

PAPER 9 - OPERATIONS MANAGEMENT & INFORMATION SYSTEM

PTP_Intermediate_Syllabus2012_Dec2015_Set 3

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	

Paper – 9 – Operations Management & Information Systems

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) Describe Process Selection.

(b) The demand for 100 Watt bulbs in the past 5 months is given as below:

Month	Demand
April	700
May	700
June	800
July	600
August	500

Calculate the moving average for a period of 5 months.

(c) An assembly line of an item A has the following output in a 10 week period:

Week No	Standard hours Produced
1	350
2	375
3	380
4	400
5	300
6	325
7	340
8	370
9	390
10	350

Calculate the demonstrated capacity of the assembly line per week.

(d) Write a note on Line Balancing.

(e) List the ten dimensions of service quality.

(f) Explain the term Rotable Spares.

(g) Explain System Components matrix.

(h) Describe Natural Language Interfaces.

(i) Explain Programme-data Independence.

(j) State the different parts of a Decision Table.

[2×10=20]

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Operations Management

Answer any three questions

2. (a) (i) Describe the different Qualitative Approaches.

(ii) A repairman is to be hired by a company to repair machines that breakdown at an average rate of 3/ hour. Breakdown occurs randomly (Poisson distribution) over time. Non-productive time on any machine is considered to cost the company ₹10 per hour. The management has narrowed down the choice to 2 repairmen; one 'slow but cheap' and other 'fast but expensive'. The 'slow but cheap' repairman has a rate of ₹5 per hour and he will service breakdown machines at an average rate of 4/hour. The 'fast but expensive' repairman has a rate of ₹7 per hour and he will service breakdown machines at an average rate of 6/hour. Which repairman should the company hire? Assume exponential repair time for both repairmen.

(iii) Discuss the three process strategies.

[5+6+5=16]

2. (b) (i) Contribution per unit (₹)

	WH1	WH2	WH3	WH4	Total supplies
Plant 1	48	60	56	58	14
Plant 2	40	55	53	60	26
Plant 3	50	100	60	62	36
Total Demand	20	32	25	21	

Find the initial solution by North-West Corner method. Is the initial solution feasible?

(ii) A firm makes two products X and Y and has a total production capacity of 16 tonnes per day. X and Y require the same production capacity. The firm has a permanent contract to supply at least 3 tonnes of X and 6 tonnes of Y per day to another company. Each tone of X requires 14 machines hours of production time and each tone of Y requires 20 machines hours of production time. The daily maximum possible number of machine hours is 280. All the firm's output can be sold, and the profit made is ₹20 per tonne of X and ₹25 per tonne of Y.

[8+8=16]

2. (c) (i) The NRB Company is planning to design, develop and market a new racing cycle. The Project is composed of the following activities:

Activity	Description	Predecessors	Time (weeks)
A	Design frame	-	4
B	Design wheels	-	3
C	Design gears	-	3
D	Design handle bars	C	2
E	Test steering	A,B,D	1
F	Test gears	A,B,D	2
G	Performance test	E,F	3
H	Manufacturing layout	A,B,D	3
I	Manufacturing demonstration	H	5
J	Preparing advertising	G	2

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K	Preparing user's manual	G	4
L	Distribute to dealers	I,J,K	2

Draw the network; find critical path and total duration of project. NRB would like to complete the project in 15 weeks. Would it help if they:

- (1) Work over time to get the frame designed in only 3 weeks?
- (2) Assign more designers to design the gears? If so, from what activity should the designers be taken from?

(ii) The Everalert Ltd. which has a satisfactory preventive maintenance system in its plant, has installed a new Hot Air Generator based on electricity instead of fuel oil for drying the finished products. The Hot Air generator requires periodic shutdown maintenance. If the shutdown is scheduled yearly, the cost of maintenance will be as under:

Maintenance cost	₹15,000	₹20,000	₹25,000
Probability	0.30	0.40	0.30

The costs are expected to be almost linear i.e. if the shutdown is scheduled twice per year, the maintenance cost will be double.

The probability distribution of breakdown cost is estimated as under:

Breakdown costs per annum	₹75,000	₹80,000	₹1,00,000
Shutdown once a year	0.20	0.50	0.30
Shutdown twice a year	0.50	0.30	0.20

Stimulate the total costs – maintenance and breakdown- and recommend whether the shutdown should be resorted once or twice a year.

Random numbers

Maintenance costs (shut down once a year)	27,44,22,32,97
Maintenance costs (shut down twice a year)	42,04,82,38,91
Breakdown costs (shut down once a year)	03,50,73,87,59
Breakdown costs (shut down twice a year)	54,65,49,03,56

[8+8=16]

2. (d) (i) ABC Company is engaged in manufacturing 5 brands of packet snacks. It is having five manufacturing setups, each capable of manufacturing any of its brands, one at a time. The cost to make a brand on these setups vary according to following table –

	S ₁	S ₂	S ₃	S ₄	S ₅
B ₁	4	6	7	5	11
B ₂	7	3	6	9	5
B ₃	8	5	4	6	9
B ₄	9	12	7	11	10
B ₅	7	5	9	8	11

Assuming five setups are S₁, S₂, S₃, S₄ and S₅ and five brands are B₁, B₂, B₃, B₄, and B₅. Find the optimum assignment of the products on these setups resulting in the minimum cost.

(ii) Explain Gantt Chart.

[10+6=16]

Information System

Answer any two questions.

- 3. (a) (i) Discuss the various Database System Utilities.**
- (ii) State the basic features of Decision Supports System.**
- (iii) 'Development in Computer has evolved business opportunities for Different Business activities relating to Hardware and Software.' - Discuss. [6+3+7=16]**
- 3. (b) (i) Describe On- Line Transaction Processing (OLTP).**
- (ii) 'Databases can be used to provide persistent storage for program objects and data structures.' – Discuss.**
- (iii) Explain when it is not desirable to Use a DBMS. [6+6+4=16]**
- 3. (c) (i) 'Any transaction resulting in a change in stock is defined as Goods Movement.' - Discuss.**
- (ii) Write a note on Public Key Infrastructure Processes.**
- (iii) List the benefits of EDI. [4+6+6=16]**