Seat No.:	Enrolment No.

## **GUJARAT TECHNOLOGICAL UNIVERSITY**

BE - SEMESTER-VI • EXAMINATION – SUMMER 2013

Subject Code: 161907 Date: 01-06-2013

**Subject Name: Industrial Engineering** 

Time: 10.30 am - 01.00 pm Total Marks: 70

**Instructions:** 

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) What is PPC? Explain the function of PPC in brief.

**07** 

**(b)** Principle of good layout

03

(c) A company is to decide on the location of a new plant. It has narrowed down the choice to 3 locations A, B, and C; data in respect of which is furnished below: Use suitable criterion and advise the company on the best choice.

Data	Location A	Location B	Location C
Wages& salaries	Rs.20,000	Rs.20,000	Rs.20,000
Power, water supply expenses	Rs.20,000	Rs.30,000	Rs.25,000
Raw material & other supplies	Rs.80,000	Rs.75,000	Rs.60,000
Total initial investment	Rs.2,00,000	Rs.3,00,000	Rs.2,50,000
Distribution expenses	Rs.50,000	Rs.40,000	Rs.60,000
Miscellaneous expenses	Rs.40,000	Rs.25,000	Rs.30,000
Expected sales per year	Rs.2,25,000	Rs.2,50,000	Rs.2,25,000

## Q.2 (a) (i) Define the following:

04

**Productivity** 

Productivity Index

Work study

**Ergonomics** 

(ii) The elemental times (in minutes) for 4 cycles of an operation using a stop **03** watch are as follow:

Elements	Cycle time in minutes								
	1	2	3	4					
1	1.5	1.5	1.3	1.4					
2	2.6	2.7	2.4	2.6					
3	3.3	3.2	3.4	3.4					
4	1.2	1.2	1.1	1.2					
5	0.51	0.51	0.52	0.49					

Calculate standard time for the operation if

Element 2 and 4 are machine element, and for other elements the operator is rated at 110% and allowances are 15% of normal time.

(b) Draw man-machine chart for the following condition and find working time and 07 % utilization of man and machine:

No. of operator= 1, No. of machines=  $2 (M_1 \& M_2)$ 

- 1. Time for clamping the work and setting the tool on  $M_1$ &  $M_2$  each = 0.2 minute
- 2. Machining time on  $M_1 = 0.4$  minute
- 3. Machining time on  $M_2 = 0.6$  minute
- 4. Groove cutting and parting off on  $M_1 = 0.3$  minute
- 5. Parting off on  $M_2 = 0.1$  minute

(b) Turning gear blanks on centre lathe involves the following elements. The stop watch data is given. Assuming the rest and the personal allowances as 13% and contingency allowance of 2%, calculate standard time.

Elem-	Description	Observation					
ents		1	2	3	4	5	
1	Pick &place	0.20	1.46	5.22	6.49*	14.25	
2	Start machine and approach tool	0.30	1.55	5.30	13.10	14.35	
3	Turn diameter	1.05	2.31	6.05	13.84	15.10	
4	Withdraw tool and stop machine	1.13	2.38	6.14	13.92	15.17	
5	Release part and keep it aside	1.28	2.54*	6.29	14.06	15.32	

Foreign elements: \*(1) 2.54 to 5.02 taking to another operator (2) 6.49 to 12.98 away for personal need.

Rating factor for element 1 is 90%, element 2 and 4 is 110%, element 3 is 100% (auto cycle), element 5 is 95%.

Q.3 (a) The demand for a product during the last 10 years is given below. Estimate the 07 demand for the next two years by the method of regression.

Ī	Year	1	2	3	4	5	6	7	8	9	10
	Units	124	135	145	150	167	157	161	170	187	168

OR

**(b)** What is MRP? Explain steps involved in MRP programme.

07

- Q.3 (a) In order to achieve sound plant layout, explain in detail the scientific step by step 07 procedure that must be followed.
  - (b) For the given data, propose efficient schedule using (i) minimum process time (ii) 07 first come first serve (iii) longest process time (iv) due date. Give your comment.

Job	A	В	C	D	E
Processing time (days)	9	7	5	11	6
Due date	16	20	25	15	40

Q.4 (a) (i) Difference between Job Evaluation and Merit Rating

03

(ii) Calculate the earnings of a worker under Halsey Plan and Rowan plan. The **04** relevant data is given below:

Time rate = Rs. 0.60/hr, Time allowed= 8 hrs,

Time taken= 6 hrs, Time saved= 2 hrs

(b) (i) Differentiate Minimum Wage, Fair Wage and Living Wage.

03

(ii) What is industrial legislation and why it is required?

04

OR

Q.4 (a) Explain the following:

**07** 

- (i) The workmenøs Compensation Act, 1923
- (ii) The Factory Act, 1948
- **Q.4 (b)** Explain the following in brief:

**07** 

- (i) The OC curve
- (ii) Control chart for the number of defects

Q.5 (a) Six consecutive lots received from a vendor were inspected by sampling process 07 by the inward inspection the buyer. The sample size was varied as per variation in the lot size. The data were recorded as under:

Sample No.	1	2	3	4	5	6
Lot size	2850	1860	480	970	4385	2568
Sample size	125	125	50	80	200	125
No. of defectives	1	3	-	2	4	1

Construct a control chart for fraction defectives and no. of defectives.

(b) Discuss in brief:
Factor affecting entrepreneurial growth

OR

Q.5 (a) 10 samples (each of size 100) of a component were inspected. The results of the 07 inspection are given below:

Sample No.	1	2	3	4	5	6	7	8	9	10
No. of defection	2	0	4	3	1	2	3	1	1	2

Draw the relevant control chart taking 3 sigma limits.

- (b) (i) Define the term entrepreneur and entrepreneurship & differentiate them. 04
  - (ii) list out the obstacles in the way of Entrepreneursødevelopment. 03

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