Answer to PTP_Intermediate_Syllabus 2012_Jun2014_Set 1

Paper 9 - Operations Management & Information Systems

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

Section –A (60 Marks)
(Operations Management)
Answer Question No. 1 (carrying 12 marks) which is compulsory and answer any four (carrying 12 marks each) from the rest in this Section.

Working Notes should form part of the answer.

1.

a) Ergonomics is another name for …….. [1]

b) The demand function of a monopolist is $p = \frac{3}{q}$ and the cost function is $C = 2q + 3q^2$. Will the monopolist produce the commodity if his objective is to maximise profit? [2]

c) The time study of a machinery operation recorded cycle times of 6.0, 8.0, 9.0 and 9.0 minutes. The analyst rated the observed worker as 90%. The firm uses a 0.15 allowance fraction. Compute the standard time. [2]

d) Where did QFD come from? [2]

e) The main shaft of calcinator has a very high reliability of 0.990. The equipment comes from Russia and has a high downtime cost associated with the failure of this shaft. This is estimated at ₹ 3 crore as the costs of sales lost and other relevant costs. However, this spare is quoted at ₹ 12 lakh at present. Should the shaft spare be procured along with the equipment and kept or not? [2]

f) Rucker plan is a ----------incentive plan. [1]

g) State suitable Material Handling Equipments used in following operations: [2]

(i) Transferring heavy materials from one department to another
(ii) Feeding coal and iron in steel plant.
(iii) Transporting fertilizer packed bags to a truck on the ground below.
(iv) Moving heavy load above the machine on the shop floor.

Answer:

a) Human Engineering.

b)

$\pi = R - C = pq - C = \frac{3}{q}.q - (2q + 3q^2)$

$\therefore \pi = 3 - 2q - 3q^2$

To maximize π, the first order condition is $\frac{d\pi}{dq} = 0$

or, $- 2 - 6q = 0$, or, $6q = - 2$ or, $q = -\frac{1}{3} < 0$.

But the level of output cannot be negative. So, the monopolist will not produce the

commodity.

c) Average cycle time = $\frac{6.0+8.0+9.0+9.0}{4}$ = 8.0 minutes

Normal time = 8.0 × 0.9 = 7.2 minutes.

Standard Time = $\frac{7.2}{(1-0.15)}$ = 8.47 minutes

The standard time for this machinery operation would be set at 8.47 minutes, which is greater than the average cycle time observed. The average cycle time was adjusted for the rating factor (90%) and the allowance fraction (0.15).

d) Yoji Akao of Tamagawa University is the key contributor to QFD Development in Japan. There are 30 matrices in his approach. The QFD team can pick and choose the matrix which would be of most use for a particular phase of product development.
Another expert in the area of QFD is Fukahara. He is associated with the Central Japan Quality Control Association. He mainly focuses on the house of quality, namely the product definition aspect. There is also the four phase (or four matrices) approach promoted by the American Supplier Institute (ASI). There are,of course, many other approaches of QFD.

e) The expected cost of down-time

= (Probability of failure) x (Cost when break-down occurs)

= (1 - 0.990) x (₹ 3 crore) = ₹ 3 lakh

However, the cost of procuring the spare now is ₹ 12 lakh. Therefore, expected cost of downtime is less than the cost of spare; hence the spare need not be bought along with the equipment.

f) Group.

g)

i) Roller Table.
ii) Belt Conveyor.
iii) Gravity chute.
iv) EOT Crane.

2.

a) Explain the activity wise costing record has to be maintained by all Indian Companies dealing with power as per section 209 (1) (d) of the Companies Act, 1956 and rule 2 of the Cost Accounting Records (Electricity Industry)Rules,2011. [7]

b) The cost function of a monopolist is $C = ax^2 + bx + c$ and the demand function is $p = \alpha - \beta x$. A unit tax 't' is imposed on sale. The monopolist seller adds this tax to production cost

(i) Determine the price and output of the monopolist before and after the imposition of the unit tax. [5]

Answer:

a) As per section 209 (1) (d), 600(3) (b) of the Companies Act, 1956 and rule 2 of the Cost Accounting Records (Electricity Industry) Rules, 201, the following activity wise Costing record has to be maintained by all Indian Companies dealing with power.

