Time Allowed: 3 Hours   **Full Marks: 100**

The figures in the margin on the right side indicate full marks.

Section - A [Operations Management]
Answer Question No. 1 which is compulsory and any three from Questions Nos. 2, 3, 4 & 5

1.   (a)   **Choose the correct alternative**   [1 × 8 = 8]

i.   Number of product variates that can be manufactured in job production is:
   a)   Limited to one or two
   b)   Large varieties of products
   c)   One only
   d)   None of the above

ii.   The starting point of production cycle is:
   a)   Product design.
   b)   Production planning.
   c)   Routing.
   d)   Market research.

iii.   Important factor in forecasting production is:
   a)   Environment changes
   b)   Available capacity of machines
   c)   Disposable income of the consumer
   d)   Changes in the preference of the consumer

iv.   The difference between product system and project system is:
   a)   Project system the equipment and machinery are fixed where as in product system they are movable
   b)   In Product system the machinery and equipment are fixed and in project system they are not fixed
   c)   Project system produces only standardized products and product system produces only unstandardized products
   d)   Products cannot be stocked whereas projects can be stocked.

v.   Fixing the flow lines of materials in production is known as:
   a)   Scheduling
   b)   Loading
   c)   Planning
   d)   Routing.

vi.   Most suitable layout for Job production is:
   a)   Line layout
   b)   Matrix layout
   c)   Process layout
   d)   Product layout.

vii. Line of Best fit is another name given to:
a) Method of Least Squares
b) Moving average method
c) Semi average method
d) Trend line method.

viii. MRP stands for:
a) Material Requirement Planning
b) Material Reordering Planning
c) Material Requisition Procedure
d) Material Recording Procedure.

(b) Fill in the blanks : [1 × 4 = 4]

(i) Statistical analysis is used to determine the optimum policy of_____ maintenance.

(ii) Taylor originated the idea of_____ relationships in an organisation.

(iii) General purpose machines are less prone to_____.

(iv) Gantt chart is used for_____ control.

(c) State True or False : [1 × 3 = 3]

(i) Training boosts employee morale.

(ii) No handling is the best handling.

(iii) Operation process chart incorporates all five symbols.

2. **(a)** From the following time series data of sale, project the trend of sales for the next three years.

Year	2015	2016	2017	2018	2019	2020	2021
Sales (`000 units)	80	90	92	83	94	99	92

(b) A manager has to decide about the number of machines to be purchased. He has three options i.e., purchasing one, or two or three machines. The data are given below.

Number of machines	Annual fixed cost	Corresponding range of output
One	₹ 12,000	0 to 300
Two	₹ 15,000	301 to 600
Three	₹ 21,000	601 to 900

Variable cost is ₹ 20 per unit and revenue is ₹ 50 per unit

(i) Determine the break-even point for each range.

(ii) If projected demand is between 600 and 650 units how many machines should the manager purchase?   **[6+9 = 15]**

3. (a) Suppose, an E-Commerce company wants to open Central order fulfilment center in Kolkata South in West Bengal. The possible locations are say L_1, L_2, and L_3. The company form a group of experts. The team identifies say 6 actors such as F_1, F_2, F_3 and F_4 to evaluate L_1 to L_3. Use factor rating method to solve the situation.

    (b) The monthly requirement of raw material for a company is 3000 units. The carrying cost is estimated to be 20% of the purchase price per unit, in addition to ₹ 2 per unit. The purchase price of raw material is ₹ 20 per unit. The ordering cost is ₹ 25 per order. (i) You are required to find EOQ.(ii) What is the total cost when the company gets a concession of 5% on the purchase price if it orders 3000 units or more but less than 6000 units per month. (iii) What happens when the company gets a concession of 10% on the purchase price when it orders 6,000 units or more? (iv) Which of the above three ways of orders the company should adopt?   **[7+8 =15]**

4. (a) What is product life cycle. Describe various stages of product life cycle.

    (b) A Bank is in the process of formulating its loan policy. Involving a maximum of ₹ 600 Million. Table below gives the relevant types of loans.Bad debts are not recoverable and produce no interest receive. To meet competition from other Banks the following policy guidelines have been set. At least 40% of the funds must be allocated to the agricultural and commercial loans. Funds allocated to housing must be at least 50% of all loans given to personal, car, Housing. The overall bad debts on all loans may not exceed 0.06.
    Formulate a linear program Model to determine optimal loan allocations.

Type of loan	Interest rate %	Bad debts
Personal	17	0.10
Car	14	0.07
Housing	11	0.05
Agricultural	10	0.08
Commercial	13	0.06

                                        [6 + 9 = 15]

5. (a) Four jobs can be processed on four different machines, with one job on one machine. Resulting profits vary with assignments. They are given below:

Machines					
		A	B	C	D

Jobs					
	I	42	35	28	21
	II	30	25	20	15
	III	30	25	20	15
	IV	24	20	16	12

Find the optimum assignment of jobs to machines and the corresponding profit.

(b) Workers come to tool store room to enquire about special tools (required by them) for accomplishing a particular project assigned to them. The average time between two arrivals is 60 seconds and the arrivals are assumed to be in Poisson distribution. The average service time (of the tool room attendant) is 40 seconds.

Determine:

(i)   average queue length,

(ii)   average length of non-empty queues,

(iii)   average number of workers in system including the worker being attended.

(iv)   mean waiting time of an arrival,

(v)   average waiting time of an arrival who waits.

[7 + 8= 15]

SECTION – B : [STRATEGIC MANAGEMENT]

**Answer Question No. 6 which is compulsory and any two from
Questions Nos. 7, 8 & 9**

6.(a) Choose the correct answer from the given alternatives (you may write only the Roman numeral and the alphabet chosen for your answer):   **[4 × 1 = 4]**

i.   One of the product examples for Line Layout is :
   a.   Repair Workshop
   b.   Welding shop
   c.   Engineering College
   d.   Cement.

ii. For production planning:
   a. Short term forecasting is useful
   b. Medium term forecasting is useful
   c. Long term forecasting is useful
   d. Forecasting is not useful.

iii. JIT stands for:
   a. Just in time purchase

      b. Just in time production

      c. Just in time use of materials

      d. Just in time order the material.

    iv. Which among the following provide the standards for performance appraisal?

      a. Mission

      b. Vision

      c. Values

      d. Objectives

(b)   **State whether the following statements are "True" or "False".**   **[1×3=3]**

    (i)   People disrespect leaders who are self-aware and self-regulating.

    (ii)   Digital strategy focuses on technology and culture.

    (iii)   The second step in operational control is the setting of standards.

(c)   **Fill in the blanks**   **[1×3= 3]**

    (i)   _____ is the ratio of the number of units of inputs required to produce a unit of output.

    (ii)   Rivalry refers to the_____ struggle between companies within an industry to gain market share from each other.

    (iii)   _____typically fit within the three main categories of stability, growth and retrenchment.

7.(a)   List the characteristics of a strategy.

  (b)   Explain culture as a driver of strategy.   **[7+8 = 15]**

8.(a)   What are the limitations of SWOT analysis?

  (b)   What are the potential advantages of divisional structures?   **[9 + 6 = 15]**

9. (a) What do you understand by implementation control? Explain the different method of implantation control.

  (b)   List down the steps that an organisation should take for digital transformation.   **[6 + 9 = 15]**