

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: **04**
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 watch are as follow: **03**

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 % utilization of man and machine: **07**

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

OR

- (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. **07**

Elem- ents	Description	Observation				
		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 demand for the next two years by the method of regression. **07**

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

- (b)** What is MRP? Explain steps involved in MRP programme. **07**

OR

- Q.3 (a)** In order to achieve sound plant layout, explain in detail the scientific step by step procedure that must be followed. **07**

- (b)** For the given data, propose efficient schedule using (i) minimum process time (ii) first come first serve (iii) longest process time (iv) due date. Give your comment. **07**

Job	A	B	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 relevant data is given below: **04**

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 workmen's 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 by the inward inspection the buyer. The sample size was varied as per variation in the lot size. The data were recorded as under: **07**

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 **07**

OR

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

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 Entrepreneurs development. **03**
