Code No: R32036 **R10** **Set No: 1**

III B.Tech. II Semester Regular/Supplementary Examinations, May/June -2014

INDUSTRIAL ENGINEERING & MANAGEMENT

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. a) Define Industrial Engineering and explain its role in increasing the productivity.
   b) Explain the principles of scientific management.

2. a) Compare the advantages, limitations and suitability of rural and urban locations.
   b) Identify and describe the different models used to assist layout designer.

3. a) What is a process chart? State the advantages of process charts and explain any one process chart.
   b) What is work sampling? Explain its need and the procedure of conducting the work sampling study.

4. a) What is meant by statistical quality control of processes? Discuss in detail with examples stating the advantages.
   b) Tests of tensile strength of malleable iron castings form four foundries gave the following results:

Foundry	Number of tests	Average tensile strength	Standard deviation
A_1	54	58,400	1,600
A_2	60	57,000	1,550
A_3	71	57,700	1,190
A_4	49	56,900	2,080

   The average sample size is 59. Plot $\bar{\bar{X}}$ and σ charts to judge whether there is clear evidence that the different foundries represent different cause system. Use simple un-weighted average to determine $\bar{\bar{X}}$ and $\bar{\sigma}$, base your limits on average sample size.

5. a) State the importance and methods of job evaluation.
   b) What are the functions of Personnel Management?

6. a) What is a Quality circle? Describe its role in quality improvement.
   b) Describe the key steps of the process of getting registered to ISO 9000 certification.

7. a) What is ERP? Explain the benefits of ERP.
   b) Explain are the steps involved in value analysis?

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8. a) What is the basic object of CPM and PERT technique?
b) A small project is composed of the following activities whose time estimates are given below: (Estimated activity duration in days)

Activity	A	B	C	D	E	F	G	H
Predecessor	-	A	A	B	C, B	E	D	F, G
Optimistic	2	8	14	4	6	6	18	8
Most likely	4	12	16	10	12	8	18	14
Pessimistic	6	16	30	16	18	22	30	32

(i) Draw the net work and find the critical path.
(ii) Compute the expected project completion time.
(iii) What is the probability that the project will require 75 days?

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Code No: R32036 **R10** **Set No: 2**

III B.Tech. II Semester Regular/Supplementary Examinations, May/June -2014

INDUSTRIAL ENGINEERING & MANAGEMENT

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. a) State and describe the Fayol's principles of management.
   b) Explain the tools and techniques of industrial engineering.

2. a) Bring out the difference between product layout and process layout.
   b) Explain the different types of maintenance systems.

3. a) When is it required to prepare a micro-motion study and how is it done?
   b) How do you estimate time by MTM method? Explain.

4. a) Define the term quality and state various factors which affect the product quality.
   b) A soft drink is sold in bottles marked 325 ml. The bottles are filled by an automatic machine. The results of 25 samples of 5 bottles each taken every 15 minutes of production, produced during the first shift are given below. The measurement 'x' is the number of millimeters over 300 ml and the range is in millimeters. Compute the control limits and comment on the process.

Sample No.	1	2	3	4	5	6	7	8	9
$\bar{X}$	28.2	24.1	25.1	24.3	24.5	27.1	26.1	25.1	23.9
R	11	8	5	5	3	4	4	5	7
Sample No.	10	11	12	13	14	15	16	17	18
$\bar{X}$	20.5	23.0	23.2	26.1	25.9	25.5	22.9	26.1	27.5
R	4	3	5	4	6	2	4	5	3
Sample No.	19	20	21	22	23	24	25		
$\bar{X}$	24.5	25.3	26.1	25.1	27.1	25.5	26.4		
R	7	6	5	5	3	6	4		

5. a) Explain the characteristics of a good incentive system.
   b) What is meant by job evaluation? Explain the methods of job evaluation.

6. a) What is quality circles? Explain the formation and advantages of quality circles.
   b) Explain the concept of (i) Zero Defect & (ii) Six sigma.

7. a) State the modules of ERP?
   b) What are the various reasons for poor value in products? Do you think all the reasons are equally important?

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8. a) Explain the rules of network construction.
b) The activity details along with time estimates in days and precedence relationships are given below:

Activity	Predecessor	Time estimate		
		Optimistic	Most likely	Pessimistic
A	--	1	2	3
B	A	1	2	3
C	A	2	4	6
D	A	2	5	14
E	C,D	6	12	18
F	D	1	3	5
G	E	10	12	30
H	G	3	5	7
I	H	1	2	3
J	B and I	5	10	15

(i) Construct the net work.
(ii) Find the Critical path and project duration.
(iii) Probability of the completion of the project within the expected time.

