

**PAPER 9 - OPERATIONS MANAGEMENT & INFORMATION SYSTEM**

## PTP\_Intermediate\_Syllabus2012\_Jun2015\_Set 2

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

	<b>Learning objectives</b>	<b>Verbs used</b>	<b>Definition</b>
<b>LEVEL B</b>	<b>KNOWLEDGE</b> 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
	<b>COMPREHENSION</b> 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
	<b>APPLICATION</b> 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
	<b>ANALYSIS</b> 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) Describe Repetitive focus.
- (b) Explain the term 'worker-machine chart.'
- (c) 'A project starts with statement of work.' - Justify.
- (d) Compute the productivity per machine hour with the following data.

Month	No. of machines employed	Working Hours	Machine hours	Production Unit
March	400	220	88,000	99,000

- (e) Describe Maintenance Engineering.
- (f) Write a note on the human side of Technology Integration.
- (g) Program Design Language is also known as Structured English.- Why?
- (h) Describe Declarative.
- (i) Explain Cyber Crime.
- (j) Cost accounting module consists of some functionalities. List them. [10 × 2=20]

### Operation Management

Answer any three questions

2. (a) (i) Describe the term Commercialisation in relation to planning of products. [3]
- (ii) List the benefits of Production Control. [5]
- (iii) With a view to improving the quality of customer services, a Bank is interested in making an assessment of the waiting time of its customers coming to one of its branches located in a residential area. This branch has only one teller's counter. The arrival rate of the customers and the service rate of the teller are given below:

Time between two consecutive arrivals of customers(in minutes)	Probability	Service Time by the teller (in minutes)	Probability
3	0.17	3	0.10
4	0.25	4	0.30
5	0.25	5	0.40
6	0.20	6	0.15
7	0.13	7	0.05

You are required to simulate 10 arrivals of customers in the system starting from 10 AM and show the waiting time of the customers and idle time of the teller. Use the following random numbers taking the first two random numbers in two digits each for the first trial and so on:

11,56,23,72,94,83,83,01,97,99,83,10,93,34,33,53,49,94,37 and 97. [8]

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- (b) (i) Trucks arrive at a factory for collecting finished goods for transportation to distant markets. As and when they come they are required to join a waiting line and are served on first come, first served basis. Trucks arrive at the rate of 10 per hour whereas the loading rate is 15 per hour. It is also given that arrivals are Poisson and loading is exponentially distributed. Transporters have complained that their trucks have to wait for nearly 12 hours at the plant. Examine whether the complaint is justified. Also determine profitability that the loaders are idle in the above problem. [6]

- (ii) An analyst has observed a job long enough to become familiar with it and has divided it into five elements. The element times for the first four cycles and a performance rating for each element are given in the following table:

Element	Cycle-1	Cycle-2	Cycle-3	Cycle-4	Performance Rating(%)
1	1.246	1.328	1.298	1.306	90
2	0.972	0.895	0.798	0.919	100
3	0.914	1.875	1.964	1.972	100
4	2.121	2.198	2.146	2.421	110
5	1.253	1.175	1.413	2.218	100

- Compute an estimated normal time for the job based on the data available at this stage of the study. [4]

- (iii) A department works on 8 hours shift, 250 days a year and has the usage data of a machine, as given below:

Product	Annual demand (units)	Processing time ( Standard time in hours)
A	600	4.0
B	800	6.0
C	1000	3.0

Determine the number of machines required. [6]

- (c) (i) ABC airline operating 7 days a week has given the following time table. Crews must have a minimum layover of five hours between the flights. Obtain the pairing flights that minimize the layover time away from home. For any given pairing the crew will be based at the city that results in the smaller layover.

HYDERABAD - DELHI			HYDERABAD - DELHI		
Flight No.	Departure	Arrival	Flight No.	Departure	Arrival
A1	6 AM	8 AM	B1	8 AM	10 AM
A2	8 AM	10 AM	B2	9 AM	11 AM
A3	2 PM	4 PM	B3	2 PM	4 PM
A4	8 PM	10 PM	B4	7 PM	9 PM

[12]

- (ii) List the problems in Maintenance Scheduling. [4]

- (d) (i) A city hospital has the following minimal daily requirement for nurses:

Period	Clock time (24 hours day)	Minimal number of nurses required
1	6 AM - 10 AM	2

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2	10 AM - 2 PM	7
3	2 PM- 6 PM	15
4	6 PM- 10 PM	8
5	10 PM – 2 AM	20
6	2 AM - 6 AM	6

Nurses report to the hospital at the beginning of each period and work for consecutive 8 hours. The hospital wants to determine the minimal number of nurses to be employed so that there will be sufficient number of nurses available for each period. Formulate LPP. Do not solve. [6]

- (ii) The following activities must be accomplished in order to complete a construction project:

Activity	A	B	C	D	E	F	G	H	I	J
Time	3	8	4	2	1	7	5	6	8	9
Predecessors	—	—	AB	B	A	C	EF	DF	GH	I

- Construct a network diagram for this project. Find the CP and the duration of the project.
- Assume that you are project manager of the project mentioned above. The project has progressed for 10 weeks and the status is follows:

Activities completed: A, B, E. Other activities have not started as yet.

- ❖ If no managerial action is taken at all when will the project get completed?
- ❖ What action might you take to get the project back to a schedule that can be completed by the end of week 42? [5+5]

### Information System

Answer any two questions.

3. (a) (i) Discuss the various fact-finding techniques used by the system analysts for determining the needs/requirements of an organization. [4]  
 (ii) List the categories of tests that a programmer performs on a program unit. [5]  
 (iii) State the pre-requisites of an effective Management Information System (MIS). [4]  
 (iv) Define query compiler. [3]
- (b) (i) List the categories of Goods Movement. [5]  
 (ii) "There are other implications of using the database approach that can benefit most organizations." –Justify. [6]  
 (iii) Describe the activities involved in conversion. [5]
- (c) (i) State the main goals of E-commerce. [3]  
 (ii) List the benefits of Electronic Data Interchange. [5]  
 (iii) Explain the term E-banking. [5]  
 (iv) "Price fixation is one of the advantages of E-commerce". – Justify. [3]