- Proforma A : Cost of utilities like water collection, water treatment, ash handling plant, effluent treatment, etc
- Proforma B : Cost of procurement of coal, lignite, gas, naphtha, fuel oil, bagasse or any other secondary conventional or non-conventional fuel.
- Proforma C : Cost of generation of power (thermal or Hydroelectric or gas turbine or atomic or Wind or solar, etc.)
- Proforma D : Cost of transmission or Distribution
- Proforma E : Cost of supply (consumer servicing and billing, etc.)
- Proforma F : Activity-wise Capital Cost of Plant and Machinery or Equipment relating Electricity activity and other common services or activities
- Proforma G : Allocation and apportionment of total expenses and income of the Company
- Proforma G1 : Apportionment of Overheads
- Proforma H : Profit Reconciliation.

b) Profit of the monopolist before the imposition of tax,

$\pi = px - C = (\alpha - \beta x)x - ax^2 - bx - c$

or, $\pi = \alpha x - \beta x^2 - ax^2 - bx - c.$

To maximize π, the first order condition is = $\frac{d\pi}{dx} = 0$

or, $\alpha - 2\beta x - 2ax - b = 0$

or, $2(\beta + a)x = \alpha - b.$ $\quad \therefore x = \frac{\alpha - b}{2(\beta + a)}$

This is the level of output before the imposition of tax. Price before tax is

$$p = \alpha - \beta x = \alpha - \frac{\beta(\alpha - b)}{2(\beta + a)}$$

$$\frac{2\alpha\beta + 2\alpha a - \alpha\beta + \beta b}{2(\beta + a)} = \frac{\alpha\beta + 2\alpha a + b\beta}{2(\beta + a)}$$

When a unit tax 't' is imposed, total cost is $C = ax^2 + bx + c + tx$
Suppose profit after tax is N.
Then $N = \alpha x - \beta x^2 - ax^2 - bx - c - tx$
Now, to maximize N, the first order condition is $\frac{dN}{dx} = 0,$

i.e., $\alpha - 2\beta x - 2ax - b - t = 0$
or, $2(\beta + a)x = \alpha - b - t$

$$\therefore x = \frac{\alpha - b - t}{2(\beta + a)}$$

This is the amount of sale after the imposition of tax. Price after the imposition of tax is

$$p = \alpha - \frac{\beta(\alpha - b - t)}{2(\beta + a)}$$

$$= \frac{2\alpha\beta + 2\alpha a - \alpha\beta + b\beta + t\beta)}{2(\beta + a)}$$

$$= \frac{\alpha\beta + 2\alpha a - \alpha\beta + b\beta + t\beta}{2(\beta + a)}$$

3.

a) Define the Work Measurement? Also mention the benefits of Work Measurement. [2+4=6]

b) Fair Faces, a small-sized company making facial cosmetic powders, has mainly blenders in its plant equipment. Due to the technical characteristics (constraints) of the powders there have to be a number of such blenders accommodating small batches of the facial powders.

The main components of the operation of a blender are:
(a) Load talc : 2.5 minutes
(b) Add perfume : 2.0 minutes
(c) Close : 0.5 minutes
(d) Blend : 31.0 minutes
(e) Unload into special bins : 2.2 minutes

(Component (d) viz. 'blend' and (e) viz. 'unload into special bins' are purely machine components).
The wages of a blender-operator (i.e. the person operating) is ₹ 30 per hour as his job involves a degree of some skill. Each load of blending generates a contribution of ₹ 50.
The company works on a single shift which consists of 7¼ operating hours, after allowing time for lunch, tea and personal breaks. How many blending machines should one person look after? Explain the economics involved in the operation in your answer. [6]

Answer:

a) Work measurement is defined as the application of techniques designed to establish the work content of a specified task by determining the time required for carrying out the task at a defined standard of performance by a qualified worker.

Benefits of Work Measurement

Work measurement helps

1. To develop a basis for comparing alternate methods developed in method study by establishing the work content in each method of doing the job.

2. To prepare realistic work schedules by accurate assessment of human work.

3. To set standards of performances for labour utilization by establishing the labour standards for an element of work, operation or product under ordinary working condition.

