INTERMEDIATE EXAMINATION

December 2013 *I–P9(OMS)*

Operation Management and Information Systems *Syllabus 2008*

Time Allowed: 3 Hours Full Marks : 100

The figures in the margin on the right side indicate full marks.

Section I : Operation Management

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

1. (a) Match the terms in Column I with the relevant terms in Column II: 0.5×8

Column I	Column II
(A) Fork-lift-Truck	(i) Milling Machine
(B) Teeth on a gear wheel	(ii) Move heavy loads over rectangular area
(C) Electrical Overhead Travelling Crane	(iii) Go-No Go gauge
(D) Methods Time measurement	(iv) Drilling Machine
(E) Industrial Finance Corporation of India	(v) Handling crates on pallets within a factory
(F) ABC	(vi) Project funding
(G) Hole in a block	(vii) Work measurement
(H) Inspection	(viii) Classification based on annual usage value

(b) For each part below, choose the most appropriate answer out of the four options given against each part: 1×5

(i) One of the important charts used in Programme control is:
(A) Material chart, (B) Gantt chart, (C) Route chart, (D) Inspection chart.

(ii) Generally the size of the order for production in Job production is:
(A) Small, (B) Large, (C) Medium, (D) Very large.

(iii) An electro-chemical process which gives a slight anticorrosion protection and improves the appearance of the product is:
(A) Lapping, (B) Anodizing, (C) Enamelling, (D) Honing.

(iv) Devices that transfer electrical energy from one circuit to another through inductively coupled wires are:
(A) Transformers, (B) Current, (C) Motors, (D) Electrical Drivers.

(v) The process of reheating which will reduce the brittleness and soften the steel is known as:
(A) Normalising, (B) Quenching, (C) Case Hardening, (D) Tempering.

(c) Examine each statement and indicate whether it is 'True' or 'False': 1×5

(i) Process improvement is not necessary when the process is slow in responding to the customer.

(ii) In 'Level Capacity' plan, the production capacity is matched with the demand in each period.

(iii) Vertical lines of authority and responsibility must be kept as short as possible.

(iv) Technology does not affect the scale of production operations.

(v) 'Routing' and 'Scheduling' are not interconnected and both can be carried out separately and independently.

Please Turn Over

2. (a) A workshop has 20 Nos. of identical machines. The failure pattern of the machine is given below: 4

Elapsed time after maintenance attention (in months)	**Probability of failure**
1	0.20
2	0.05
3	0.20
4	0.20
5	0.15
6	0.20

It costs Rs. 200 to attend a failed machine and rectify the same. Compute the yearly cost of servicing the broken down machines.

(b) An operator manufactures 12 identical components in a week of 48 hours duration. Each component takes 320 standard minutes and the material cost per component is Rs. 20. 4

Estimate the cost per component if the company operates an incentive system as below:

Guaranteed basic rate is Rs. 5 per hour upto 80% performance level, 110% of the basic rate is paid if the performance level is between 80% and 100% and 120% of the rate is paid if the performance level falls between 101% and 110%. Above 110% performance level, 130% of the basic wages are paid. Overhead component of each job is 150% of the direct labour.

(c) A Company adopts a counter-seasonal product strategy to smooth production requirements. It manufactures its spring product line during the first four months of the year and would like to employ a strategy that minimises production costs while meeting the demand during these four months. The Company presently has, on its rolls, 30 employees with an average wage of Rs. 1,000 per months. Each unit of the product requires 8 man-hours. The Company works on single shift basis (8 hrs. shift/day). Hiring an employee costs Rs. 400 per employee per occasion and discharging an employee costs Rs. 500 per person per occasion. Inventory carrying costs are Rs. 5/unit/month and shortage costs are Rs. 100/unit/month. The Company forecasts the demand for the next four months as below: 5

Month	Demand (Units)	No. of working days in the month
January	500	22
February	600	19
March	800	21
April	400	21

The Company is thinking of adopting one of the following strategies:

Plan I: Vary work force levels to meet the demand.

Plan II: Maintain 30 employees and use inventory and stock-outs to absorb demand fluctuations.

Which strategy would you recommend? You may assume nil inventory at the start.

(d) What are the cost factors on which any equipment is replaced? 5

3. (a) The work-study engineer carries out the work sampling study in a machine shop for a duration of 120 hours. The following observations were made: 5

Total number of observations	7000
No working activities	1200
Ratio between manual to machine elements	2 : 1
Average rating factor	120%
Total number of jobs produced during study	800 units
Rest and personal allowances	17%

Compute the standard time for the job.

(b) Put an appropriate word or two in blank position: 1×5

(i) A protable platform on which goods are placed to form a 'unit' load for handling and stacking is called a _____.

(ii) _____ in the network analysis represents the difference between the maximum time available to finish the activity and the time required to complete it.

(iii) The _____ layout involves the movement of men and materials to the product, which remains stationary.

(iv) (Hours worked for maintenance)/(Scheduled hours) × 100 = _____ of department.

(v) By using _____, the automatic placement and withdrawal of parts and products into and from designated storage places in the warehouse are achieved.

(c) "The principles of materials handling can be grouped under three broad headings." What are these three groups? 3

(d) With the help of the following data, project the trend for the next five years: 5

Yerar	2002	2003	2004	2005	2006	2007
Sales (Rs. Lakhs)	100	110	115	120	135	140

4. (a) A company which is planning to undertake the production of medical testing equipments has to decide on the location of the plant. Three locations are being considered, namely, A, B and C. The fixed costs of three locations are estimated to be Rs. 30 lakhs, Rs. 50 lakhs and Rs. 25 lakhs respectively per annum. The variable costs are Rs. 300, Rs. 200 and Rs. 350 per unit respectively. The average sales price of the equipment is Rs. 700 per unit. 3+2

Find:

(i) The range of annual production/sales volume for which each location is most suitable.

