Roll No.: | | | | | | | | 13 |

B.E/B.Tech. (FT) DEGREE END SEMESTER EXAMINATION APRIL/MAY 2011

INDUSTRIAL ENGINEERING BRANCH

V SEMESTER- (REGULATION 2008)

IE9302 –OPERATIONS RESEARCH-II

Answer All Questions

PART 'A' (10 x 2 = 20 Mark)

1. What is P system and Q system in inventory control
2. What is shortage cost in the inventory model
3. What is ROL
4. Define safety stock
5. What is balking In queuing theory
6. Define Kendal's notation
7. Name different criteria for decision making under uncertainty condition
8. State the primary objective of game theory
9. What is maintenance? List the type of maintenance
10. What is group replacement policy

PART-B **50 X 16 = 20 Marks**

11. The demand rate for an item in a company is 12000units per year. The company can produce at the rate of 2000/month . The set up cost Rs.600 per order and the holding cost is Rs. 0.25 per unit per month. Calculate
    i) The optimum manufacturing quantity
    2) The maximum inventory
    3) The time between order
    4) The number of order per year
    5) The time of manufacture
    6) The optimum annual cost is Rs 4/unit

12 a) Find the optimum order quantity for a product for which the price breaks are as follows

Order Quantity	Unit cost (Rs.)
$0 < Q_1 < 1000$	25.00
$1000 \leq Q_2 < 2000$	20.00
$200 0 \leq Q_3$	15.00

The monthly demand for the product is 400 units. The storage cost is 20% of the unit cost of the product per month and the cost of ordering is Rs30/month

OR

12 b) (i) A newspaper boy buys paper for 60 paise each and sells them for Rs.1.40 each. He cannot return unsold newspapers. Daily demand has the following distribution.

No.of customers	23	24	25	26	27	28	29	30	31	32
Probability	0.01	0.03	0.06	0.10	0.20	0.25	0.15	0.10	0.05	0.05

If each day's demand is independent of the previous day demand, how many papers should be ordered each day? 6 marks

(ii) A baking company sells one type of cake by weight. It makes a project of Rs.9.50 on every kg. of cake sold on the day it is baked. It disposes of all cakes not sold on the date it is baked at a loss of Rs.1.50 per kg. if demand known to be rectangular between 300 and 400 kgs. Determine the optimum amount to be baked?

10 marks

13 (a) In a railway marshalling yard, goods trains arrive at a rate of 30 trains per day. Assume that the inter arrival time follows an exponential distribution and the service time distribution is also exponential with an average of 36 minutes. Calculate

(i) The probability that the yard is empty 8 marks

(ii) Average queue length assuming that the line capacity of the yard is 9 trains 8 marks

(OR)

13(b) A barber shop has two barbers and three chairs for customers. Assume that the customers arrive in poison fashion at a rate of 5 per hour and that each barber services customers according to an exponential distribution with mean of 15 minutes. Further if a customer arrives and no empty chair in the shop, he will eave. What is the probability that the shop is empty? What is the expected number of customers in the shop?

8 + 8 = 16 marks

14(a) A super Bazaar must decide on the level of supplies it must stock to meet the needs of its customers during Diwali days. The exact number of customers is not known, but it is expected to be in one of the four categories, 300, 350, 400 or 450 customers. Four levels of supplies are thus suggested with level j being ideal (from the view point of incurred costs) if the number of customers falls in category j. Deviations from the ideal levels results in additional costs either because extra suppliers are stocked needlessly or because demand cannot be satisfied. The table below provides these costs in thousands of rupees.

Customer category	Supplier levels			
	A1	A2	A3	A4
E1	7	12	20	27
E2	10	9	10	25
E3	23	20	14	23
E4	32	24	21	17

What is the best alternative under :

(i) Laplace criterion
(ii) Minimax criterion
(iii) Maximum criterion
(iv) Savage criterion 16 marks

(OR)

14 (b) A company is currently working with a process, which, after paying for materials, labour and so on, brings a profit of Rs.12000. The company has the following alternatives.

(i) The company can conduct research R_1 which is expected to cost Rs.10000 and having 90% probability of success. If successful, the gross income will be Rs.26,000/-.

(ii) The company can conduct Research R_2, which is expected to cost Rs.6000/- and having a probability of 60% success. If successful, the gross income will be Rs.24000/-.

(iii) The company can pay Rs.5000/- as royalty of a new process which will bring a gross income of Rs.20,000/-.(iv) The company may continue the current process.

Draw a decision tree. What should be your decision? 16 marks

15.(a)Using dominance property solve the following games

		Player B			
		I	II	III	IV
Player A	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

16 marks

(OR)

15 (b) A truck has been purchased at a cost of Rs.2,60,000/-. The value of the truck is depreciated in the first three years by Rs.25,000/- each year and Rs.18,000/- per year thereafter its maintenance and operating costs for the first three years are Rs.16,000/-, Rs.20,000/- and Rs.22,000/- in that order and increase by Rs.4,000/- every year. Assuming an interest rate of 15 percent, find the economic life of the truck.

16 marks