

# 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 maximize 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 shopfloor.
- 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  
  
Determine the price and output of the monopolist before and after the imposition of the unit tax. [5]

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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]**

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]**

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 |
|------------------------------|---------------------|
|------------------------------|---------------------|

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|      |           |
|------|-----------|
| 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 cost of machine down time (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]**

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) Explain the Limitations of Oligopoly Price Policy. **[3]**

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### 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 the term 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]
- 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]
- 9.
- a) Discuss the liability under Law of Tort and Internet. [4]
  - b) State the concept of the cost of quality? [2]
  - c) Define transform Analysis and transaction Analysis? [2]
- 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? [5]
  - b) What is Data Dictionary? [3]
- 11.
- a) What is configuration? [2]
  - b) State the general Mode of Configuration. [2]
  - c) Discuss ERP Accounts Payable and Receivable? [4]
- 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=5]