MCA.I/12.13.1135

MCA DEGREE I SEMESTER EXAMINATION DECEMBER 2013

CAS 2105 COMPUTER BASED OPTIMIZATION

(Regular and Supplementary – 2011 Revision)

Time: 3 Hours | Maximum Marks: 50

PART A

(Answer *ALL* questions)

(15 × 2 = 30)

I. (a) Define basic solution and optimum basic feasible solution.

(b) Briefly explain big-M method for solving LPP.

(c) Solve graphically.

Maximize Z=5X1+4X2

Subject to 6X1+4X2< = 24

X1+2X2<=6

X2<=2

X2-X1<=1

and X1,X2>=0

II. (a) Explain MODI method for testing the optimality of transportation problem.

(b) Formulate the mathematical model of assignment problem.

(c) What is degeneracy in transportation problem?

III. (a) Give branch and bound algorithm to solve integer programming problem.

(b) Explain the characteristics of 0-1 integer programming problem.

(c) Differentiate pure integer programming and mixed integer programming.

IV. (a) State Bellman's principle of optimality.

(b) With suitable example explain probabilistic dynamic programming.

(c) What is Markovian property?

V. (a) List and explain the components of a Queuing system.

(b) Define stochastic process and list its classification.

(c) Write notes on pure birth process and pure death process, give examples for each.

PART B

(5 × 4 = 20)

VI. Use simplex method to solve

Maximize Z=4X1+10X2

Subject to 2X1+X2<=50

2X1+5X2<=100

2X1+3X2<=90

and X1,X2>=0

OR

VII. Apply dual simplex method to solve

Minimize Z=3X1+X2

Subject to X1+X2>=1

2X1+3X2>=2

and X1,X2>=0

(P.T.O.)

VIII. Solve the transportation problem by Vogel's approximation method.

	D1	D2	D3	D4	Supply
S1	3	7	6	4	5
S2	2	4	3	2	2
S3	4	3	8	5	3
Demand	3	3	2	2	

OR

IX. Solve the assignment problem by Hungarian algorithm.

	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

X. Solve the integer programming problem by Gomory's fractional cut method.

Maximize Z=X1+4X2

Subject to 2X1+4X2<=7

5X1+3X2<=15

and X1,X2>=0

OR

XI. Solve the Traveling Salesman's problem by branch and bound method.

	A	B	C	D	E
A	-	4	7	3	4
B	4	-	6	3	4
C	7	6	-	7	5
D	3	3	7	-	7
E	4	4	5	7	-

XII. Divide a positive quantity C into n equal parts so as to maximize their product.

OR

XIII. Use dynamic programming problem to solve.

Maximize Z=3X1+5X2

Subject to X1<=4

X2<=6

3X1+2X2<=18

and X1,X2>=0

XIV. Write short notes on:

(i) jokeying
(ii) service utilization factor
(iii) reneging
(iv) balking

OR

XV. A television repairman finds that the time spend on his jobs has an exponential distribution with mean 30 minutes. If he repairs the sets in the order they came in and if the arrival follows poisson distribution with an average rate of 10 per 8 hours day. Calculate the repairman's idle waiting time and expected number of TV sets in the system.

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