B.E.(with Credits)-Regular-Semester 2012-Mechanical Engineering Sem V ME502 - Metrology and Quality Control

P. P Tim	ages : e : Thr	2 ree H	Hours	GUG/W/16/3798 Max. Marks : 80		
	Note	s :	 All questions carry marks as indicated. Answer Q. 1 or 2, Q. 3 or 4, Q. 5 or 6, Q. 7 or 8, Q. 9 or 10. Due credit will be given to neatness and adequate dimensions. Assume suitable data wherever necessary. 			
1.	a)	What do you mean by product critical and process critical operations ? Explain it with suitable examples.				
	b)	Dra i)	aw the diagram of shaft and hole pair for clearance fit and explain the foll Maximum clearance	lowing term. 8		
		ii)	Minimum clearance			
		iii)) Upper deviation for shaft			
		iv)	Lower deviation for shaft			
		v)	Upper deviation for hole			
		vi)	Lower deviation for hole			
			OR			
2.	a)	Des	esign and draw plug gage and snap gage for the shaft and hole pair design	ated 50D ₈ h ₉ . 10		
	b)	Dis	scuss Taylor's principle for designing limit gauges.	6		
3.	a)	Describe with neat sketch the principle and working of an auto collimator what are its applications ?		hat are its 8		
	b)	What do you mean by comparators ? Explain with neat sketch sigma comparator giving its advantages and limitations.				
			OR			
4.	a)	Exp	plain constant chord method for gear tooth measurement.	6		
	b)	Explain working of any one type of pneumatic comparator giving its advantages and limitations.				
	c)	Exp	plain slip gauges.	3		
5.	a)	Stat dep	ate and explain the factors on which quality of design and quality of confo pends.	ormance 6		

b) The following table shows number of defectives in 20 samples each of 50 items.

Sample No	No. of defectives	Sample No.	No. of defectives
1	7	11	22
2	14	12	17
3	18	13	14
4	4	14	17
5	15	15	05
6	10	16	28
7	15	17	15
8	19	18	07
9	26	19	12
10	28	20	14

10

- i) Draw p-chart and show all the limits.
- ii) What are the samples out of control
- iii) Find new process level, if it is required to shift.
- iv) Find process capability.

OR

6.	a)	What do you mean by process control ? What are the steps in process control ?	Discu	ss various objectives of process control.	8	
	b)	What do you mean by control charts for for variable ? How quality interpreted by	varia y thes	bles ? Explain various types of control chart e chart ?	8	
7.	a)	Discuss significance of average outgoing quality (AOQ) curve. What is AOQL ? How this limit helps in minimizing the acceptance of bad quality items ?				
	b)	Draw O.C. curve and explain producer's	s risk,	consumer's risk, AQL and LTPD region.	6	
	c)	What is the effect of change in lot size and sample size on these regions ? OR				
8.	a)	What do you mean by quality assurance ? Which activities are covered under it ?				
	b)	Define quality audit. Explain various objectives of quality audits.				
	c)	Discuss quality planning. What are the essential functions of quality planning ?				
9.	a)	What are the main requirements of design clamps? Discuss advantages of using clamps.				
	b)	Discuss with neat sketch any one type of milling fixtures.				
	c)	Explain 3-2-1 principle of location.			6	
			0	R		
10.		Write short notes on any four.			16	
		i) Jig bushes.	ii)	ISO – 9000		
		iii) Quality planning	iv)	Hole basis system		

v) Electrical comparator.
