

Total No. of Pages: **2**

7550

Register Number

Name of the Candidate:

P.G. DIPLOMA EXAMINATION, May 2015

(APPLIED OPERATIONS RESEARCH)

130: INVENTORY, QUEUING AND SIMULATION MODELS

Time: Three hours

Maximum: 100 marks

**Answer any FIVE questions
Use of Statistical Table Permitted**

(5×20=100)

1. Calculate the E.O.Q in units and total variable cost for the following item, ordering cost is ₹ 5 and larding cost is 10%

Item	Arounded Demand	Unit price(Rs.)
A	800 units	0.02
B	400 units	1.00
C	392 units	8.00
D	13,800 units	0.20

Also calculate the no. of order per year for each item.

2. Describe the following Inventory control models: i) ABC ii) VED iii) FSN iv) **(4×5=20)** FSN
3. A Baking Company sells one of its types of cake by weight. It makes a profit of Rs.95 per kg on every kg of cake sold on the day it is baked. It disposes of all cake not sold on the day. They are baked at a loss of Rs.15 per kg. If demand is known to have probability density function. $f(d) = -0.03 - 0.0003d$. Find the optimum amount of cake the company should bake daily.
4. Describe an overview of the MRP system.
5. ABC groceries operated with three check-out counters. The sign by the check out area advice the customers that an additional counter will be opened any time the number of customers in any lane exceeds three. This means that for fewer than from customers , only one counter will be in operation. For four to six customers, two counters will be open. For more than six customer, two counters will be open. For more than six customers, all three counters will be open. The customers arrive at the counters area according to a Poisson distribution with a mean of 10 customers is exponential with mean of 12 minutes. Determine the steady-state probability p_n of n customers in the check out area.

6. An average of 40 cars per hour (inter arrival time are exponentially distributed) are tempted to use the drive in window at a restaurant. If a total of more than 4 cars are in line (including the car at the window) a car will not enter the line. It takes an average of 4 minutes (exponentially distributed) to serve a car.
- a) What is the average number of cars waiting for the drive in window (not including a car at the window)
 - b) On the average, how many cars will be served per hour?
 - c) You have joined the line at the drive in window. On the average how long will it be before you receive your food?
7. Determine the minimum number of parallel servers needed in each of the following (Poisson/departure) situations to guarantee that the operation of the queuing situation will be stable.
- a) Customer arrive every 5 minutes and are served at the rate of 10 customers per hour.
 - b) The average inter arrival time is 2 minutes and the average service time is 6 minutes
 - c) The arrival rate is 30 customers per hour and the service rate per server is customers per hour.
8. With the help of a flow chart, explain the steps in a simulation study.
