KUMARAGURU
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M.E DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2014)

Second Semester

INDUSTRIAL ENGINEERING

P14IET203: Quality Engineering

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1.   Control charts are used   [K1]

   a)   to assure the quality   b)   to improve the quality

   c)   to compare the quality   d)   to control quality

2.   The readings obtained in inspection by attributes are plotted in   [K2]

   a)   p chart   b)   x and R chart

   c)   C chart   d)   A B C chart

3.   Acceptance sampling is carried out   [K2]

   a)   to assure the quality   b)   to improve the quality

   c)   to compare the quality   d)   to control quality

4.   [K3]

List I	List II
A. np chart	i. No. of defects in products of varying sample size
B. C chart	ii. Moving range
C. p chart	iii. Constant sample size
D. MR	iv. No. of defects in portion of the population

   a)   A-iii, B-iv, C-i, D-ii   b)   A-iv, B-i, C-iii, D-ii

   c)   A-i, B-iii, C-iv, D-ii   d)   A-ii, B-iv, C-i, D-iii

5.   Taguchi's techniques were initially developed in   [K1]

   a)   Japan   b)   UK

   c)   USA   d)   Germany

6.   Factorial experiments are suitable when an experiment is having   [K3]

   a)   Single factor of interest   b)   Two factors of interest

   c)   Many factors of interest   d)   Not relevant

7. Assertion (A): TQM is continuous quality improvement   [K₂]

    Reason (R): TQM gives benefit to Customers, Employees and Society.

    a) A is TRUE and B is FALSE   b) A is FALSE and B is TRUE

    c) Both A and B are TRUE   d) Both A and B are FALSE

8. ISO 9000 is a standard for   [K₁]

    a) Product quality   b) Process quality

    c) Quality Management System   d) All the above

9. In exponential distribution, the hazard rate is   [K₂]

    a) Exponentially increasing   b) Exponentially decreasing

    c) Varying linearly   d) Constant

10. Reliability deals with   [K₁]

    a) Hazard analysis   b) Failure mode and effects analysis

    c) Fault tree analysis   d) All the above

PART B (10 x 2 = 20 Marks)

11. Differentiate between inspection and quality control.   [K₂]

12. Differentiate variables and attributes.   [K₁]

13. Explain the significance of OC curves.   [K₂]

14. Define AOQL.   [K₁]

15. Explain the importance of experimental design in quality control.   [K₃]

16. Explain the significance of Taguchi method.   [K₂]

17. Define Quality Circles.   [K₂]

18. Define Quality Function Deployment (QFD).   [K₂]

19. Define the terms failure and reliability.   [K₁]

20. Define standard redundancy.   [K₂]

PART C (6 x 5 = 30 Marks)

21. A subgroup of 5 items each are taken from a manufacturing process at a regular interval. A [K₃]
    certain quality characteristics are measured and x and R values are computed. After 25
    subgroups, it is found that Σx= 357.5 and ΣR= 8.80. If the specification limits are 14.40 ± 0.40
    and if the process is in statistical control, what conclusions can you draw about the ability of
    the process to produce items within specification.

22. Describe significance of process capability in quality control? [K2]

23. Explain the deficiency of Taguchi's inner array outer array design? What is the alternative [K2] recommended by Montgomery?

24. Describe the purpose of an ISO 9000 quality system. [K2]

25. Discuss briefly about Zero defect management. [K2]

26. Explain the methods for improving reliability during design. [K2]

PART D (4 x 10 = 40 Marks)

27. Define quality. Select a product and describe how the dimensions of quality influence its [K3] acceptance.

28. A leading computer firm uses a sampling plan of n = 50 and c = 0 regardless of lot sizes. [K3] Construct OC and AOQ curves. Graphically determine the AQL value for α = 0.05 and the AOQL value.

29. An engineer at a casting company performed an experiment to determine which factor [K3] (quenching temperature, alloy content, or machine tool speed) had the largest effect on the surface roughness. The following table gives the levels for each factor in the experiment. Using a one-factor-at-a-time experiment, determine which factor has the most effect on surface roughness if the response are y_o = 1.10 µin, y_A = 1.20 µin, y_B = 0.80 µin and y_C =1.60 µin.

Factor	Description	Level 1	Level 2
A	Quenching temperature (˚F)	800	400
B	Machine tool speed (inch/s)	0.005	0.01
C	Nickel Alloy content (%)	1	4

30. Define TQM. Discuss the basic concepts of TQM in detail. [K1]

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