

**D. K. M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1****SEMESTER EXAMINATIONS****JUNE - 2022****21CPMA2E****ELECTIVE – II: OPERATIONS RESEARCH****Time: 3 Hours****Max. Marks: 75****SECTION – A (5 x 6 = 30)****Answer ALL the questions.**

1. (a) Discuss the type of decision making environments.

(Or)

(b) Explain the criteria for decision making under uncertainty.

2. (a) Explain basic difference between PERT AND CPM.

(Or)

(b) Listed in the table are the activities and sequencing necessary for a maintenance job on the heat exchangers in a refinery.

Activity	Description	Predecessor Activity
A	Dismantle pipe connections	-
B	Dismantle heater closer and floating front	A
C	Remove tube bundle	B
D	Clean bolts	B
E	Clean heater and floating head front	B
F	Clean tube bundle	C
G	Clean shell	C
H	Replace tube bundle	F,G
I	Prepare shell pressure test	D,E,H
J	Prepare tube pressure test and reassemble	I

Draw a network diagram of activities for the project.

3. (a) The production department of a company requires 3,600 kg of raw materials for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs.36 and the cost of carrying inventory in 25 percent of the investment in the inventories the price is Rs.10 per Kg. help the purchase manager to determine an ordinary policy for raw materials.

(Or)

(b) Explain EOQ model with different rate of demand in different cycle.

4. (a) A television repairman finds that the time spent on his jobs has an exponential distribution with a mean of 30 minutes. If he repairs the set in the order in which they came in and if the arrival of sets follow a Poisson distribution with an approximate average rate of 10 per 8 hour day what is the repairmen expected idle time each day? How many jobs are ahead of the average set just brought in?

(Or)

(b) Explain (M/M/1): ( $\infty$  /FCFS).

5. (a) A company is considering the purchase of a new machine at Rs.15,000 the economic life of the machine is expected to be 8 years. The salvage value of the machine at the end of the life will be Rs.3,000 the annual running cost is estimated to be Rs.7,000 Assuming an interest rate of 5 percent determine the present worth of future cost of the proposed machine

(Or)

- (b) Explain Failures of Mechanism.

**SECTION – B (3 x 15 = 45)**

**Answer any THREE of the following questions.**

6. The probability of the demand for lorries for lining on any day in a given district is as follows.

No. of Lorries demand	0	1	2	3	4
Probability	0.1	0.2	0.3	0.2	0.2

Lorries have a fixed cost of Rs.90 each day to keep the daily hire charges Rs.200 If the Lorry – hire company owns 4 lorries, what is its daily expectation? If the company has no lorries, how many lorries should it buy?

7. A project with the following activities duration and manpower requirement is given.

Activity	1-2	1-3	1-4	2-5	2-6	3-7	4-8	5-9	6-9	7-8	8-9
Duration (days)	2	2	0	2	5	4	5	6	3	4	6
Manpower required	5	4	0	2	3	6	2	8	7	4	3

Draw the network diagram of the project indicating the earliest start, earliest finish latest finish and float of each activity.

8. Explain Wilson Lot Size Formula.
9. A super market has two sales girls at the sales counters. If the service time for each customer is exponential with a mean of 4 minutes, and if the people arrive in a Poisson fashion at the rate of 10 an hour then calculate the following.

- a) Probability that a customer has to wait for being served
- b) Expected percentage of idle time for each sales girl.
- c) If a customer has to wait, what is the expected length of his waiting time?

10. The data collected in running a machine, the cost of which is Rs.60,000 are given below

Year	1	2	3	4	5
Resale Value (Rs)	42,000	30,000	20,400	14,400	9,650
Cost of Spares (Rs)	4,000	4,270	4,880	5,700	6,800
Cost of Labour (Rs)	14,000	16,000	18,000	21,000	25,000

Determine the optimum period for replacement of the machine.

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