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Code No: R32036 **R10** **Set No: 3**

III B.Tech. II Semester Regular/Supplementary Examinations, May/June -2014

INDUSTRIAL ENGINEERING & MANAGEMENT

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. a) Describe the functions of management.
   b) Explain the scope and historic development of Industrial Engineering?

2. a) What are the factors to be considered for the selection of a location for a plant? Discuss.
   b) Explain the importance of plant location decision.

3. a) How are different subjects studied simultaneously by a string diagram? Give advantages and limitations of string diagram.
   b) What is performance rating Explain the various methods of rating?

4. a) What is quality control? How is it different from inspection?
   b) Random samples of 4 are taken for the thickness of sheet metal (in mm) used in automobile bodies. The averages and standard deviation are calculated for each sample and are given below:

Sample No.	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	10.19	9.80	10.12	10.54	9.86	9.45	10.06	10.13	9.82	10.17
σ	0.15	0.12	0.18	0.19	0.14	0.09	0.16	0.18	0.14	0.13
Sample No.	11	12	13	14	15	16	17	18	19	20
$\bar{X}$	10.18	9.85	9.82	10.18	9.96	9.57	10.14	10.08	9.82	10.15
σ	0.16	0.15	0.06	0.34	0.11	0.09	0.12	0.15	0.09	0.12

   (i) Find the control limits for the $\bar{X}$ and σ charts? If there are out-of-control points, assume special causes and revise the limits.
   (ii) Estimate the universe process mean and process standard deviation.

5. a) What are the objectives of evaluating different jobs in an organization?
   b) What is Bedaux point incentive system? Explain the advantages and disadvantages.

6. a) What is the need for ISO 9000 standards? What are the various certifications under this umbrella of ISO 9000?
   b) What is a Quality circle? Describe its role in quality improvement.

7. a) What is supply chain management?
   b) Explain the stages/phases of Enterprise Resource Planning.

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8. a) Explain, under what circumstances can be think of using dummy in a network.
   b) The following table lists the jobs of a network along with their time estimates.

Job		Duration (days)		
i	j	Optimistic	Most Likely	Pessimistic
1	2	3	6	15
1	6	2	5	14
2	3	6	12	30
2	4	2	5	8
3	5	5	11	17
4	5	3	6	15
6	7	3	9	27
5	8	1	4	7
7	8	4	19	28

(i) Draw the project net work.
(ii) Calculate the length and variance of the critical path and
(iii) What is the probability that the jobs on the critical path will be completed in 41 days?

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Code No: R32036 **R10** **Set No: 4**

III B.Tech. II Semester Regular/Supplementary Examinations, May/June -2014

INDUSTRIAL ENGINEERING & MANAGEMENT

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. a) What are the contributions of Taylor for scientific management?
   b) Explain the partial productivity measures and total productivity measure and what are the advantages and limitations of each?

2. a) Explain the principles of plant layout.
   b) What is the importance of maintenance? What the various types of maintenance?

3. a) Describe the basic procedure to be followed in adopting work study techniques for sound results
   b) Why is it necessary to break an operation into elements and explain the various types of elements with examples for each?

4. a) Explain the significance of statistics in quality control.
   b) The specifications for a product characteristic are 0.3027+0.008. The values given below are the last two figures of the dimensions reading that, 23 means 0.0323. Sample size is 5.

Sample No.	1	2	3	4	5	6	7	8	9	10
X	24	19	28	26	26	21	25	29	31	30
R	7	5	3	2	9	2	4	6	2	3
Sample No.	11	12	13	14	15	16	17	18	19	20
X	22	24	19	27	26	29	22	28	21	18
R	6	14	3	3	5	7	5	4	5	7

   Compute the X and R- chart control limits and comment on the process.

5. a) Explain the Rowan plan of wage payment.
   b) What is merit rating? Explain the methods of merit rating.

6. a) Describe the key steps of the process of getting registered to ISO 9000 certification.
   b) Explain the concept of Six Sigma. How does it improve the quality of a product?

7. a) What are the different types of values?
   b) What is a supply chain? What are the design parameters of a supply chain and also explain the influence of each parameter on the supply chain.

Code No: R32036 **R10** **Set No: 4**

8. a) Explain, under what circumstances can be think of using dummy in a network.
b) For the following data, (i) compute the project completion time (ii) Crash the project to 7 weeks at the least cost.

Activity	Preceding Activity	Normal Time (days)	Crash Time (days)	Normal cost (Rs.)	Crash cost (Rs.)
A	-	3	2	1000	1600
B	-	2	1	2000	2700
C	-	1	1	300	300
D	A	7	3	1300	1600
E	B	6	3	850	1000
F	C	2	1	4000	5000
G	D,E	4	2	1500	2000

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