Registration no:

Total Number of Pages:

M.TECH
IMPC 201

Second Semester Examination – 2013
QUALITY ENGINEERING AND MANAGEMENT

Time: 3 Hours

Max marks: 70

Answer Question No.1 which is compulsory and any five from the rest.

The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

a) Define statistical quality control (SQC).
b) Differentiate between variables chart and attributes chart.
c) What is ISO 9001?
d) Differentiate between P and C chart in SQC?
e) What is the difference between producer risk and consumer risk in quality control?
f) What is Juran's trilogy of quality management?
g) What are the steps involved in PDSA cycle?
h) What are the different costs of quality?
i) What is Operating Characteristics Curve?
j) Define six-sigma.

Q2 a) What does the term 'Statistical Quality Control' mean? Explain the different techniques used in Statistical Quality Control. (5)

b) Mention the seven basic tools involved in statistic quality control (5)

Q3 a) Discuss the Deming philosophies and their impact on quality (5)

b) Explain the Juran's principles on quality management. (5)

Q4 A machine is working to specification of 12.58±0.05 mm. The study of 50 consecutive pieces shows the following measurements put into 10 groups of 5 each. (10)

1	2	3	4	5	6	7	8	9	10
12.62	12.63	12.62	12.61	12.59	12.57	12.57	12.59	12.63	12.70
12.6	12.56	12.56	12.66	12.58	12.63	12.56	12.59	12.60	12.71
12.62	12.60	12.57	12.62	12.57	12.59	12.61	12.60	12.62	12.63
12.61	12.59	12.58	12.61	12.59	12.59	12.59	12.59	12.63	12.56
12.65	12.63	12.63	12.60	12.56	12.59	12.59	12.62	12.66	12.58

Determine the process capability and 3 sigma limit for $\bar{X}$ chart.

Q5 a) What is the significance of ISO in quality management? (3)

b) Your company develops a new manufacturing process to make its key product. You sample the product and find that some of them are defective, as per the data in the chart. Draw the process control chart for the new manufacturing process (Z=3). (7)

Sample	n	Defectives
1	100	4
2	100	1
3	100	3
4	100	3
5	100	3
6	100	4
7	100	3
8	100	11
9	100	1
10	100	2
11	100	3
12	100	2
13	100	2
14	100	10
15	100	3

Q6 Set up an analysis of variance table for the following two-way design results: (10)

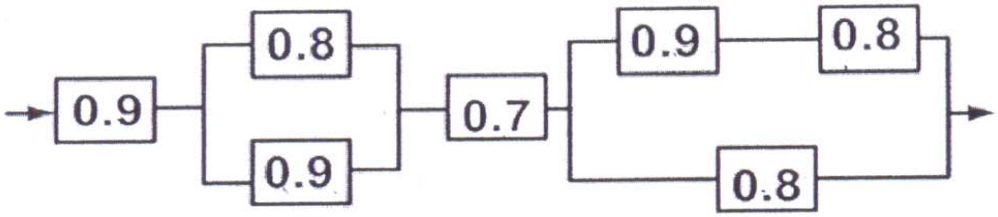
Per Acre Production Data of Wheat *(in metric tonnes)*

Varieties of seeds →	A	B	C
Varieties of fertilizers ↓			
W	6	5	5
X	7	5	4
Y	3	3	3
Z	8	7	4

Also state whether variety differences are significance at 5% level.

Q7 a) Discuss the need for availability and maintainability in reliability. (5)

b) Compute the system reliability of the following system (5)



Q8 Write Short notes (4 x 2.5)

a) Acceptance sampling
b) Bath tub curve
c) Process capability
d) ISO 9000 and 14000 standards.