. **[8]**

b) Write short notes **[8]**

i) ISO 9000

ii) Five 'S'

OR

Q10) Write Short notes on **[16]**

a) Kanban

b) FMECA

c) DMAIC

d) Process capability

Q11) a) Comparison between variable chart and attribute chart. **[8]**

b) Draw and explain OC curve. **[4]**

c) Calculate sample size and AOQ for single sampling plan using following data **[6]**

i) Probability of acceptance of 0.6% defective in a lot is 0.525

ii) Lot size = 10,000 units

iii) Acceptance number = 1

iv) nP' = 1.5

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

OR

Q12) a) Differentiate between single, double, multiple sampling plan. **[8]**

b) A component with specification limits 50±0.1 was inspected the components were taken sub group of 5 items 10 such sub groups were checked the X & R values were noted as follows **[10]**

Subgroup	1	2	3	4	5	6	7	8	9	10
X(mean)	44	43	41.8	43.4	44	43.8	43.8	45	40.8	43
R	10	7	3	5	4	12	2	5	4	9

Establish the central limits for limits for X(mean) and R charts. Draw the chart & check whether the product will meet the specifications or not, (Take $A_2 = 0.577$, $D_3 = 0$, $D_4 = 2.115$).