

INTERMEDIATE EXAMINATION

December 2014

(2MO)094

I-P9(OMS)
Syllabus 2008

Operation Management and Information Systems

Time Allowed: 3 Hours

Full Marks : 100

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

Operation Management

Answer question No. 1 which is compulsory and any two questions from the rest.

1. (a) Put an appropriate word in blank position: 1×5=5
- (i) _____ focuses on such areas as inventory goals and wage budgets.
 - (ii) IBFS is optimal and unique when all numbers in the _____ are non-negative.
 - (iii) The investment on machines in a straight line layout is _____ than the investment on machines in a functional layout.
 - (iv) _____ refers to the heating and cooling operations which are usually applied to induce softening.
 - (v) _____ machines are often kept to reduce the loss due to the breakdown of a key machine.
- (b) Expand the following: 1×4=4
- (i) AQL (ii) SRAC
 - (iii) NET (iv) CRAFT
- (c) Examine each statement and indicate whether it is 'True' or 'False'. 1×5=5
- (i) A special purpose Machine Tool performs only a limited number of specialised operations with great speed and precision.
 - (ii) Strikes and lock-out are controllable factors affecting Capacity Planning.
 - (iii) Incentives are substitute for lower wages.
 - (iv) Linear Programming does not consider uncertainties.
 - (v) Depending on the need, the maintenance activity may be centralized or decentralized.
2. (a) Mention when the following trucks are used: 4
- (i) Forklift truck (ii) Reach trucks
 - (iii) Stackers (iv) Stillage trucks
- (b) In a transformer, it is observed that the voltage of secondary winding is 115 volts and the number of turns in primary coil and secondary coil are 250 and 500 respectively. Calculate the voltage of primary winding, and derive whether it is a 'step-up' or 'step-down' type of transformer. 3

Please Turn Over

- (c) The probabilities of failure p_n of an equipment in the n^{th} period after maintenance have been estimated as follows:

n	1	2	3	4
p_n	0.1	0.2	0.4	0.3

Cost of preventive maintenance : ₹ 150

Cost of breakdown maintenance : ₹ 100

Determine the optimum frequency of preventive maintenance.

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- (d) Maximise $3x_1 + 2x_2$ under the following restrictions:

6

$$x_1 \geq 0, x_2 \geq 0$$

$$2x_1 + x_2 \leq 40$$

$$x_1 + x_2 \leq 24$$

$$2x_1 + 3x_2 \leq 60$$

3. (a) Mention the different techniques which are used for improving productivity in industry. 5
- (b) The demand of a certain item is random. It has been estimated that the monthly demand of the item has a normal distribution with a mean of 680 and a standard deviation of 130 units. The unit price of the item is ₹ 10 per unit; the ordering cost is ₹ 20. The inventory carrying cost is estimated to be 25 per cent per year. The procurement lead time is constant and is one week. Find the most economic ordering policy and the expected total cost of controlling inventory, given that the service level is 97.5%. [Z for 97.5% service level may be taken as 2.] 6
- (c) List the various objectives of maintenance. 4
- (d) What are the features of Kinetic Pumps? 3
4. (a) A manufacturing enterprise has introduced a bonus system of wage payment on a slab-rate based on cost of production towards labour and overheads.

The slab-rate being—

1% - 10%	saving in production cost	5% of saving
Between 11% - 20%	saving in production cost	15% of saving
Between 21% - 40%	saving in production cost	30% of saving
Between 41% - 70%	saving in production cost	40% of saving
Above 70%	saving in production cost	50% of saving

The rate per hour for three workers A, B, C are ₹ 5, ₹ 6 and ₹ 6.25 respectively. The overhead recovery rate is 500% of production wages and the material cost is ₹ 30 per unit. The standard cost of production per unit is determined at ₹ 150 per unit.

If the time taken by A, B, C to finish 10 units is 25 hours, 30 hours and 18 hours respectively, what is the amount of bonus earned by the individual workers and actual cost of production per unit? 6

- (b) Expand FMS and state its key components. 3
- (c) Give the formula for calculating the following: 2
- (i) Performance of the department (ii) Frequency of breakdowns
- (d) You are appointed to provide consulting services to a plant for planning its layout. State the objectives of a good plant layout. 7

