Paper 9 - Operations Management & Information Systems

Time allowed-3hrs **Full Marks: 100**

Section I: Operation Management

Answer Question No. 1 which is compulsory and any Two questions from the rest, under Section I.

Working Notes should form part of the answer.

1.

a) Choose the most appropriate alternative: [8]

i) Job evaluation determines
   a. Relative worth of job holders;
   b. Relative worth of various jobs;
   c. Time taken for a job;
   d. Bonus.

ii) Specifying the order in which individual jobs are to be executed
   a. Planning;
   b. Loading;
   c. Sequencing;
   d. Routing.

iii) Enameling is a
   a. Heat Treatment Process;
   b. Surface Treatment Process;
   c. Machining Process;
   d. Extrusion Process.

iv) Capacity is
   a. Long term concept;
   b. Maximum available output;
   c. Not related to cost of production;
   d. All of the above.

v) Machines are arranged in sequence of operations:
   a. Product layout;
   b. Process layout;
   c. Fixed position layout;
   d. Group layout.

vi) Control chart for proportion of defectives is
   a. c-chart;
   b. N-chart;
   c. X chart;
   d. p chart.

vii) Normal time means
   a. Time required by a qualified worker to do a job under normal circumstances;
   b. How much time should be taken to get incentive;

c. Time to do a job;
d. Time required by any person to do a job.

viii) Addition of value to raw materials through application of technology is
a. Product;
b. Production;
c. Advancement;
d. Transformation.

b) Fill in the blanks with more suitable word(s) given below: [6]

i) Rucker plan is a ----------incentive plan. (group/individual)
ii) Ranking is a ----------method. (Value Analysis/Job Evaluation)
iii) Production management is a-------function. (staff/line)
iv) Acceptance number is the maximum number of ------- items in a sample. (good/defective)
v) X chart is --------- chart. (mean/range)
vi) Labour Rate Variance is Actual Rate minus Standard Rate multiplied by --------- hours. (Actual/Standard)

2.

a) A firm is considering alternative locations for a new plant. It has attempted to study all costs at the various locations and finds the production costs of the following items vary from one location to another. The firm will finance the new plant from deposits, fetching 10% interest.

	A	B	C	D
Labour (per unit) (₹)	7.50	11.00	8.00	9.00
Plant construction cost (₹Crores)	4.6	3.9	4.0	4.8
Material & equipment (per unit) (₹)	4.30	6.00	4.00	5.50
Electricity (per yr.) (₹ Lakhs)	3.0	2.60	3.00	2.80
Water (per yr.) (₹ Lakhs)	0.7	0.6	0.7	0.7
Taxes (per year) (₹ Lakhs)	3.3	2.8	6.3	3.5
Transportation (Per unit) (₹)	0.20	1.00	1.00	0.50

The material and equipment includes a projected depreciation, but no interest. If the plant is designed to have an effective system capacity of 10,000 units per year and is expected to operate at 80% efficiency, what is the most economic location on the basis of actual output? [6]

b) Describe Multipurpose and Single Purpose machine tools. Give examples of each of them. State the uses of these two types of machine tools. [2+1+2]

c) Sunil works an eight hour day as a machine operator. He works with an average P.I. of 105%. A work sampling study determines that he is idle 20% of the day. Product record shows that he turned out 400 pieces of acceptable quality during the day. What is the standard time for the operation, if the job is given total Relaxation Allowance of 10%? [3]

d) Find the machining cost of a M. S. bar on a lathe from the following data: R. P. M. of the Job = 500. Feed of tool per revolution of job = 0.5 mm. Depth of cut = 2 mm. Diameter of raw material = 60 mm. Diameter of finished job = 40 mm. Length of Job = 1000 mm. Machining cost = ₹ 9 per hour. [4]

3.

a) The following data is available for a machine in a manufacturing unit:

Hours worked per day	8
Working days per month	52
Number of operators	1
Standard minutes per unit of production	
Machine time	22
Operator time	8
Total time per unit	30

(i) If plant is operated at 75% efficiency, and the operator is working at 100% efficiency, what is the output per month?

(ii) If machine productivity is increased by 5% over the existing level, what will be the output per month?

(iii) If operator efficiency is reduced by 20% over the existing level, what will be the output per month? [6]

b) List the eight steps of Benchmarking Process. [4]

c) State the objectives of Scheduling. [2]

d) Describe Mean Absolute Deviation (MAD) and Bias. [3+3=6]

4.

a) A Mutual Fund has cash resources of ₹ 200 million for investment in a diversified portfolio. Table below shows the opportunities available, their estimated annual yields, risk factor and term period details.

Formulate a Linear Program Model to find the optimal portfolio that will maximize return, considering the following policy guidelines:

- All the funds available may be invested
- Weighted average period of at least five years as planning horizon.
- Weighted average risk factor not to exceed 0.20.
- Investment in real estate and speculative stocks to be not more than 25% of the monies invested in total.

Investment type	Annual yield (percentage)	Risk factor	Term period (years)
Bank deposit	9.5	0.02	6
Treasury notes	8.5	0.01	4
Corporate deposit	12.0	0.08	3
Blue-chip stock	15.0	0.25	5
Speculative stocks	32.5	0.45	3
Real estate	35.0	0.40	10

[5]

b) State the characteristics of Just-in-time System. [4]

c) List the differences between CPM and PERT. [3]

d) Southern Naval Command of Indian Navy has 10 ships which arrive at Cochin Naval Base for repairs and other maintenance work with a negative exponential distribution of the inter-arrival times. The mean of these times is 15 days. The time for which a ship occupies a berth for repair-and-maintenance shows a negative exponential distribution with a mean of 25 days. If the average delay in the repair/maintenance of ships is to be kept below five days, how many berths should there be at the naval base? [6]

Section II: Information Systems

Answer Question No. 5 which is compulsory and Any two questions from the rest.

5.

a) Fill in the blanks: [5]

i) ORACLE is a software package for ----------.
ii) A computer network in which there is no host and in which all stations are equal is called a --------- network.
iii) Eliminating errors of a program is called----------.
iv) Multiprogramming is processing of a number of programs simultaneously by using the technique of ----------.
v) ---------means browsing with any predetermined search material.

b) Discuss briefly the following term with reference to Information Technology: [5]
i) Stored Program Concept
ii) Reference files
iii) System decomposition
iv) Toggle
v) Virtual Memory

c) Expand the following abbreviations: [4]
i) INGRES
ii) B2C
iii) SQL
iv) WYSIWYG

6.

a) State the features of Inventory Management in SAP. [5]
b) Describe "backup" of computer files. State why is it necessary to keep back up of computer file? [3]
c) Describe Program Debugging. List the steps involved therein. [4]
d) Discuss the characteristics of a good coding system. [4]
e) State whether a Website is a product or a service? [2]

7.

a) State the major areas of computer-based applications. [5]

b) List the steps for successful installation of an equipment. [3]
c) State the benefit of Business Intelligence (BI). [5]
d) Describe communication protocol. State its functions. [5]

8.

a) State two negative effects of coding. [2]
b) List the limitations of using flowcharts. [2]
c) State the major attributes of judging a CPU. [2]
d) Describe DBMS [Data Base Management System]. [3]
e) Explain Business Process Re- engineering (BPR). [3]
f) Describe EDI. State the uses of EDI. [6]