

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2161907

Date:13/05/2016

Subject Name: Industrial Engineering

Time: 10:30 AM to 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) Discuss the various factors that affects the plant location. 07
(b) Differentiate between product layout and process layout by taking suitable example. 07

- Q.2 (a) What is PPC? Explain the function of PPC in brief. 07
(b) The sales of a product during the last four years were 860,880,870,890 units. The forecast for the fourth year was 876 units. If the forecast for the fifth year using exponential smoothing is equal to the forecast using a 3 period moving average. Find the value of smoothing constant (α). 07

OR

- (b) The following data gives the sales of the company for various years. By the method of least square find the trend values for each of the year. Forecast the sales for the year 1998 and 1999. 07

Year	Sales ('000)
1989	13
1990	20
1991	20
1992	28
1993	30
1994	32
1995	33
1996	38
1997	43

- Q.3 (a) What is line of balance? Discuss in detail. 07
(b) A work sampling study was conducted to establish the standard time for an operation. The observations of the study is given below: 07
Total number of observations = 160
Manual (hand controlled work) = 14
Machine controlled work = 106
Machine idle time = 40
Average performance rating = 80%
No. of parts produced = 36
Allowance for personal needs and fatigue = 10%
Study conducted for 3 days
Available working hours per day = 8 hrs
Calculate the standard time per piece.

OR

Q.3 (a) What is Productivity? Discuss the following: **07**

- (i) Ineffective time within the control of the worker.
- (ii) Ineffective time due to shortcomings on the part of management.

(b) A time study was conducted on a job consisting of three elements. Stop watch readings in hundredth of a minute are given. Calculate the standard time if allowance is 12%. **07**

Elements	Stop watch readings					Rating
	1	2	3	4	5	
A	10	73	139	203	266	80
B	25	88	155	218	288	100
C	64	128	193	257	320	110

Q.4 (a) Explain in brief various charts and diagrams utilized in method study. **07**

(b) Define wages and explain in detail various types of incentives plans. **07**

OR

Q.4 (a) What is industrial legislation? Name the different acts which are helpful in resolving the industrial disputes. Discuss any one act in detail. **07**

(b) What is an OC curve? Explain the step-by-step procedure for the construction of an OC curve. **07**

Q.5 (a) Write short note on: **07**

- (1) Six Sigma
- (2) T. Q. M.

(b) Following are the readings of diameters taken for pins manufactured on the lathe machine. Draw X-bar and R chart for the given data and state whether the process is in control. (Given: $A_2=0.577$, $D_3=0$, $D_4=2.114$). **07**

Sample	1	2	3	4	5
1	5.02	5.01	4.94	4.99	4.96
2	5.01	5.03	5.07	4.95	4.96
3	4.99	5.00	4.93	4.92	4.99
4	5.03	4.91	5.01	4.98	4.89
5	4.95	4.92	5.03	5.05	5.01
6	4.97	5.06	5.06	4.96	5.03
7	5.05	5.01	5.10	4.96	4.99
8	5.09	5.10	5.00	4.99	5.08
9	5.14	5.10	4.99	5.08	5.09
10	5.01	4.98	5.08	5.07	4.99

OR

Q.5 (a) In a manufacturing process, the no of defectives found in the inspection of 15 lots of 400 items each are given below: **07**

Sample No.	No. of Defectives	Sample No.	No. of Defectives
1	2	9	18
2	5	10	8
3	0	11	6
4	14	12	0
5	3	13	3
6	0	14	0
7	1	15	6
8	0		

Draw the Suitable control chart and state whether the process is in control.
Determine the revised control limits.

- (b)** State various sources of industrial finance and government incentives to entrepreneurs. **07**
