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The LNM Institute of Information Technology

THE LNM INSTITUTE OF INFORMATION TECHNOLOGY (LNMIIT)

Department of Mechanical-Mechatronics Engineering

Total Quality Management
MID Term Examination

Time: 90 minutes **Date:** 26 /Feb /2018 **Max. Marks:** 60

Instructions: ***No doubt clarifications in the examination hall. If assumptions are to be made, make your own assumptions, state it and use it. If assumptions are relevant and it makes sense it will be considered. Answer must be to the point. Assume suitable data, if required. All questions carry equal marks.***

1. What characteristics would be used to evaluate quality for the following products? (5 marks)
   a.) Ceiling fan
   b.) Toothbrush

2. What is the purpose of quality audit? What are the different types of quality audits? Discuss each and identify the context in which they are used. (10 marks)

3. Assume that a company has just committed to change from a traditional style of management to one based on TQM. What strategies would you include for shop floor employees? Explain in detail. (10 marks)

4. How would you establish a system to measure customer satisfaction? (10 marks)

5. State and explain each rule for determining out-of-control points in statistical process control chart. (10 marks)

6. Describe Juran's quality trilogy program with detailed explanation. (10 marks)

7. A) Find true or false statements. (2.5 marks)
   i. Failure costs increases with prevention.
   ii. Vision statement provides strategy for achieving mission.
   iii. Kaizen means dramatic improvement.
   iv. 99.73% of values lie between 2σ limits.
   v. Quality circle is an informal group of people.

   B) Match the following: (2.5 marks)

a.	Feigenbaum	i.	Pareto diagram
b.	Crosby	ii.	quality loss function
c.	Ishikawa	iii.	concept of zero defects
d.	Taguchi	iv.	total quality control
e.	Prioritizing	v.	concept of internal customer

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Total Quality Management
ENDTerm Examination

Time: 3 hours **Date:**07 /May/2018 **Max. Marks:** 100

Instructions:*No doubt clarifications in the examination hall. If assumptions are to be made, make your own assumptions, state it and use it. If assumptions are relevant and it makes sense it will be considered. Answer must be to the point.Assume suitable data, if required.*

1. A.) A machine produces certain components with dimensions as given below. Calculate the limits and draw $\bar{X}$ and R charts. (5)

Sample	X_1	X_2	X_3	X_4	X_5	X_6
1	7	10	11	12	15	12
2	6	9	10	10	10	13
3	5	6	7	8	12	13
4	10	11	11	12	12	16
5	6	7	8	9	10	10
6	7	8	9	9	10	13
7	6	7	9	9	11	11
8	7	8	9	10	10	12
9	6	10	10	11	11	15
10	4	6	8	9	10	12

B.) In a blade manufacturing factory, 1000 blades are examined daily. Draw the np chart for the following table and examine whether the process is under control? (5)

Date:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of defective blades	9	10	12	8	7	15	10	12	10	8	7	13	14	15	16

2. Discuss the categorization of manufacturing losses in TPM. What is overall equipment effectiveness? Define all terms used in OEE. (10)
3. Briefly explain below: (20)
   A) Life cycle curve with neat diagram
   B) Different criteria for Malcolm Baldridge National Quality Award
   C) Four strategies for ~~performance measures~~ Continuous improvement
   D) Cause and effect diagram with example
4. When do you use 'quality function deployment'? What are the steps involved in QFD process? Explain in detail. (10)

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5. When do you conduct FMEA? Discuss the procedure for FMEA. Also discuss an example using FMEA form. (10)

6. What is benchmarking? Describe internal, functional, process and competitive benchmarking. (10)

7. What is ISO 14000? Discuss organizational evaluation standards of ISO 14000 series. (10)

8. A.) Calculate the probability of survival of an equipment that will work for 500 hours and which consists of 4 sub-assemblies having the following MTBF. (5)

Sub-system	A	B	C	D
MTBF	5000 hrs	3000 hrs	15000 hrs	15000 hrs

Consider two cases; first sub-assemblies are in series and second sub-assemblies are in parallel.

B.) What is the highest failure rate for a product if it is to have a probability of survival of 95% at 4000hrs? Assume that the time to failure follows exponential distribution. (5)

9. True and False (5)

a.) All processes in an organization have to be benchmarked. (True/ False)
b.) Higher the severity, lower the effect on the system. (True/ False)
c.) Predictive maintenance is based on data. (True/ False)
d.) FMEA is a requirement of ISO 9001. (True/ False)
e.) 5S is one of the pillars of TPM.(True/ False)
f.) Audits are informal activities. (True/ False)
g.) 6 sigma means more profit. (True/ False)
h.) Seven points closer to central line means that the process is not stable.(True/ False)
i.) Mean is a measure of dispersion. (True/ False)
j.) Process is stable when there are special causes variations.(True/ False)

10. Match the following: (5)

A. ISO 14020	i. QS Model for Quality Assurance in Production, Installation, and Servicing
B. ISO 14021	ii. QS Model for Quality Assurance in Final Inspection and Test
C. ISO 14022	iii. Principles and framework of life cycle assessment
D. ISO14040	iv. Environmental Labelling – Self Declaration of Environmental Claims
E. ISO 14041	v. Improvement Assessment of life cycle assessment
F. ISO 14042	vi. Quality Management and Quality System Elements – Guidelines
G. ISO 14043	vii. Environmental Labelling – Symbols
H. ISO 9002	viii. Life-Cycle Assessment – Goals and Definition
I. ISO 9003	ix. Impact Assessment of life cycle assessment
J. ISO 9004	x. Environmental Labelling – Basic Principles for All Environmental Labelling