(ii) Select the best location from profitability at a sales volume of 18,000 units.

(b) Indian Electronics manufactures TV sets and carries out the picture tube testing for 2000 hours. A sample of 100 tubes was put through this quality test during which two tubes failed. If the average usage of TV by the customer is 4 hours/day and if 10,000 TV sets were sold, then in one year how many tubes were expected to fail and what is the mean time between failures for these tubes? 5

(c) Expand the following: 1×5

(i) AGV
(ii) GERT
(iii) SPT
(iv) MTBF
(v) IBFS

(d) A small manufacturing firm produces two types of products - A and B, which are first processed in the foundry, and then sent to the machine for finishing. The number of labour-hours required in each shop for the production of each unit of A and B as well as the number of labour-hours the firm has available per week are as follows: 3

	Foundry	Machine Shop
Product A: Labour hours/unit	20	10
Product B: Labour hours/unit	6	4
Firm's Capacity per week (in Labour hours)	1500	900

The profit on the sale of A is Rs. 40 per unit as compared to B's Rs. 30 per unit.

Construct the equation for the objective function and the corresponding constraints by introducing Slack variables under Simplex method of linear programming for an optimal solution.

Section II : Information Systems

Answer **Question No. 5** *which is compulsory and* **any two** *questions from the rest, under Section II.*

5. (a) Match the terms in Column I with the relevant terms in Column II: 0.5×8

Column I	Column II
(A) Dumb Terminals	(i) Method of using computers as audit tools
(B) Normalization	(ii) Each workstation having equivalent capabilities and responsibilities
(C) Logical operations	(iii) Brain of a DSS
(D) Peer-to-peer architecture	(iv) Information presented in summary format
(E) Mathematical Model	(v) Used for data entry only
(F) EIS	(vi) A data set in the form of graph, picture or frictional diagram
(G) Model Base	(vii) Comparing, selecting and matching of data
(H) Test Deck	(viii) Process of organizing data in a database

(b) Each statement below is either **True** or **False**. Indicate the same in your answers: 1×3

(i) Disk imaging helps in prevention of damage out of fraud.

(ii) The task of a compiler is to convert the Machine Language Program into Source Program.

(iii) Full duplex data can travel both directions at a time.

(c) Put an appropriate word or two in blank position: 1×5

(i) In _____ language, the flow of control is managed through line number.

(ii) _____ test is also known as sandwich testing.

(iii) A real-time processing system is necessarily an _____ system, but the reverse is not true.

(iv) Virtual Reality is a _____ language to simulate the model in such a fashion that it looks like real.

(v) _____ offers an effective system to protect access by unauthorized user from outside.

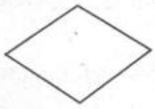
(d) For each part below, choose the most appropriate answer out of the four options given against each part: 1×2

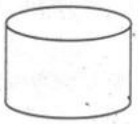
(i) Particular characteristic of database where data in the database exist permanently:
(A) Integrity, (B) Security, (C) Persistence, (D) Consistency.

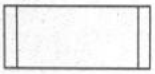
(ii) A mechanism of defining user profile based on physical parameters and behaviour:
(A) Biometric Security, (B) Password Security, (C) Network Security, (D) Database Security.

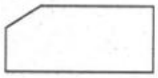
6. (a) (i) What is a System Flow Chart? 2

(ii) What is indicated by each of the following four symbols used in a System Flow Chart? 0.5×4

(A) 

(B) 

(C) 

(D) 

(b) What is the purpose of testing of a computer program? Name the various levels of testing. Explain the term 'Structured Walk Through'. 1+2+2

(c) Expand the following and write one or two sentences on each expression to convey its meaning or implication: 1×5

(i) IRG
(ii) EBCDIC
(iii) OLAP
(iv) CASE
(v) EPROM

(d) A manufacturer sells his products to three different types of customers with different discount rates based on order vales as under: 4

Customer	Commission on %age on order value		
	Less than Rs. 7,500	Rs. 7,500 to less than Rs. 15,000	Rs. 15,000 and more
Retailer	5	8	10
Distributor	8	10	15
Govt. Party	8	8	8

Draw the decision table.

7. (a) A company engaged in steel manufacturing activities is considering the implementation of an ERP system. The company has a few computerised applications running in different areas of the organisation. All these will be discontinued after ERP system is implemented. 5

A software firm has given a quotation for the new system which states that the implementation will take a little more than a year and the capital cost will be Rs. 85 lakhs (payable as Rs. 55 lakhs in the first year and Rs. 30 lakhs in the second year). The management is wondering as to when the ERP system will recover all of

its initial costs and start making a profit. What would be your answer based on the given data? The following information about Operational Costs (in Rs. lakhs) are also available:

	Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Old system	26	28	33	42	45
New system	—	8	16	17	18

(b) What is meant by Structured Programming? Enlist the rules of Structured Programming. 1+2

(c) Expand BPR and mention its scope. 1+3

(d) (i) ''Integration of information is an important feature of an ERP system.'' Please establish the statement. 2

(ii) What are the sub-systems in Human Resource Module and Materials Management Module. 2+2

8. Write short notes on any six of the following: 3×6

(a) Sort and Merge;

(b) Domain Name;

(c) E-money;

(d) Main features of client-server architecture;

(e) Implementation process in ready-made software;

(f) Data Source;

(g) Functions of the Operating System;

(h) Commonly used Internet Protocols.