KUMARAGURU
college of technology
character is life

Register Number: ………….

B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2013)

Fourth Semester

MECHANICAL ENGINEERING

U13MET402: Engineering Metrology and Quality control

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Systematic errors can be called as

   a) Random errors   b) Controllable errors

   c) Spurious errors   d) Dynamic error

2. The measurement of length can be done by using ---------------- standards

3. The technology that enables one to develop a comparison of physical part to a CAD model is called as

   a) Computer aided Inspection   b) Computer aide process planning

   c) Machine vision   d) Interferometer

4. ------------------ are used to divide the laser beam into separate beams along different axes.

5. The control charts used for measurable quality characteristics are called as

   a) AQL   b) Attribute control charts

   c) variable control charts   d) OC curve

6. Quality of performance of a product is concerned with the quality of ----------------.

7. The control chart for number defects per sample is

   a) P chart   b) C chart

   c) (np chart)   d) U chart

8. If the lower control limit on p chart has a negative value then it is taken as equal to -------------.

9. The success of sampling inspection not depends upon
   a) Sample size
   b) Lot size
   c) Acceptance number
   d) Manufacturing Process

10. LTPD stands for --------------------.

PART B (10 x 2 = 20 Marks)
(Not more than 40 words)

11. Define repeatability.

12. What is interchangeability?

13. Explain about interferometry.

14. Show the application of machine vision.

15. Define SQC.

16. Infer about control charts

17. What do you know about attributes?

18. Compare defect and defective.

19. Differentiate Lot number and sample number.

20. Explain about AOQL

PART C (5 x 14 = 70 Marks)
(Not more than 400 words)

Q.No. 21 is Compulsory

21. Construct the different types of coordinate measuring machines and explain its applications.

22. a) (i) Explain with simple examples/sketches about precision and accuracy (10)

   (ii) Interpret about calibration. (4)

(OR)

b) Illustrate any seven important geometric tolerances with simple sketches.

23. a) Outline about process capability studies with sketches, that being followed for process control.

(OR)

b) In the manufacturing precision pins in which the diameter of the pin is the quality characteristic to be controlled, 10 samples of five pins each were collected after a lapse of every 30 minutes period. $\bar{x}$ and R for each sample were calculated and recorded as below.

Sample number	$\bar{x}$	R
1	50.04	0.07
2	50.24	0.08
3	50.14	0.03
4	50.08	0.05
5	50.28	0.04
6	50.16	0.09
7	50.30	0.04
8	50.10	0.04
9	50.16	0.05
10	50.10	0.07
	$\sum\bar{x} = 501.60$	$\sum R = 0.56$

Take the value for A2 = 0.577, D4 = 2.115 and D3 =0.

Construct $\bar{x}$ and R char after the calculations and discuss about the process.

24. a) The following table shows the number of defects observed on 25 similar big castings: Find C bar and compute the trail control limits with graphical representations. What value of 'c' can be suggested for subsequent period?

Casting Number	No.of defects observed	Casting Number	No.of defects observed
1	7	14	24
2	14	15	14
3	14	16	9
4	18	17	9
5	8	18	11
6	14	19	10
7	8	20	8
8	11	21	9
9	20	22	11
10	12	23	7
11	22	24	26
12	15	25	8
13	8		

(OR)

b)   Organize the procedure for the construction of p charts and np chart with your own example.

25. a)   Construct the flow diagram and explain about multiple sampling techniques.

(OR)

b)   Infer about the following

1. Producer risk

2.Consumer risk

3.AQL

4.LTPD

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