PAPER 9 - OPERATIONS MANAGEMENT & INFORMATION SYSTEM

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
		Identity	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 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 indicted.

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

1. **(a) Calculate EBQ from the details: Monthly demand -4000 units, setting up costs per batch - ₹200, cost of manufacture per unit - ₹60, rate of interest – 10% p.a.**
   (b) Explain Total Productivity.
   (c) State the three levels of quality.
   (d) Describe Pragmatic JIT.
   (e) List the disadvantages of Vertical Integration.
   (f) Describe MDD as a sequencing rule for single facility.
   (g) Explain Virtual Reality.
   (h) Describe DDP.
   (i) List the shortcomings of SDLC.
   (j) "Quality can be viewed as hinging on two major factors." State the factors. [10 × 2=20]

2. **Answer any three questions.**

(a) (i) List the basic steps in Strategic Bench trending. [4]

(ii) Patients arriving at a village dispensary are treated by a doctor on a first – come- first-served basis.

The inter-arrival time of the patients is known to be uniformly distributed between 0 and 80 minutes, while their service time is known to be uniformly distributed between 15 and 40 minutes.The starting time is 8 .00 A.M.

It is desired to simulate the system and determine the average time a patient has to be in the getting service and the proportion of time the doctor would be idle.

Carry out the simulation using the following sequences of random numbers. The numbers have been selected between 00 and 80 to estimate inter-arrival times and between 15 and 40 to estimate the service times required by the patients.

Series 1	07	21	12	80	08	03	32	65	43	74
Series 2	23	37	16	28	30	18	25	24	19	21

[9]

(iii) State the elements of lean production. [3]

(b) (i) A department of a company has to process a large number of components/month. The process equipment time required is 30 minutes/component and the manual skilled manpower required is 10 minutes/component. The following additional data is available:

	Availability/month	Efficiency of utilization
Equipment hour	400	80%
Skilled manpower hours	250	65%

What is the maximum possible production under the current conditions? [4]

(ii) Five swimmers are eligible to compete in a relay team which is to consist of four swimmers swimming four different swimming styles: back stroke, breast stroke, free style and butterfly. The time taken by the five swimmers Anand, Bhaskar, Chandru, Dorai and Easwar - to cover a distance of 100 meters in various swimming styles are given below in minutes: seconds. Anand swims the back stroke in 1:09, breast stroke in 1:15 and has never competed in free style or butterfly. Bhaskar is a free style specialist averaging 1.01 for the 100 meters but can also swim breast stroke in 1:16 and butterfly in 1:20. Chandru swims all four styles - back 1:10; butterfly 1:12, free style 1:05 and breast stroke 1:20. Dorai swims only the butterfly 1:11 while Easwar swims back stroke 1:20, the breast stroke 1:16, the free style 1:06 and the butterfly 1:10. Which swimmers should be assigned to which swimming style? Who will not be in relay? [12]

(c) (i) An electric company which generates and distributes electricity conducted a study on the life of poles. The repatriate life data are given in the following table: [6]

Life data of electric poles

Year after installation:	1	2	3	4	5	6	7	8	9	10
Percentage poles failing:	1	2	3	5	7	12	20	30	16	4

- **If the company now installs 5,000 poles and follows a policy of replacing poles only when they fail, how many poles are expected to be replaced each year during the next ten years?**
  To simplify the computation assume that failures occur and replacements are made only at the end of a year.
- **If the cost of replacing individually is ₹ 160 per pole and if we have a common group replacement policy it costs ₹ 80 per pole, find out the optimal period for group replacement.**

(ii)A company produces two types of pen, say A and B. Pen A is a superior quality and Pen B is a lower quality. Profit on pens A and B is ₹ 5 and ₹3 per pen respectively. Raw material required for each pen A is twice as that for pen B. The supply of raw material is sufficient only for 1,000 pens of type per day. Pen A requires a special clip and only 400 such clips are available per day. For Pen B, only 700 clips are available per day. Find graphically the product mix , so that the company can make maximum profit. [6]

(iii) What are the advantages of KAIZEN technique? [4]

(d) (i) Draw the network for the following activities and find critical path and total duration of project.

Activity	Duration (months)	Activity	Duration (months)
1-2	2.5	4-5	2.0
2-3	2.5	5-6	3.0
2-4	1.5	6-7	1.5
3-4	1.0	5-7	1.5
3-5	1.0		

[8]

(ii) The demand for computers has been rising rapidly since 2005. The following data are for one of the metropolitan cities. Fit a quadratic curve to the data and forecast the demand during years 2014, 2015, 2016, 2017 and 2018. [8]

Year	Demand ('000)
2005	25
2006	35
2007	50
2008	65
2009	85
2010	115
2011	150
2012	205
2013	285

3. Answer any two questions.

(a) (i) State the advantages of Computer Based Information System (CBIS). [4]
(ii) State the concept of Search Engines. [4]
(iii) Describe the importance of Marketing Information System. [5]
(iv) List the characteristics of good quality information. [3]

(b) (i) Discuss are the impediments in introducing E-commerce. [4]
(ii) In a payroll system, the employee master file is being designed to have records of fixed length consisting of the following fields:

Field Name	Maximum field size
Employee Number	5
Employee Name	36
Designation	10
Date of birth	5
Date of joining	5
Selection code	5
Qualification	20
Training codes	10
Scale of pay	10

The Employee Master has 2000 employee records presently. Once an employee leaves, his record is deleted. However, it is estimated that there may be fresh recruitment upto 15% of present strength in future. The file management software also requires an overhead of 20% for minimizing probabilities of collision and overflow conditions. Compute the total file space requirement after allowing for 10% contingency factor on total. [6]

(iii) "There can be many specialists in a database environment". Name at least four such specialists and mention the duties of any two of them who may be considered essential. [2+4]

(c) (i) State the important activities related to setting up of base in ERP System. [6]
(ii) Explain the Cash Management module of an ERP system. [2]
(iii) Define Electronic Financial Transaction(EFT). [2]
(iv) State where the Information Technology Act, 2000 is not applicable. [6]