4. To compare actual time taken by the worker with the allowed time (standard time) for proper control of labour.

5. To assist in labour cost estimation.

6. To provide information related to estimation of tenders, fixation of selling price and assessment of delivery schedule.

b)

One man's job (on each machine) = (loading + adding perfume + closing)
= (2.5 + 2.0 + 0.5) min. = 5.0 min.
A machine's job = addition of all the component times
= 31.0 + 2.2 + 5.0 = 38.2 minutes

No. of machines per man = $\frac{38.2}{5.0}$ = 7.64

An operator may attend to seven to eight machines
Case 1: If the operator handles seven blending machines, he effectively works for (5.0 x 7) = 35.0 minutes and idles for 3.2 minutes for every 38.2 minutes. The idle costs (costs of idle times) are computed as follows:

Possible blending cycles = $\frac{(7\frac{1}{4} \times 60)}{38.2} = \frac{435\,\text{min}}{38.2\,\text{min. per cycle}}$ = 11 cycles

(Note: This takes 420.2 minutes; the rest of the time i.e. 14.8 minutes cannot be utilised to make a batch)

* Idle time of man per day = (3.2 x 11) + (14.8) = 50.0 min.

Cost of idle time of man = $\frac{50}{60}$ × 30 = ₹ 25 per day

* Idle time of machine per day = 14.8 minutes

Cost of such idling = $\frac{14.8}{60}$ × 50 = ₹ 12.36

* Therefore, total costs (idling) = ₹ 25.00 + ₹ 12.36 = ₹ 37.36

Case II: If eight machines are handled by one man, the idle times of machines are 1.8 minute per 40 minutes. (Note: 5 min. x 8 = 40 min. minus 38.2 min. = 1.8 min.)

Number of cycles = $\frac{435\,\text{min}}{40\,\text{min}}$ = 10 cycles (+ 35 minutes of non-productive time)

Machine time lost = (1.8 x 10) + 35 min. = 53 min.

Cost of such idling = $\frac{53}{60} \times 50 = ₹ 44.15$

Man-time lost = 35 min.

Cost of such idling = $\frac{35}{60} \times 30 = ₹ 17.50$

Total costs (idling) = ₹ 44.15 + ₹ 17.50 = ₹ 61.65

Since the Case I costs are lower, on this criterion, a man should look after only seven machines.

4. A large computer installation contains 2,000 components of identical nature which are subject to failure as per probability distribution that follows:

Month End:	1	2	3	4	5
% Failure to date:	10	25	50	80	100

Components which fail have to be replaced for efficient functioning of the system. If they are replaced as and when failures occur, the cost of replacement per unit is ₹ 3. Alternatively, if all components are replaced in one lot at periodical intervals and individually replace only such failures as occur between group replacement, the cost of component replaced is ₹ 1.

(a) Assess which policy of replacement would be economical.

(b) If group replacement is economical at current costs, then assess at what cost of individual replacement would group replacement be uneconomical.

(c) How high can the cost per unit in group replacement be to make a performance for individual replacement polity? [6+3+3=12]

Solution:

(a)

Computation of Failures & Mean life

Month	Probability	P_1X_1
1	0.10	0.10
2	0.15	0.30
3	0.25	0.75
4	0.30	1.20
5	0.20	1.00
		3.35

Average No. of Replacements = 2000/3.35 = 597

Cost of Individual Replacement = 597 x 3 = 1791

Computation of expected No. of Replacements:

Month		
0	$N_0 = N_0P_0 = 2000 \times 0$	0
1	$N_1 = N_0P_1 = 2000 \text{ X } 0.1$	200
2	$N_2 = N_0P_2 + N_1P_1 = 2000 \text{ X } 0.15 + 200 \text{ X } 0.1$	320
3	$N_3 = N_0P_3 + N_1P_2 + N_2P_1 = 2000 \text{ X } 0.25 + 200 \text{ X } 0.15 + 320 \text{ X } 0.1$	562
4	$N_4 = N_0P_4 + N_1P_3 + N_2P_2 + N_3P_1 = 2000 \text{ X } 0.3 + 200 \text{ X } 0.25 + 320 \text{ X } 0.15 + 562 \text{ X } 0.1$	754.2

