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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: B.Tech PIE
Subject (Course): Industrial Quality Control
Course Code : IPEG 321
No. of page/s: 2

Semester – V
Max. Marks : 100
Duration : 3 Hrs.

Section A: 5 marks each (Attempt all questions)

- 1) Explain the various types of sampling plan & their selection criteria
- 2) Name & describe the brainstorming activity with an example which is used in industry for finding the cause of any problem.
- 3) Name & compare the three philosophies given for the quality management.
- 4) Name the graphical methods of data presentation and describe the best suitable method for the central tendency.

Section B: 4X10=40 (Attempt any one part from Q8)

- 5) Discuss the assumptions made in Deming's Kp rules. When would you use this rule?
- 6) i) The numbers of weekly customer complaints are monitored at a large hotel using a c-chart. Complaints have been recorded over the past twenty weeks. Develop three-sigma control limits using the following data:

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
No. Of Complaints	3	2	3	1	3	3	2	1	3	1	3	4	2	1	1	1	3	2	2	3

- ii) Explain the advantages of using control charts in Industries. Which control charts are more preferable & why?
- 7) A major automobile company is interested in reducing the time that customers have to wait while having their car serviced with one of the dealers. They select four customers randomly each day and find the total time that each customer has to wait (in minutes) while his or her car is serviced. From these four observations, the sample average and range are found. This process is repeated for 25 days. The summary data for observations are

$$\sum_{i=1}^{25} \bar{X}_i = 1000, \sum_{i=1}^{25} R_i = 250$$

- (a) Find the \bar{X} and R-chart limits
- (b) Assuming that the process is in control and the distribution of waiting time is normal, find the percentage of customers who will not have to wait more than 50 minutes.
- 8) Determine the control limits for X and R chart if $\sum \bar{X} = 357.50$ & $\sum R = 9.90$ number of subgroups (=sample) = 20 it is given that $A_2 = 0.18$, $D_3 = 0.41$, $D_4 = 1.59$ and $d_2 = 3.735$. Also find the process capability.

OR

Discuss the Cost of Quality and is it feasible to increase productivity and reduce quality costs at the same time? Explain

Section C: 40 marks each (Attempt any one part from Q10)

- 9) For the sampling plan $N = 1500$, $n = 150$, $c = 3$,
- Construct the OC curve. If the acceptable quality level is 0.05% nonconforming and the limiting quality level is 6% nonconforming, describe the protection offered by the plan at these quality levels.
 - Construct the average outgoing quality curve.
 - What is the AOQL? Interpret it.
- 10) a) What do you mean by process capability? What are the capability indices.
- b) The intensive care unit lab process has an average turnaround time of 26.2 minutes and a standard deviation of 1.35 minutes. The nominal value for this service is 25 minutes with an upper specification limit of 30 minutes and a lower specification limit of 20 minutes. The administrator of the lab wants to have three-sigma performance for her lab. Is the lab process capable of this level of performance?

OR

- Skip-lot sampling plan
- Natural tolerance
- Producer & Consumer Risk
- Defects & defective