

Total No. of Questions : 12]

SEAT No. :

P2807

[5154]-189

[Total No. of Pages : 4

B.E. (Computer)

OPERATIONS RESEARCH

(Elective - IV) (2008 Course) (Semester -II) (410451B)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answer any THREE questions from each Section.*
- 2) *Answers to these questions should be written in separate books.*
- 3) *Use of Non programmable calculator is allowed.*
- 4) *Neat diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*
- 6) *Assume suitable data, if necessary.*

SECTION -I

- Q1) a)** A plastic products manufacturer has 1,200 boxes of transparent wrap in stock at one factory and another 1,200 boxes at it's second factory. The manufacturer has orders for this product from three different retailers in quantities of 1000, 700 and 500 boxes, respectively. The unit shipping costs (in rupees per box) from factories to retailers are as follows.

	Retailer 1	Retailer 2	Retailer 3
Factory A	14	11	13
Factory B	13	13	12

Formulate this problem as LP model, Determine a minimum cost shipping schedule for all demands from current inventory. **[8]**

- b) Write steps of the simplex algorithm for obtaining on optimal solution to a linear programming problem. **[8]**

OR

P.T.O.

Q2) a) Use Graphical method to solve Following LP problem.

Maximize $Z = 2x_1 + x_2$ subject to constraints

[8]

and

b) Draw flowchart for simplex algorithm for solving linear programming problem. [8]

Q3) a) Box 1 contains 2000 components of which 5% are defective. Box 2 contains 500 components of which 40% are defective. Box 3 and Box 4 contains 1000 components each with 10% defectiveness. A Box is selected randomly and a component is removed at random. [8]

- i) What is the probability that the selected component is defective?
- ii) If the selected component is defective what is the probability that it came from Box 2? $x_1, x_2 \leq 10$

b) What is Normal distribution? Explain central limit theorem and Standard Normal random variable. [8]

OR

Q4) a) State and explain steps of decision making process. [8]

b) For what value of λ , the Game with following pay-off matrix is strictly determinable? [8]

		Player B		
		B ₁	B ₂	B ₃
Player A	A ₁	λ	6	2
	A ₂	-1	λ	-7
	A ₃	-2	4	λ

- Q5) a)** What is queuing system? Explain queuing systems transient state and steady state. [9]
- b) A software tester finds that the time spent on debugging & fixing the error has an exponential distribution with mean 30 min per module. The arrival of modules is Poisson with an average of 10 modules per day of 8 hours. What is expected time per day? How many modules are there on average? [9]

OR

- Q6) a)** At what rate (average) a clerk at super market work in order to ensure a probability of 0.9 that the customer will not have to wait longer than 12 minutes? It is assumed that there is only one counter to which customer arrive in a Poisson fashion at an average rate of 15 per hour. The length of service by the clerk has an exponential distribution. [9]
- b) State and prove the arrival distribution theorem (Pure birth Process). [9]

SECTION -II

- Q7) a)** Describe Forward and Backward pass method of critical path Analysis. [9]
- b) Find the sequence that minimizes the total elapsed time and processing time in hours required to complete the following Jobs. [9]

Job	1	2	3	4	5	6
Machine A	4	8	3	6	7	5
Machine B	6	33	7	2	8	4

OR

- Q8) a)** Write procedure for processing ‘n’ Jobs through three machines with respect to sequencing problem. [9]
- b) What is float? What are different types of floats? Discuss in brief
- i) Total Float
- ii) Free Float
- Also explain their uses in network. [9]

- Q9)** a) Write a note on formulation of Geometric programming problem. [8]
b) Describe linear fractional programming algorithm. [8]

OR

- Q10)** a) Explain how to obtain normality & orthogonality conditions? [8]
b) Explain Lagrangian method. [8]

- Q11)**a) What is importance of Decision tree with respect to dynamic programming? State a sufficient condition for two stage optimization problem to be solved by dynamic programming. [8]
b) Describe the recursive equation approach to solve the dynamic programming problem. [8]

OR

- Q12)**a) What is dynamic programming? Explain the Bellman's principle of optimality. [8]
b) Explain Mathematical formulation of multistage Model. [8]

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