5	$N_5 = N_0P_5 + N_1P_4 + N_2P_3 + N_3P_2 + N_4P_1$ = 2000 X 0.2 + 200 X 0.3 + 320 X 0.25 + 562 X 0.15 + 754.2 X 0.1	699.72

Computation of Average cost

Month	Individual Replacement	Cost		Total Cost	Average Cost
		IR	GR		
		₹	₹	₹	₹
1	200	600	2000	2600	2600
2	520	1560	2000	3560	1780
3	1082	3246	2000	5246	1748.67*
4	1836.2	5508.6	2000	7408.6	1877.15
5	2535.92	7607.76	2000	9607.76	1921.55

Since the average cost is lowest in 3rd month, the optimal interval i.e., replacement is 3 months. Also the average cost is less than ₹ 1791 of individual replacement, the group replacement policy is better.

(b)

Let 'K' be the cost of Individual Replacement

Month	Average Cost of Group Replacement	Average cost of IR	'K' Value (₹)
1	1 (2000 + 200 K)	597 K	5.04
2	0.5 (2000 + 520 K)	597 K	2.97
3	0.33 (2000 + 1082 K)	597 K	2.82
4	0.25 (2000 + 1836.2 K)	597 K	3.62
5	0.20 (2000 + 2535.92 K)	597 K	4.45

If group replacement is anything smaller than 2.82, then Group Replacement would be uneconomical.

(c)

Let 'a' be the unit cost of Group Replacement Policy

Month	Average Cost of Group Replacement	Average cost of IR	'a' Value (₹)
1	1 (2000 a + 600)	1791	0.60
2	0.5 (2000 a + 1560)	1791	1.01
3	0.33 (2000 a + 3246)	1791	1.06
4	0.25 (2000 a + 5508.6)	1791	0.83
5	0.20 (2000 a + 7607.76)	1791	0.67

When unit cost is more than ₹ 1.06 then Individual Replacement policy would be better.

5.

a) What are the seven deadly Disease and Sins according to Deming's? [4]

b) Request for maintenance service made upon a centralized maintenance facility have been simulated for a Typical 8 hour shift with arrival and service pattern as shown below:

Request arrival (clock) time	Repair service time

1:30	**60 mins.**
2:00	**20 mins.**
4:15	**45 mins.**
4:30	**120 mins.**
5.30	**30 mins.**
7:00	**10 mins.**

The labour charges of maintenance crew is ₹ 40 per hour whether working or idle. The waiting time of machinery that has broken-down is costed at ₹ 70 per hour.

i) Find the idle time cost of the maintenance facility.
ii) Find the break-down cost of machinery (not including repair time).
iii) Find the total facility idle time and machinery waiting time cost.
iv) Assuming that for an additional cost of ₹ 10 per hour the maintenance centre could add another crew and decrease the repair time by one third, would the additional cost be justified? [2×4=8]

Answer:

a) Deming's Seven Deadly Diseases and Sins

1. Lack of constancy of purpose (short-term quality programs)
2. Emphasis on short-term profits
3. Over reliance on performance appraisals
4. Mobility of management (Job hopping)
5. Over emphasis on visual figures
6. Excessive medical costs for employees' healthcare
7. Excessive costs of warranty and legal costs.

b) Calculation of machine down time :

Request Arrival time	Repair time reqd. with one crew (mins)	Repair time begins (clock time)	Repair time ends (clock time)	Waiting Time + Repair time = Total time (hrs.)
01:30	60	01:30	02:30	Nil + 1.0 = 1.00
02:00	20	02:30	02:50	0.5 + 0.33 = 0.83
04:15	45	04:15	05:00	Nil + 0.75 = 0.75
04:30	120	05:00	07:00	0.5 + 2.0 = 2.50
05:30	30	07:00	07:30	1.5 + 0.5 = 2.00
07:00	10	07:30	07:40	0.5 + 0.166 = 0.666
				7.75 Hrs.

(i) Calculation of the idle time cost of maintenance facility :

Total repair service time = (60 + 20 + 45 + 120 + 30 + 10) mts.

= 285 mts. = 4.75 hrs.

