K19P 1365

Reg. No. : ....

Name : ....

V Semester Master of Computer Application (M.C.A.)/ M.C.A. Lateral Entry Degree (Reg./Suppl./Imp.) Examination, November - 2019
(2014 Admission Onwards)
Elective-III MCA 5E09 : OPERATIONS RESEARCH

Time : 3 Hours   Max. Marks : 80

Instructions:
1) Answer any **ten** questions from section - A. Each question carries three marks.

2) Answer all questions from section -B. Each question carries **ten** marks.

SECTION - A

Note: Answer any **ten** questions. Each question carries **three** marks.

                                                    (10x3=30)

1. What is the difference between basic solution and basic feasible solution?
2. Briefly explain the duality in LPP.
3. Briefly explain about "Unbounded solution".
4. What do you understand by degeneracy in transportation problem?
5. Write short note on the assignment problem and its applications.
6. Give the difference between Dynamic Programming and Linear Programming.
7. What is an event and how will you represent an event in a network diagram?
8. Explain the importance of sequencing problem.
9. Explain how you sequence 2 jobs on in machines.
10. Write the components of a queueing system.
11. Explain the terms: (i) optimistic time (ii) pessimistic time (iii) most likely time
12. Write a short note on Continuous parameter Markov Chains.

SECTION -B

Answer all questions. Each question carries **ten** marks.

13. a) XYZ factory manufactures 2 articles A & B. To manufacture the article A. a certain machine has to be worked for 1.5 hours and in addition a craftsman has to work for 2 hours. To manufacture the article B, the certain machine has to be worked for 2.5 hours and the craftsman has to work for 1.5 hours. In a week the factory can avail 80 hrs of machine time and 70 hrs of craftsman's time. The profit on article A is Rs. 50 and on article B is Rs. 40. If all articles produced can be sold find how many articles of each kind should be produced to earn maximum profit. Formulate the problem as a LPP and solve it graphically. **(10)**

(OR)

b) Using Simplex method, solve the LPP. **(10)**

Maximize $Z=5x+4y$

Subject to the constraints:

$4x+5y<=10$

$3x+2y<=9$

$8x+3y<=12$

Where $x>=0, y>=0$.

14. a) Solve the following LPP using dual Simplex Method: **(10)**

Maximize $Z = 5x+6y+z$

Subject to the constraints

$9x + 3y - 2 < = 5$

$4x + 2y - z < = 2$

$x - 4y + z < = 3$

where $x, y, z > = 0$

(OR)

b) Obtain the initial basic feasible solution by using Vogel's Approximation method and hence obtain the optimal solution, where A, B, C, D & E are factories and X, Y & Z are retail shops. **(10)**

	A	B	C	D	E	Availability
X	5	8	6	6	3	80
Y	4	7	7	6	6	50
Z	8	4	6	6	3	90
Requirement	40	40	50	40	80	

15. a) Briefly explain the applications of dynamic programming.　(10)

(OR)

b) Solve the following integer programming problem using cutting plane algorithm.　(10)

Maximize $Z = x_1 + x_2$

Subject to the constraints: $3x_1 + 2x_2 \leq 5$

$$x_2 \leq 2$$

$$x_1, x_2 \geq 0 \text{ and are integers}$$

16. a) Tasks A, B, C, ..., H, 1 constitute a project. The precedence relationships are A <D; A< E; B< F; D< F; C< G; C< H; F< I; G<I

Draw a network to represent the project and find the minimum time of completion of the project when time, in days, of each unit task is as follows:　(10)

Task :　A　　B　　C　　D　　E　　F　　G　　H　I

Time :　8　　10　　8　　10　　16　　17　　18　　14　9

Also identify the critical path.

(OR)

b) Use the graphical method to minimize the time required to process the following jobs on the machine shown, i.e. each machine finds the job which should be done first. Also calculate the total elapsed time to complete both the jobs.　(10)

Job 1	Machine				
Sequence	A	B	C	D	E
Time (hrs)	5	4	2	6	2
Job 2	Machine				
Sequence	B	C	A	D	E
Time (hrs)	5	4	3	2	6

17. a) Write a note on: (5+5)

      (I)   Discrete parameter Markov chain

      (ii)   Continuous parameter Markov chain

(OR)

b) Explain in detail about the Queuing model, its characteristics and classification of queuing model. (10)

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