Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **M.Tech**
IMPC201

2nd Semester Back Examination 2016-17

QUALITY ENGINEERING AND MANAGEMENT
BRANCH:INDUSTRIAL ENGG, INDUSTRIAL ENGG & MANAGEMENT
Time: 3 Hours
Max Marks: 70
Q.CODE:Z503

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*10)

a) Name different Quality Rewards.
b) Explain system reliability through diagram?
c) What is Quality circle & who developed it?
d) What are the different causes of wear out failure in bath tub curve?
e) What is AQL & LPTD ?
f) What are the different causes of wear out failure in bath tub curve?
g) Explain Operating Characteristics Curve?
h) According to Crosby philosophy, which are basic elements of improvement?
i) What is poka-yoke?
j) What are the basic steps to implement Kaizen?

Q2. Inspection results of magnets for 19 observations are given in the following table. (10)

Week No.	No. of Magnets inspected	No. of defective magnets
1	724	48
2	763	83
3	748	70
4	748	85
5	724	45
6	727	56
7	726	48
8	719	67
9	759	37
10	745	52
11	736	47
12	739	50
13	723	47
14	748	57
15	770	51
16	756	71
17	719	53
18	757	34
19	760	29

a) Calculate the average fraction defective and 3 sigma control limits, construct the control chart. State whether the process is in statistical control?
b) What will be the new mean fraction defective if some points outside control limit are eliminated? What will be the corresponding upper & lower control limits?

Q3. a) Discuss the four dimensions of Quality of a good or service. (5)
b) Explain seven problem solving tools with diagram. (5)

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

Subgroup No.	1	2	3	4	5	6	7	8	9	10
Dimension of each sample of 5	12.63	12.62	12.60	12.61	12.59	12.59	12.59	12.61	12.58	12.54
	12.60	12.56	12.56	12.66	12.57	12.59	12.60	12.62	12.57	12.56
	12.62	12.61	12.59	12.63	12.58	12.61	12.60	12.60	12.60	12.62
	12.60	12.59	12.56	12.60	12.56	12.56	12.63	12.65	12.61	12.54
	12.65	12.60	12.63	12.61	12.59	12.57	12.57	12.60	12.60	12.36

a) Determine the 3 Sigma limits of X (bar) chart.
b) Determine the process capability.
c) Does it appear that the machine is capable of meeting the specification requirements?

Assume:

a. Normal distribution.
b. d_2 for sub group of 5 is 2.326.

Q5) a)Give a comparison of three Quality Gurus on the basis of definition, statistical process control, cost of Quality, performance standard & structure. (5)

b)Explain Bath tub curve. (5)

Q6. a) Define TQM. Explain the principles associated with it. (5)

b) Explain different cost of Quality (5)

Q7.

Per acre production data			
Plot of land	Variety of wheat (Metric Tonnes)		
	A	B	C
1	55	72	47
2	64	66	53
3	58	57	74
4	59	57	58

Set up an analysis of variance table for the following per acre production data for three varieties of wheat, each grown on 4 plots and state if the variety differences are significant (significance at 5% level) (10)

Q8. **Write Short note on any Two** (5*2)

a) ISO 9000
b) Malcolm Baldrige National Quality Award
c) PDCA cycle