Total idle time of maintenance facility = 8.00 - 4.75 = 3.25 hrs.

Total idle time cost of maintenance facility = 3.25 x 40 = ₹ 130

(ii) Calculation of waiting time of operators:

Total waiting time for repair = (7.75 – 4.75) = 3.0 hrs

Waiting time cost = 3.0 x 70 = ₹ 210

(iii) Calculation of total facility idle time and machinery waiting time cost:

Total idle time cost of maintenance facility + Machinery waiting time cost =130+210 = ₹ 340

(iv) Adding one more maintenance crew at a cost of ₹ 10 per hour decreases repair time by one third.

Increase in labour cost/ shift of 8 hours = ₹ 10×8 = ₹ 80

Decrease in repair time = 1/3 of repair time with one crew

Saving in operator and machine time = $\frac{1}{3} \times 4.75 = 1.582$ hrs.

Idle time cost = 1.582 x 70 = ₹ 110.74

Since savings in operator and machinery idle time cost is (i.e., ₹ 110.74) more than the increase in labour cost (i.e., ₹ 80/-), it is justified to have one more maintenance crew.

6.

a) Maharashtra Trucking Company (MTC) has a fleet of 50 trucks. The past data on the breakdown of the trucks show the following probability distribution (for a new truck as well as for one which has been repaired after a breakdown).

Months after Maintenance	Probability of Breakdown
1	0.10
2	0.20
3	0.30
4	0.40

Each breakdown costs ₹ 3,000 on an average; which includes cost of time lost and cost of materials and manpower.

The manager of MTC knows the importance of preventive maintenance. He estimates the costs of the preventive maintenance to be ₹ 500 per such preventive action. What should be the appropriate maintenance policy in terms of the mix of preventive and breakdown maintenance? [9]

b) State the Limitations of Oligopoly Price Policy. [3]

Answer:

a) First, let us compute the cost of a totally breakdown maintenance policy.

The expected number of months between failures

$$= 0.1\ (1) + 0.2\ (2) + 0.3\ (3) + 0.4\ (4) = 3.0$$

Cost per month of totally breakdown maintenance policy

$$= \frac{\text{(No. of trucks) (Cost per breakdown)}}{\text{(Expected number of months between failure)}}$$

$$= \frac{(50)\,(₹3000)}{(3.0)} = ₹\ 50{,}000$$

Now let us compute the costs of different periodicities of preventive maintenance.

(i) Preventive maintenance (PM) period one month

No. of breakdowns within the period of one month:

$B_1 = (50) \times (0.1) = 5$

Cost of breakdown = 5 x ₹ 3000 = ₹ 15,000

Cost of preventive maintenance = ₹ 500 x 50 = ₹ 25,000

Total Cost during the PM period = ₹ 40,000

Therefore, cost per month for this policy is

$$= 40{,}000 \div 1 = ₹\ 40{,}000$$

(ii) Preventive maintenance (PM) period two months

No. of breakdowns within 2 months:

$B_2 = (50) \times (0.1 + 0.2) + (50) \times (0.1) \times (0.1) = 15.5$

Cost of breakdown = (15.5) x ₹ 3000 = ₹ 46,500

Cost of prev. maintenance = ₹ 500 x 50 = ₹ 25,000

Total cost during the PM period = ₹ 71,500

Therefore, cost per month for this policy:

₹ 71,500 ÷ 2 months = ₹ 35,750

(iii) Preventive maintenance period 3 months

No. of breakdowns within 3 months:

$B_3 = (50) \times (0.1 + 0.2 + 0.3) + (50 \times 0.1)\ (0.1 + 0.2) + (50 \times 0.1 \times 0.1)\ (0.1)$

$= 30 + 1.5 + 0.05 = 31.55$

Cost of breakdown = 31.55 x ₹ 3000 = ₹ 94,650

Cost of preventive maintenance = 50 x ₹ 500 = ₹ 25,000

Total = ₹ 1,19,650

Therefore, cost per month for this policy

= ₹ 1,19,650 ÷ 3 months = ₹ 39,883.33

(iv) Preventive maintenance period 4 months

No. of breakdowns within 4 months

B4 = [(50) x (1.0)] + [(50) x (0.1) x (0.1 + 0.2 + 0.3) + (50 x 0.1 x 0.1) x (0.1 + 0.2) + (50 x 0.1 x 0.1 x 0.1) x (0.1) + (50 x 0.1 x 0.2) x (0.1)]+ [(50 x 0.2) x (0.1 + 0.2) + (50 x 0.2 x 0.1) x (0.1)] + [(50 x 0.3 x (0.1)]

