Register Number:……..

KUMARAGURU
college of technology
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B.E DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Sixth Semester

MECHATRONICS ENGINEERING

U18MCE0008**:** Statistical Quality Control

COURSE OUTCOMES

CO1: Define the concept of probability and quality control
CO2: Explain various sampling method to measure quality and the attributes of quality
CO3: Summarize the process behavior based on various control charts for variables
CO4: Summarize the process behavior based on various control charts for attributes
CO5: Select the appropriate samples for the study
CO6: Apply various techniques to improve the overall quality

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

Use of approved statistical tables is permitted in the exam hall

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	List the probability distributions used in quality control.	CO1	[K_2]
2.	Comment on quality engineering.	CO1	[K_2]
3.	Explain the chance causes of quality variation.	CO3	[K_2]
4.	Comment on process capability study.	CO3	[K_2]
5.	Mention the merits of R chart.	CO4	[K_2]
6.	Compare c and u chart.	CO4	[K_3]
7.	Define AOQ with respect to _____.	CO5	[K_2]
8.	List the reliability improvement techniques.	CO6	[K_2]
9.	What are all the advantages of Pareto analysis? What is the significance of Pareto analysis?	CO6	[K_2]
10.	Define zero defects program.	CO6	[K_2]

Answer any FIVE Questions:-
PART B (5 x 4 = 20 Marks)
(Answer not more than 80 words)

11.	Describe quality cost.	CO1	[K_2]
12.	A manufacturing process produces thousands of semiconductor chips per day. On the average,	CO2	[K_3]

1% of these chips do not conform to specifications. Every hour, an inspector selects a random sample of 25 chips and classifies each chip in the sample as conforming or nonconforming. Calculate the probability of finding one or fewer nonconforming parts in the sample.

13. Comment on warning and control limits for control charts. CO3 [K_2]

14. Explain the important considerations in forming lots for inspection. CO5 [K_2]

15. Distinguish Single and Double sampling plan. CO5 [K_2]

16. Explain quality circle. CO6 [K_2]

Answer any FIVE Questions:-
PART C (5 x 12 = 60 Marks)
(Answer not more than 300 words)

17. a) Define quality and explain the dimensions of quality. Comment on quality assurance. 12 CO1 [K_2]

18. a) 8 CO1 [K_3]

Cycle Time in Days to Pay Employee Health Insurance Claims

Claim	Days	Claim	Days	Claim	Days	Claim	Days
1	48	11	35	21	37	31	16
2	41	12	34	22	43	32	22
3	35	13	36	23	17	33	33
4	36	14	42	24	26	34	30
5	37	15	43	25	28	35	24
6	26	16	36	26	27	36	23
7	36	17	56	27	45	37	22
8	46	18	32	28	33	38	30
9	35	19	46	29	22	39	31
10	47	20	30	30	27	40	17

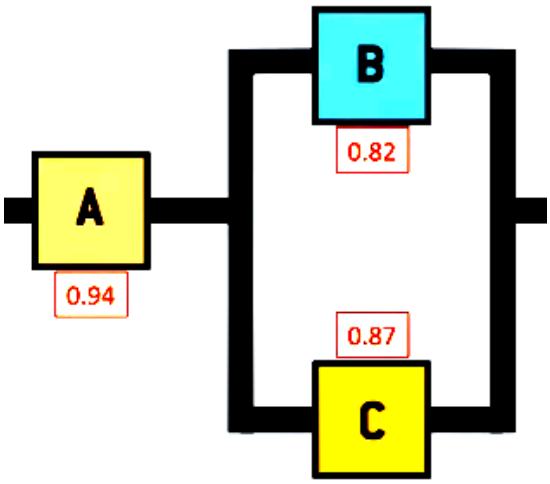
Plot the data in stem and leaf plot and Histogram plot.

b) The diameter of a metal shaft used in a disk-drive unit is normally distributed with mean 0.2508 in. and standard deviation 0.0005 in. The specifications on the shaft have been established as 0.2500 ± 0.0015 in. What fraction of the shafts produced conform to specifications? 4 CO1 [K_3]

19. a) Explain the sensitizing rules for control charts. 12 CO3 [K_2]

20. a) How to construct ku chart? How it varies from other charts? State it merits and demerits. 12 CO4 [K_3]

21.	a)	Describe the OC curve and Ideal OC curve. Explain the effects of sample size (n) and acceptance number (c) on OC curve.	10	CO5	[K_2]
	b)	Define MIL standard for acceptance sampling.	2	CO5	[K_2]
22.	a)	A student is getting low marks in a particular course. Construct a Fishbone diagram to identify the potential causes.	8	CO6	[K_4]
	b)	Find the reliability of the system shown in figure. Individual components (A, B and C) reliability is given in the figure.	4	CO6	[K_3]



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