

PAPER 9 - OPERATIONS MANAGEMENT & INFORMATION SYSTEM

PTP_Intermediate_Syllabus2012_Jun2015_Set 1

The following table lists the learning objectives and the verbs that appear in the syllabus learning aims and examination questions:

	Learning objectives	Verbs used	Definition
LEVEL B	KNOWLEDGE What you are expected to know	List	Make a list of
		State	Express, fully or clearly, the details/facts
		Define	Give the exact meaning of
	COMPREHENSION What you are expected to understand	Describe	Communicate the key features of
		Distinguish	Highlight the differences between
		Explain	Make clear or intelligible/ state the meaning or purpose of
		Identify	Recognize, establish or select after consideration
		Illustrate	Use an example to describe or explain something
	APPLICATION How you are expected to apply your knowledge	Apply	Put to practical use
		Calculate	Ascertain or reckon mathematically
		Demonstrate	Prove with certainty or exhibit by practical means
		Prepare	Make or get ready for use
		Reconcile	Make or prove consistent/ compatible
		Solve	Find an answer to
		Tabulate	Arrange in a table
ANALYSIS How you are expected to analyse the detail of what you have learned	Analyse	Examine in detail the structure of	
	Categorise	Place into a defined class or division	
	Compare and contrast	Show the similarities and/or differences between	
	Construct	Build up or compile	
	Prioritise	Place in order of priority or sequence for action	
	Produce	Create or bring into existence	

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Paper 9 - Operations Management & Information System

Full Marks: 100

Time allowed-3hrs

This paper contains 3 questions. All questions are compulsory, subject to instruction provided against each question. All workings must form part of your answer. Assumptions, if any, must be clearly indicated.

Question No. 1 : Answer all questions. [20 marks]

1. (a) 'Design for Manufacturing and Design for Assembly are related concepts in manufacturing'. Justify.
- (b) Define Time Study.
- (c) For a certain element of work, the basic time is established to be 20 seconds. A time study observer record rating of 125 on a 100 normal scale. What is the observed time?
- (d) Define Customer-Driven Quality.
- (e) Describe Rotable Spare.
- (f) Define Material Planning.
- (g) Describe Commerce Net.
- (h) Define programmed decision making.
- (i) Define Feasibility Study.
- (j) Describe legacy data. [10 × 2 = 20]

Operations Management

Answer any three questions

2. (a) (i) Explain the term Quality Function Deployment (QFD). [5]
- (ii) List the important steps in problem analysis. [3]
- (iii) State the causes of low productivity. [3]
- (iv) The following matrix gives the unit cost of transporting a product from production plants P₁, P₂ and P₃ to destinations D₁, D₂ and D₃. Plants P₁, P₂ and P₃ have a maximum production of 65, 25 and 110 units respectively and destinations D₁, D₂ and D₃ must receive at least 60, 65 and 75 units respectively.

To	D ₁	D ₂	D ₃	Supply
From				
P ₁	₹500	₹500	₹800	65
P ₂	₹1,000	₹1,200	₹1,400	25
P ₃	₹500	₹900	₹700	110
Demand	60	65	75	200

You are required to formulate the above as linear programming problem. (Only formulation is required.) [5]

- (b) (i) Identify the five common process decisions considered by production/operations managers. [5]

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- (ii) Production Manager of a unit wants to know from what quantity he can use automatic machine against semi-automatic machine.

Data	Automatic	Semi-automatic
Time for the job	4 mins	10 mins
Set up time	4 hrs	3 hrs
Cost per hour	₹40	₹24

Calculate the break-even point.

[7]

- (iii) The demand for three months for 100 Watt bulbs is given below:

Period	January	February	March
Demand	1000	1200	1600

If the weight assigned to the period of January, February and March are 0.30, 0.38 and 0.32 respectively, forecast the demand for the month of April by using Weighted Moving Average Method.

[4]

- (c) (i) The breakdown probability of an equipment is given below:

Month	Probability
1	0.05
2	0.15
3	0.30
4	0.30
5	0.20

There are 50 such equipments in the plant. The cost of individual preventive replacement is ₹15 per equipment and the cost of individual breakdown replacement is ₹30 per equipment. Which is the most suitable maintenance policy? Periodicities of replacement are considered every one, two, three and four months.

[10]

- (ii) TV repairman finds that time spends on his jobs has an exponential distribution with mean 30 minutes. If he repairs sets on the first-come first-served basis and if the arrival of sets is approximately Poisson with an average rate of 10 per 8-hour day, what is repairman's expected idle time each day? Also obtain average number of units in the system.

[6]

- (d) (i) A book store wishes to carry 'Ramayana' in stock. Demand is probabilistic and replenishment of stock takes 2 days (i.e. if an order is placed on March 1, it will be delivered at the end of the day on March 3). The probabilities of demand are given below

Demand(daily)	0	1	2	3	4
Probability	0.05	0.10	0.30	0.45	0.10

Each time an order is placed, the store incurs an ordering cost of ₹ 10 per order. The store also incurs a carrying cost of ₹ 0.50 per book per day. The inventory carrying cost is calculated on the basis of stock at the end of each day.

The manager of the bookstore wishes to order 5 books when the inventory at the beginning of the day plus order outstanding is less than 8 books.

Currently (beginning 1st day) the store has a stock of 8 books plus 6 books ordered two days ago and expected to arrive next day.

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Use Monte-Carlo Simulation for 10 cycles.

The two digit random numbers are given below:

89 34 78 63 61 81 39 16 13 73

(ii) A project with normal duration and cost along with crash duration and cost for each activity is given below:

Activity	Normal time (Hrs.)	Normal cost (₹)	Crash time (Hrs.)	Crash cost (₹)
1-2	5	200	4	300
2-3	5	30	5	30
2-4	9	320	7	480
2-5	12	620	10	710
3-5	6	150	5	200
4-5	0	0	0	0
5-6	8	220	6	310
6-7	6	300	5	370

Overhead cost is ₹ 50 per hour.

Required:

(1) Draw network diagram and identify the critical path.

[8+8]

Information System

Answer any two questions.

3. (a) (i) Discuss the purpose for providing persistent storage for program objects and data structures. [5]
- (ii) Describe the four types of implementation strategies. [6]
- (iii) State the strengths/advantages of Prototyping Model. [5]
- (b) (i) State the requirements of E-Procurement. [3]
- (ii) List the major characteristics of Transaction Processing Systems. [5]
- (iii) Describe Transaction Processing System. [4]
- (iv) List the major constraints in operating MIS. [4]
- (c) (i) Discuss whether web server can act as Permanent Establishment. [4]
- (ii) List the steps involved to develop a sound public key infrastructure for an efficient allocation and verification of digital signatures certificates. [4]
- (iii) 'The digital signature is created in two distinct steps.' Justify. [3]
- (iv) State the notable features of the Information Technology Amendment Act, 2008. [5]