= 57.855

Cost of breakdown = (57.855) x (₹ 3,000) = ₹ 1,73,565

Cost of preventive maintenance = 50 x Rs 500 = ₹ 25,000

Total = ₹ 1,98,565

Therefore, cost per month for this policy is ₹ 1,98,565 ÷ 4 months = ₹ 49,641.25

Comparing the costs per month of different policies, we see that the policy of preventive maintenance every two months is the most economic policy.

b) The price policy under oligopoly does not help much to improve sales for the following reasons.

i) Price cutting is not possible as it may lead to a price war resulting in all firms earning only normal profits,

ii) Price reduction is not a plausible policy also because the customers may become suspicious about the quality of the product,

iii) There is a general tendency of price rigidity under oligopoly; firms try to maintain a status quo as far as possible,

iv) The Cost of production as well as selling costs are so high that it is not an easy job to reduce prices,

v) This is more true in a situation of an inflationary rise in prices. It is ridiculous to talk of a reduction when maintaining the price is difficult,

vi) Oligopolies are found mostly in the case of sophisticated manufactures such as engineering goods and consumer durables. The discretionary incomes squeeze under inflation. This poses a problem of demand recession, putting manufacturers in a situation of helplessness.

Section B(40 Marks)

Information System

Answer Question No. 7 (carrying 8 marks) which is compulsory and answer any four (carrying 8 marks each) from the rest in this Section.

7.

a) Define Commerce Net. [2]
b) State the term Mathematical Model used for representing the information. [2]
c) List the basic functions of a computer? [2]
d) Transferring programs from main memory to disk storage and back is called……[1]
e) In …….. Information system architecture, each workstation has equivalent capabilities and responsibilities. [1]

Answer:

a) **Commerce Net** is a consortium of companies which is promoting the use of internet for E-commerce. Sponsored by Silicon Valley vendors and US government agencies, it was launched in 1994 with the aim of creating infrastructure for business-to-business transactions on the internet. Today, it has over 120 members and helps companies to streamline their procurement and development cycles by performing transactions online, overcome impediments to e-Commerce by making new interfaces, security mechanisms and indexing tools.

b) **Mathematical Model** represents a data set in the form of graph, picture or frictional diagram. It uses highly mathematical or statistical algorithm to interpret data of huge volume with ease. The algorithm varies depending on the complexity of analysis of data sets and the type of analysis.

c) Computer does the following four functions :
- Receive the input data through input devices
- Process the data with the help of CPU
- Generate the output through output devices
- Stores the input/output in storage devices

d) Swapping
e) Peer-to-peer

8.

a) How does EDI work? State the use of EDI. [4+2=6]
b) Mention any two reasons for the spread of E- commerce. [2]

Answer:

a) Before EDI following steps were involved in commerce:
Step I: Creation of purchase order (PO) by the customer.
Step II: PO is sent by the customer (sender of the message) using post office, fax, and telex and so on.
Step III: PO is received by the supplier (receiver of the message).
Step IV: PO is interpreted by the supplier (receiver).
After EDI following steps were involved in commerce:

Step I: Customer's computer system creates and sends the electronic PO.
Step II: PO is received by the supplier (receiver of the message) and places the order directly into his system and he acts accordingly.

Uses of EDI
EDI is used in following ways:

i) EDI is used to electronically transfer documents such as purchase order, invoices, shipping notices, receiving advises and other standard business correspondence between the trading partners.
ii) EDI can also be used to transmit financial information and payment in electronic form. However, where EDI is used for effecting payment it is commonly known as financial EDI or electronic funds transfer.

b) Main Reasons for the spread of E-commerce:

i) Digital convergence, i.e., it means that due to digital revolution almost all digital devices can communicate with one another.
ii) Today's E-commerce is available to anyone, anywhere in the world, anytime 24/7 (24 hours a day, 7 days a week).

