Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/B.Tech/ME/PE/BT/TT/APM (NEW)/SEM-6/HU-611/2013

2013
PRODUCTION & OPERATIONS 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 :

$$10 \times 1 = 10$$

    i)   Which among the following is not a phase in the product life cycle ?

       a)   Maintenance   b)   Growth

       c)   Maturity   d)   Decline.

    ii)   Which among the following is not a tool for demand forecasting ?

       a)   Regression analysis

       b)   Moving average method

       c)   Simplex method

       d)   Exponential smoothing method.

iii) In ABC classification of inventory items, *A* items are

    a) 20% items, 20% money value

    b) 60% items, 20% money value

    c) 20% items, 60% money value.

iv) KANBAN is a system of

    a) inventory control

    b) production planning

    c) project execution

    d) quality control.

v) Which is not an essential requirement of JIT purchasing ?

    a) Stable relation with vendor

    b) Simple purchase agreement

    c) Timely exact quantity delivery

    d) Specifying all conceivable design features.

vi) Cycling in a CPM/PERT network means

    a) early finish of project

    b) project will never start

    c) project will never finish

    d) existence of dummy activity.
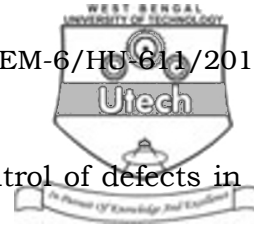
vii) The appropriate control chart for control of defects in a casting is

   a) X-bar chart   b) R-chart

   c) P-chart   d) C-chart.

viii) P-chart in Quality control is also known as

   a) fraction defective chart

   b) chart for number of defectives

   c) chart for number of defects per unit

   d) none of these.

ix) i) At EOQ the Order Quantity is minimum

   ii) At EOQ the total cost of inventory is minimum

      a) only statement (i) is true

      b) only statement (ii) is true

      c) both statements are true

      d) none of these statements are true.

x) Johnson's Rule is applicable in

   a) job sequencing

   b) machine scheduling

   c) quality control

   d) none of these.

xi) Shoe manufacturing is an example of

    a) Job production

    b) Batch production

    c) Continuous production

    d) None of these.

xii) Productivity can be mathematically expressed as

    a) cost/input   b) input/output

   c) input + output   d) output/input.

GROUP – B

(Short Answer Type Questions)

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

2. Discuss in brief various Qualitative Methods of Forecasting.

3. The actual demand for a particular model of mobile phone for three months is given below :

Period	January	February	March
Actual Demand	500	600	800

    a) Forecast the demand for the month of April based on simple average.

    b) If the weights assigned to the periods of January, February and March are 0·25, 0·35 and 0·40 respectively, forecast the demand for the month of April using Weighted Moving Average Method.
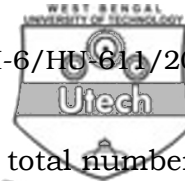
4. Ten woolen carpets were studied critically for total number of defects in their texture. The details of the number of defects in each carpet are given below :

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)

5. M/s Raj Engineering Works, Durgapur has been given a contract by Indian Railways to make seven components. Each of these components requires processing on two machines M1 and M2 in the order M1, M2. 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 of jobs.

| Job	M1	M2
A	9	2
B	5	4
C	8	10
D	3	5
E	4	6
F	1	11
G	7	6
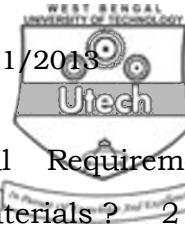
6. What do you understand by 'Material Requirement Planning' ? How is it used in planning for materials ? 2 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Identify the various costs associated with inventory. 4

   b) Explain the concept of the 'Q' system and 'P' system. 5

   c) Fixed costs in a factory are Rs. 10,000/- per year, the variable costs are Rs. 2/- per unit and selling price is Rs. 4/- per unit. Calculate no. of units at Break-even points. If sales are 8000 units, calculate safety margin. If desired profit is Rs. 6,000, calculate target sales volume. 6

8. a) What is an Operating Characteristics (OC) curve ? 3

   b) Determine the control limits for X bar and R charts if $\Sigma\ \overline{X}$ = 357·50, Σ R = 9·90, Number of subgroup = 20. It is given that $A_2 = 0 \cdot 18, D_3 = 0 \cdot 41, D_4 = 1 \cdot 59$, $d_2 = 3 \cdot 735$. Also find process capability. 6

   c) What is Six Sigma ? Name and describe the various steps in the application of Six Sigma. 6

9. a) What is productivity ? 2

   b) Discuss the factors to be considered for increasing productivity. 4

   c) State the benefits of productivity improvement. 3
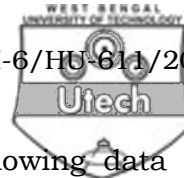
d) From the last month's record, the following data are obtained. Calculate Total Productivity, Material Productivity & Total Factor Productivity. 6

	Rs.
Output	20,000
Human input	10,000
Material input	2,000
Capital input	1,000
Energy	500
Other expenses	1,000

10. a) What is 'Aggregate Planning' ? Explain the different strategies associated with it. 4

b) Illustrate by a block diagram, how Master Production Schedule (MPS) is related to other manufacturing planning and control activities. 4

c) Six jobs are to be processed through machines A and B in the order A, B. The processing times of jobs on different machines are given below. Find the optimal sequence of jobs, total elapsed time and idle times on machines. 7

Job No. M/C	1	2	3	4	5	6
A	8	12	7	10	11	9
B	10	7	11	6	12	8

11. Write short notes on any three of the following :   3 × 5 = 15

    a)   Critical path

    b)   Break-even point of a productive system

    c)   Gantt chart

    d)   Single Machine Scheduling

    e)   ABC Analysis.