UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

Program: B.Tech ADE | **Semester – VI**
Subject (Course): Industrial Engineering and Management | **Max. Marks : 100**
Course Code : IMGT 303 | **Duration : 3 Hrs**
No. of page/s: 3

SECTION A [20 Marks]

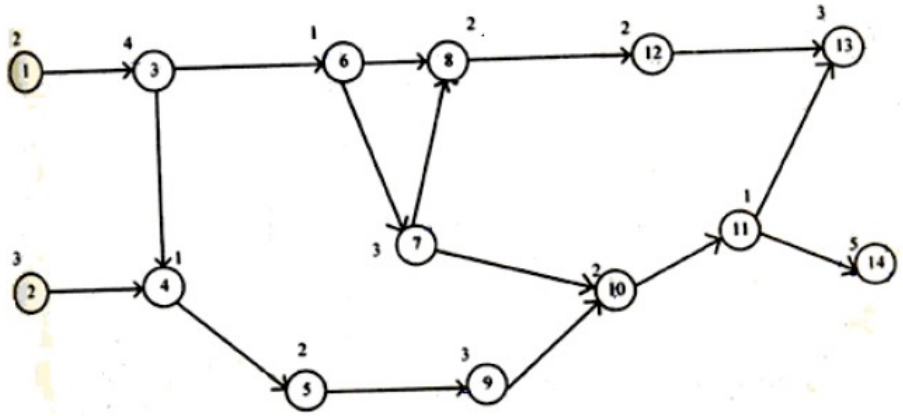
Note: Attempt all questions. Be brief and specific.

S. No.	Content	Marks	CO
Q1.	Draw the sketch of following five therbligs: (a)Release load (b) Plan (c) Rest (d) Preposition (e) Unavoidable delay	5	CO4
Q2.	Briefly explain following five principles of management of Henry Fayol: (a)Scalar chain (b) Esprit de corps (c) Order (d) Unity of direction (e) Initiative	5	CO5
Q3.	Briefly explain Type A and Type B error in Statistical Quality control.	5	CO2
Q4.	A soldering operation was work-sampled over two days (16 hours) during which an employee soldered 108 joints. Actual working time was 90% of the total time and the performance rating was estimated to be 120 percent. If the contract provides allowance of 20 percent of the total time available. Calculate the standard time for the operation.	5	CO4

SECTION B [40 Marks]

Note: Attempt all questions. Be brief and specific.

Q5.	A material manager had recently attended a short training program on material management he thought of applying some of the optimization concept that he had learnt. He picked on one item BV1960, which was essentially a brass valve. From the current record he found that the average annual demand was 10000 valves. The accounting information system revealed that the carrying cost Rs.0.40 per valve per year whereas the ordering cost was Rs. 5.50/- per order. The current policy adopted in the company was to order for 400 valves at a time. Is this an optimal policy? What would be the annual savings if the EOQ concept was applied?	10	CO1
Q6.	Explain the Mintzberg's managerial roles.	10	CO5
Q7.	Design the work stations for an assembly line shown below. Use Rank position weighted method. Also calculate the line efficiency. Take cycle time as 10 minutes.	10	CO3

			
Q8.	Explain the following with diagram with respect to Method study: (1) Multiple Activity Chart (2) Process charts and Flow Process charts. **Or** Explain the following: (1) PMTS and its advantages (2) Procedure for Method study	10	CO4

SECTION C [40 Marks]

Note: Attempt all questions. All question carry equal marks. Be brief and specific.

Q9.	(a) Briefly explain the following terms **(I)** Routing **(II)** Loading **(III)** Expediting **(IV)** Dispatching (b) The past data about the load on a machine center is as given below: (i) If a five month moving average is used to forecast the next month's demand, compute the forecast of the load on the center in the 6th, 7th and 8th month. (ii) Compute a weighted three moving average for the 6th, 7th and 8th, where the weights are 0.5 for the latest month, 0.3 and 0.2 for the other months, respectively. **Month** — **Load, Machine-Hours** 1 — 585 2 — 611 3 — 656 4 — 748 5 — 863 6 — 914 7 — 964	10 10	CO1
Q10.	The number of dietary errors is found from a random sample of 100 trays chosen on a daily basis in a health care facility. The data for 25 such samples are shown in Table below. (a) Construct an appropriate control chart and comment on the process. (b) How many dietary errors do you predict if no changes are made in the	20	CO2

process?
(c) Is the system capable of reducing dietary errors to 2, on average, per 100 trays, if no changes are made in the process?

Sample Number	Number of Dietary Errors	Sample Number	Number of Dietary Errors
1	9	14	8
2	6	15	8
3	4	16	7
4	7	17	6
5	5	18	4
6	6	19	12
7	16	20	7
8	8	21	6
9	7	22	8
10	9	23	6
11	3	24	8
12	6	25	5
13	10		

Or

The bore size on a component to be used in assembly is a critical dimension. Samples of size 4 are collected and the sample average diameter and range are calculated. After 25 samples, we have

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$$\sum_{i=1}^{25} \overline{X_i} = 107.5 \qquad \sum_{i=1}^{25} R_i = 12.5$$

Data given: $D_3 = 0$; $D_4 = 2.282$; $A_2 = 0.729$; $d_2 = 2.059$
The specifications on the bore size are 4.4 ± 0.2 mm. The daily production rate is 1200.
(a) Find the *X-bar* and R-chart control limits.
(b) Assuming that the process is in control, estimate its standard deviation.
(c) Find the proportion of scrap and rework.
(d) If the process average shifts to 4.5 mm, what is the impact on the proportion of scrap and rework produced?