



Name : .....  
Roll No. : .....  
Invigilator's Signature : .....

**CS/MBA/SEM-2(FT)/MB-204/2013**

**2013**

**PRODUCTION & OPERATION MANAGEMENT**

Time Allotted : 3 Hours

Full Marks : 70

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**GROUP – A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) Procurement cost ..... with the increase in inventory level.
  - a) decreases
  - b) increases
  - c) does not change
  - d) may increase or decrease.
  
- ii) The economic order quantity for an item has been found out to be 300. If 12000 items are required per annum and the ordering cost is Rs. 20 per order, then the annual procurement cost is
  - a) Rs. 1,200
  - b) Rs. 800
  - c) Rs. 1,800
  - d) Rs. 20.



- iii) The main objective of assembly line balancing is
  - a) to reduce the work element time
  - b) to combine all the work elements into one work station
  - c) to reduce the total number of operations
  - d) to reduce the balance delay of the line.
- iv) After inspection of 10 carpets, each of length 2 metres, the following number of defects is found on each carpet : 35, 32, 42, 56, 41, 26, 40, 33, 51, 39. The control chart suitable will be
  - a) *R*-chart
  - b) *p*-chart
  - c) *c*-chart
  - d) a combination of *R*-chart and *p*-chart.
- v) Batch Production is adopted when
  - a) volume is very large and variety is less
  - b) volume is small and variety is large
  - c) both volume and variety are medium
  - d) all of these.
- vi) Which of the following is not a component of inventory carrying cost ?
  - a) Capital cost
  - b) Insurance cost
  - c) Obsolescence cost
  - d) Transportation cost.
- vii) In a situation of rising prices, the LIFO method of stock valuation will have which of the following impacts ?
  - a) Inflated Profit
  - b) Suppressed Profit
  - c) Unchanged Profit
  - d) none of these.
- viii) A Six Sigma process ensures not more than ..... defects per million opportunities.
  - a) 2700
  - b) 4·3
  - c) 3·4
  - d) 99·73.



ix) Which one of the following statements best fits with 'Kaizen' ?

- a) Kaizen is a system of production management for streamlining certain repetitive operations
- b) Kaizen is a system of continuous improvement in quality, technology, processes, company culture, productivity, safety and leadership
- c) Kaizen is a tool for work study
- d) none of these.

x) Fishbone diagrams

- a) show that the causes of a certain event are charts which identify potential causes for particular quality problems
- b) show cause and effect relationship with respect to manufacturing activities only
- c) show the difference between actual and planned performance flow chart
- d) none of these.

xi) Examples of variable Control Chart are

- a)  $\bar{X}$ -bar,  $R$ -Chart &  $P$ -Chart
- b)  $R$ -Chart,  $MA$ -Chart &  $C$ -Chart
- c)  $P$ -Chart,  $C$ -Chart &  $U$ -Chart
- d)  $\bar{X}$ -Bar Chart,  $R$ -Chart &  $MA$ -Chart.



- xii) A critical path has
- zero float
  - longest activity duration
  - both (a) and (b)
  - none of these.

**GROUP – B**

**( Short Answer Type Questions )**

Answer any *three* of the following.  $3 \times 5 = 15$

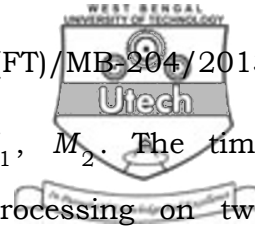
- What factors need to be considered for the selection of a site for a plant ?
- State the objectives of Work Study.
- Ten woolen carpets were studied critically for total number of defects in their texture. The details of the number of defects in each carpet are given below :

Carpet No.	1	2	3	4	5	6	7	8	9	10
No. of defects	5	7	3	2	6	4	5	3	2	3

Calculate the following for constructing a control chart for number of defects :

(a) Central line, (b) Upper Control Limit (UCL), (c) Lower Control Limit (LCL).

