Total No. of Questions : 12]

SEAT No. :

P1373

[Total No. of Pages : 3

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T.E. (Mechanical)

METROLOGY AND QUALITY CONTROL

(2008 Pattern) (Semester - II)

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

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of logarithmic tables, slide rule, electronic non programmable pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Differentiate between Line and End Standards. **[4]**

b) Explain Different types of Errors in Measurement. **[8]**

c) What is the difference between Alignment test & performance test? Explain with neat sketch any one such tests on a Lathe machine **[4]**

OR

Q2) a) Explain construction, working, application, advantages and limitations of Johansson's Microkator Comparator. **[8]**

b) Describe with neat sketches of autocollimator & sine bar. **[8]**

Q3) a) Difference between primary & secondary texture. **[4]**

b) Explain concept of RMS value for surface roughness. **[6]**

c) Design and make a drawing of general purpose GO and NOGO plug gauge for inspecting hole of $70H_8$. Data with usual notation. **[8]**

i) i (micron) = $0.45 * \sqrt[3]{D} + 0.001D$,

ii) Diameter step 50 to 80 mm

iii) The value of tolerance for $IT_8 = 25i$

P.T.O.

OR

Q4) a) What are optical flat? How are patterns of fringes interpreted? **[5]**

b) Explain working of LASER interferometer with neat sketch. **[5]**

c) Design GO and NOGO limit plug gauge for checking a hole having $50^{+0.06}_{-0.00}$ Size Assume gauge maker's tolerance equal to 10% of work tolerance and wear allowance equal to 10% of gauge maker's tolerance. **[8]**

Q5) a) Calculate the constant chord length & its distance below the tooth tip for gear of module 5mm & pressure angle 20º. **[6]**

b) Describe working of universal measuring machine **[4]**

c) Write a short note on computer controlled co-ordinate measuring machine. **[6]**

OR

Q6) a) Derive the relation for Best wire size for M24 × 3 mm external threads. Calculate the Diameter of the best wire size and the difference between the size under the wires and effective diameter. **[6]**

b) Write short note on (Any Two) : **[10]**

i) Machine Vision.

ii) Lasers in Metrology.

iii) Gear tooth Vernier caliper.

SECTION - II

Q7) a) What are different quality costs? Explain cost of quality and value of quality. **[6]**

b) Explain : Quality policy. **[5]**

c) Explain what you understand by concurrent engineering. **[5]**

OR

Q8) a) Describe malcom national Quality awards. **[4]**

b) Write a note on quality circle. **[6]**

c) State seven quality control tools and explain any two. **[6]**

Q9) a) What do you mean by FMECA ? Explain in detail. **[8]**

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

i) Quality Audit

ii) Kaizen

OR

Q10) a) Explain ISO 9000 Quality system standards. **[6]**

b) Write a short note on Total quality management. **[5]**

c) What is JIT ? Explain in details its applications. **[5]**

Q11) a) Compare 'P' chart and 'c' chart. **[6]**

b) Explain DMAIC uses in six sigma. **[6]**

c) Explain operating characteristics curve with LTPD, AQL, Producer's risk (α) Consumer's risk (β). **[6]**

OR

Q12) a) Calculate the sample size AOQ for a single sampling plan. **[6]**

i) Probability of acceptance for 0.5% defectives in a lot is 0.525.

ii) Lot size N = 10,000 units.

iii) Acceptance number = 1

iv) nP' = 1.6

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

b) A machine producing plastic moulded components is checked up for the statistical stability. Draw 'P' chart for machine and comment upon the process. Sample size = 200 Nos. **[6]**

Sample No.	1	2	3	4	5	6	7	8	9	10
Defectives	11	8	22	15	12	27	10	15	10	2

c) Explain Statistical process control (SPC). **[6]**

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