

**VIT**

Vellore Institute of Technology

**Final Assessment Test – November 2019**

Course: MEE1014 - Industrial Engineering and Management

Class NBR(s): 1300 / 1643

Time: Three Hours

Slot: B1+TB1

Max. Marks: 100

**KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS EXAM MALPRACTICE****PART – A (2 X 10 = 20 Marks)**Answer ALL Questions

1. From the data shown in table below about demand for smart phones, calculate the price elasticity of demand from: point B to point C, point D to point E, and point G to point H. Classify the elasticity at each point as elastic, inelastic, or unit elastic.

Points	P	Q
A	60	3000
B	70	2800
C	80	2600
D	90	2400
E	100	2200
F	110	2000
G	120	1800
H	130	1600

2. A job consists of three work elements and all are performed by the same operator. An analyst conducted work sampling to determine the standard time for the job. The duration of the study is one shift with 400 minutes of effective time. The details of observations are summarized in the following table. The total number of acceptable units produced during the study period is 150 units. Determine the standard time by assuming allowance of 10%.

Work Element Number	Frequency of Performance	Performance Rating (in %)
1	70	80
2	80	120
3	50	110

**PART – B (4 X 20 = 80 Marks)**Answer any FOUR Questions

3. Using data given for the financial year 2019-2020, Calculate the demand for April 2020.

Period	2019-2020
Apr	9000
May	6500
Jun	9456
July	10000
Aug	6783
Sep	8500
Oct	12300
Nov	15000
Dec	12300
Jan	9500
Feb	10800
Mar	11070
April	?

SEARCH VIT QUESTION PAPERS  
ON TELEGRAM TO JOIN



Using:-

- Simple moving average method for three periods
  - Double moving average method for three periods
  - Weighted moving average method ( $W_1 = 0.50$ ;  $W_2 = 0.33$ ;  $W_3 = 0.17$ )
  - Exponential Smoothing method ( $\alpha = 0.3$ )
- The price of a machine is Rs5000/- and the distributor is allowed 20% discount. The marketing and administrative expenditure is 50% of factory cost, and the material cost, labour cost and factory overheads are in the ratio of 1:3:2. If the cost of labour on the manufacture of the machine is Rs.1200/-. Determine the profit on each machine.
  - ABC produces fruit crates, which it sells to growers. With the current equipment, ABC produces 240 crates per 100 logs. It currently purchases 100 logs per day, and each log requires three labour hours to process. ABC is considering to hire a professional buyer who can buy better quality logs at the same cost. If this is the case, ABC can increase production to 260 crates per 100 logs, and the labour hours required will increase by eight hours per day (for the buyer).
    - Compute the labour productivity for the current method (i.e., no buyer).
    - What will the labour productivity be if ABC hires the professional buyer?

Suppose that ABC spends Rs.12 per hour on each worker who makes the crates. The buyer, however, is paid Rs.24 per hour. The material cost is Rs.10 per log (regardless of who purchases them).

    - Compute the multifactor productivity for the current method.
    - How does the multifactor productivity change if the professional buyer is hired?
  - In a welding shop, a direct time study was done on a welding operation. One inexperienced and one experienced industrial engineer conducted the study simultaneously. They agreed precisely on cycle time in below, but their opinion on rating the worker differed. The experienced engineer rated the worker 100% and the other engineer rated the worker 120%. They used a 10% allowance.

Cycle Time (in minutes)	Number of Times Observed
20	2
24	1
29	1
32	1

From the above statement.

- Determine the standard time using the experienced industrial engineers worker rating.
  - Find the standard time using the worker rating of inexperienced industrial engineer.
  - Comment on the reliability of time study engineers
- Develop a layout using ALDEP. Layout & area requirements are shown in Table below.

Dept. No.	Area (sq.ft)	No. of grids
1	160	4
2	80	2
3	80	2
4	240	6
5	80	2
6	160	4
7	80	2
Total	600	20

Assume size of one grid as 40 sq ft.

Layout size = 4 Col. x 5 Row

Sweep Width = 2

Relationship Matrix

Dept. No.	1	2	3	4	5	6	7
1	-	E	O	I	O	U	U
2	E	-	U	E	I	I	U
3	O	U	-	U	U	O	U
4	I	E	U	-	I	U	U
5	O	I	U	I	-	A	I
6	O	I	O	U	A	-	E
7	U	U	U	U	I	E	-

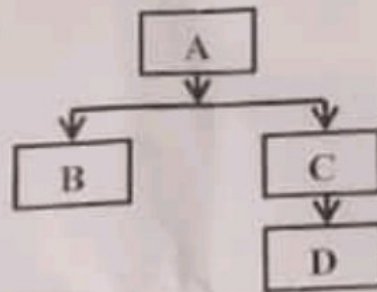
Let department FOUR be placed as first department.

8. Consider the following machine component incidence matrix with 7 machines and 5 components. Obtain the final machine-component cells using Rank Order Clustering Algorithm (ROCA).

Machine	Component				
	1	2	3	4	5
1	0	1	0	1	0
2	1	0	0	0	1
3	0	1	1	0	0
4	1	0	0	0	1
5	0	0	1	1	0
6	0	0	0	0	1
7	0	1	1	1	0

9. The XYZ company has just hired you as production manager of their Vellore unit. Your first job is to use the MRP methodology to schedule production for the next nine weeks. The XYZ company has given you the following information to work with.

*Bill of Materials:*



*Current Inventory Records:*

Part	Lead time in weeks	Lot Size	Inventory currently in hand
A	1	Lot for Lot	125
B	3	100	875
C	2	Lot for Lot	55
D	1	50	900

*Master Production Schedule:*

Part	Weeks								
	1	2	3	4	5	6	7	8	9
A	100	0	0	500	0	500	100	0	95

- Using your MRP schedule for the next nine weeks, how much of Part C will be in inventory at the end of Week 3?
- Using your MRP schedule for the next nine weeks, how much of Part B will be in inventory at the end of Week 9?
- Which of the following best describes some of the events taking place in week 4 in your unit?
  - An order of 475 A's will be completed (Planned Order Receipts)
  - An order of 100 D's will be completed (Planned Order Receipts)
  - An order of 100 C's will be completed (Planned Order Receipts)
  - I only
  - II only
  - III only
  - I and III
  - I, II and III