- What do you understand by 'Material Requirement Planning' ? How is it used in planning for materials ?
- M/s. Raj Engineering Works, Durgapur has been given a contract by Indian Railways to make seven components. Each of these components require processing on two



machines  $M_1$  and  $M_2$  in the order  $M_1, M_2$ . The time required by each of these jobs for processing on two machines is given below. Find the optimal sequence for processing the seven jobs and calculate the waiting time for jobs.

Job	$M_1$	$M_2$
A	9	2
B	5	4
C	8	10
D	3	5
E	4	6
F	1	11
G	7	6

**GROUP - C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

7. a) What are the various costs associated with inventory management ?
- b) Explain why ordering costs decrease with increase in inventory.
- c) A factory uses annually 24,000 units of raw material, which cost Rs. 1.25 per unit. Placing each order costs Rs. 25 and carrying cost is 6% per year of the average inventory.
  - i) Find the economic order quantity and the total inventory cost including the cost of material and no. of orders to be placed for the above per year/or how frequently should the order be placed ?



- ii) The factory works for 320 days a year. If the procurement time is 10 days and the safety stock is 450 units, find the reorder point, the minimum, maximum and average inventory. 5 + 4 + 6

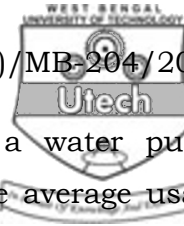
8. a) What is ERP ? What are the benefits of ERP ?
- b) Jobs *A* through *E* in the aircraft repair facility must each pass through the Sheet Metal centre and then through Paint centre. The processing time for each job in each centre is shown below. Find the sequence that minimizes completion time of the job. Calculate the cumulative flow time and idle time.

PROCESSING TIME IN DAYS

Jobs	Wc-1 (Sheet metal centre)	Wc-2 (Paint centre)
<i>A</i>	4	5
<i>B</i>	17	7
<i>C</i>	14	12
<i>D</i>	9	2
<i>E</i>	11	6

6 + 9

9. a) Explain Range Chart and its application in Quality Control function.
- b) Briefly justify relevance of Economic Order Quantity (EOQ) in management of inventory.



- c) A spare part "I-10" is produced by a water pump manufacturer from a local firm and the average usage rate in pump manufacturing activity is 500 numbers per month. Ordering cost of "I-10" is Rs. 36 per order and the cost of holding this inventory is Rs. 1.20 per piece per year.
- i) Determine the quantity that should be procured at a time to optimize the total cost.
  - ii) If the usage of I-10 increases to 40 numbers per day and inventory carrying cost becomes Re. 0.02 per unit per day, what will be the revised EOQ ? (Assume : 300 days in a year.)
  - iii) From the sum, show that ordering cost is equal to inventory holding cost in case of EOQ.
  - iv) If the company maintains a safety stock of 1000 units, calculate total cost (ordering cost and inventory carrying cost) with respect to (i) above.

$$3 + 3 + ( 2 + 3 + 2 + 2 )$$

10. a) What do you mean by PERT in Project Analysis ?
- b) What are the three time estimates related to PERT ?
- c) Write down the difference between PERT and CPM.
- d) A firm is considering the launch of a new product in the national market. This project consists of ten major activities. The firm does not have adequate prior experience of similar project. The project is riddled with considerable uncertainty due to political and public



interference. The precedence relationship and the three possible time estimates of each activity are given in the table below :

Activity	Predecessor Activity	Optimistic Duration (weeks)	Most Likely Duration (weeks)	Pessimistic Duration (weeks)
A	None	2	4	6
B	None	2	3	10
C	B	4	7	10
D	A	4	5	12
E	B	2	7	12
F	C, D	3	4	5
G	C, D	6	8	10
H	E, F	6	7	14
I	G, H	2	3	16

- i) Draw the network of the above project.
- ii) What is the expected project completion time ?
- iii) Identify the critical activity and critical path.
- iv) Determine the float of each activity.

$$2 + 1 + 2 + ( 3 + 2 + 1 + 4 )$$

11. Write short notes on any *three* of the following : 3 × 5

- a) PDCA cycle
- b) Johnson's Rule
- c) Critical path
- d) Vendor Rating
- e) Value Analysis.

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