9.

a) Discuss the liability under Law of Tort and Internet. [4]
b) List the concept of the cost of quality. [2]
c) Define Transform Analysis and Transaction Analysis? [2]

Answer:

a) Basically tort is a civil wrong which involves civil liability and civil action. Most of the cases relating to fraud, negligence, misrepresentation, false advertisement, and IPRs infringement are covered under it.

- Strict liability: Products that produce the wrong solution, causing injury to others, fall under laws of strict liability or negligence. The basis of liability involves product liability and is covered under tort law. Therefore the moot question is that if such product is purchased online causing injury to another person whether rule of liability would be applicable?
- Fraud: If an e-merchant gives false advertisement on the website or sells wrong products or a customer gives an unauthorized credit card over the Internet, whether he or she will be liable for fraud?
- Suppose a product is bought online but consumer finds it defective. Again here question is of liability. Here depending upon how liability is worded liability is of the manufacturer. Generally in such situation every person involved in transaction (manufacturer, e-merchant and seller) would be liable.

b) The concept of cost of quality are:

i) The premise underlying cost reduction is to decrease costs while maintaining or improving product quality.
ii) If the quality of products and services does not conform to quality standards, the organization incurs the *cost of nonconformance to quality standards*.

c) Transform Analysis

One approach used to derive a program structure chart from program DFD is transform analysis.

Transaction Analysis
An alternative structured design strategy for developing structure charts is called transaction analysis.

10.

a) "The final step of the system implementation is its evaluation." What functions are being served by the system evaluation? Discuss different aspects of evaluation? [2+3=5]

b) What is Data Dictionary? [3]

Answer:

a) Evaluation of the new system: The final step of the system implementation is evaluation. Evaluation provides the feedback necessary to assess the value of information and the performance of personnel and technology included in the newly designed system.

There are two basic areas of information systems that should be evaluated. The first area is concerned with whether the newly developed system is operating properly. The other area is concerned with whether the user is satisfied with the information system with regard to the reports supplied by it.

Development evaluation: Evaluation of the development process is primarily concerned with whether the system was developed on schedule and within budget.

Operation evaluation: The evaluation of the information system's operation pertains to whether the hardware, software and personnel are capable to perform their duties and they do actually perform.

Operation evaluation answers such questions:

i) Are all transactions processed on time?
ii) Are all values computed accurately?
iii) Is the system easy to work with and understand?
iv) Is terminal response time within acceptable limits?
v) Are reports processed on time?
vi) Is there adequate storage capacity for data?

Information evaluation: The extent to which information provided by the system is supportive to decision making is the area of concern in evaluating the system. User satisfaction can be used as a measure to evaluate the information provided by an information system. If management is generally satisfied with an information system, it is assumed that the system is meeting the requirements of the organization.

b) Data Dictionary: Each computer record of a data dictionary contains information about a single data item used in a business information system. The information in each record of a Data Dictionary may include the following:

i) Codes describing the data item's length, data type and range.
ii) Identity of the source documents used to create the data.
iii) Names of the computer files storing the data item.
iv) Identity of individuals/programs permitted to access the data item.
v) Identity of programs/individuals not permitted to access the data item.
vi) Names of the computer programs that modify the data item.

For an Auditor, A data dictionary can also help to establish an audit trial because it can identify the input sources of data items, the computer programs that modify particular data items, and the managerial reports on which data items are output.

For the accountants, a data dictionary can also be used to plan the flow of transaction data through the system.

11.

a) What is configuration? [2]
b) State the general Mode of Configuration. [2]
c) Discuss ERP Accounts Payable and Receivable? [4]

Answer:

a) Configuration of an ERP system deals with handling of numerous usage controls, which can be switched off or switched on, so as to balance its functionalities to extant needs. First thing to happen is to install specific modules needed and configuring these modules, as per the scope of the project. Thousands of configuration tables are present, which define how the system should operate, how the data entry screen will look like, how the signals and massages will appear etc.

The above process is extremely complex, particularly for tier 1 vendors like SAP and Oracle. To alleviate this complexity, ERP vendors are creating pre configured modules suitable for a particular business vertical. ERP vendors are also developing automated pre configuration tools such as Orgware from BaaN. SAP has also brought out "Accelerated SAP Solution" containing industry specific templates which can be tweaked for an individual company.

b) General Mode of Configuration:

i) A function can be turned on or turned off or made optional.
ii) XOR i.e.to chooses only one flow that fulfills the specified condition.
iii) OR where a configuration supports optional activities or flow requiring all, none or some of the activities.
iv) AND - indicate mandatory parallel flows.

Some configuration choices are irreversible e.g. if "negative inventory allowed" option is chosen, it cannot be reversed at a later stage. Some configurations are reversible e.g. purchase order quantity may exceed blanket order quantity or not. In some case if a specific choice is not made, configurable function can be switched on or off by default.

c) Accounts payable and Accounts receivable modules are two important execution modules under finance segment of an ERP system. Financial relationship with vendors who are providing input to the organization in the form of goods and services are maintained in Accounts Payable (AP) module. On the flip side, the financial connection with customers who use output of the organization, are dealt through Accounts Receivable (AR) module. Both these modules maintain personal accounts either of debtors or creditors and maintain various sub ledgers such as control account, currency fluctuation accounts etc. as an integral part of General Ledger (GL).

Accounts Payable Module (AP) - This module provides the functionality to enter, monitor, maintain and process for payment of invoices and credit notes, that the organization received from its vendors. The key functionality of this module is as follows:

i) Immediate registration of incoming invoices
ii) Tracking & authorization of incoming invoices
iii) Entry of order-based and sundry invoices
iv) Automatic matching of invoices with receipts
v) Separate procedure for approval of invoices that exceeded the user tolerances
vi) Self-Billing Invoices this is suitable for JIT environment where receipt of goods automatically generates approved invoices in the system which is paid through remittances and supplier need not send any invoice.
vii) Accounts Classification for reconciliation.

Accounts Receivable Module (AR) - This module helps in tracking all the invoices that is awaiting payment from customers. The key functionalities of AR are:

i) Accounts classification for reconciliation & control.
ii) On-line credit management.
iii) Reminder letters with varying degrees of severity.
iv) Aging Analysis reports for review.
v) Interest for late payments.
vi) Customer statements.

12.

a) Explain Relational Data Base Management System? [3]

b) Define system with an example. State the types of system according to Interactive Behavior. [2+3]

Answer:

a) RDBMS – Relational Data Base Management System or Relational DBMS

A DBMS has to be persistent, that is it should be accessible when the program created the data ceases to exist or even the application that created the data restarted. A DBMS also has to provide some uniform methods independent of a specific application for accessing the information that is stored.

RDBMS adds the additional condition that the system supports a tabular structure for the data, with enforced relationships between the tables. This excludes the databases that don't support a tabular structure or don't enforce relationships between tables.

DBMS does not impose any constraints or security with regard to data manipulation it is user or the programmer responsibility to ensure the ACID PROPERTY of the database whereas the RDBMS is more with this regards because RDBMS defines the integrity constraint for the purpose of holding ACID PROPERTY. RDBMS may be or may not be Client Server Database System.

Examples:

DBMS – File System, XML
RDBMS – SQL Server, Oracle

b) A system is a collection of inter-related and inters deponent elements or components that operate collectively to achieve some common purpose or goal. For example – Human body is a system, consisting of various parts such as head, heart, hands, legs etc and they work well together. A computer based information system is also a system consist of collection of people, hardware, software, data and procedures that interact to provide timely information to authorized people for such decision making and for the other purposes.

Type of system According to Interactive Behaviour:
1. Open System
2. Closed System

Differentiate between open and closed systems:

Open Systems: Open systems actively interact with their environment. Such systems regularly get inputs and give outputs to its environment. Open systems are also able to adapt to environmental changes for their survival and growth. Business organization is an example of such system. Marketing System is an open system. The system takes inputs/feedbacks and gives outputs to its environment by way of giving products of the company and also creates new customers.

Closed Systems: A closed system is self contained and does not interact or make exchange across its boundaries with its environment. Closed systems do not get the feedback they need from the external environment and tend to deteriorate eventually. For example, if a marketing system does not get feedback from the market, its efficiency will gradually continue to decrease.