Total No. of Questions : 12]

SEAT No. :

P1678

[Total No. of Pages :4

[4859]-5
B.E. (CIVIL)
b-SYSTEM APPROACH IN CIVIL ENGINEERING
(Elective-I) (2008 Course) (Semester - I)

Time : 3 Hours] *[Max. Marks : 100*

Instructions:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicates full marks.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain the scope of 'System Approach' in Civil Engineering. **[10]**

b) Define: **[8]**

i) Function

ii) Constraints

iii) Convex function

iv) Concave function

OR

Q2) Use the SIMPLEX method and solve following LP problem **[18]**

Maximize $Z=3x_1+5x_2+4x_3$

Subject to constraints,

$$2x_1 + 3x_2 \le 8$$
$$2x_2 + 5x_3 \le 10$$
$$3x_1 + 2x_2 + 4x_3 \le 15 \text{ and } x_1, x_2, x_3 \ge 0$$

Q3) a) Solve following LP by using two phase method **[12]**

Max $Z = 4x_1+5x_2$

Subject to

$$2x_2 + 3x_2 \le 6$$
$$3x_1 + x_2 \ge 3$$
$$x_1 x_2 \ge 0$$

b) Explain schematic presentation of transportation Model. **[4]**

OR

P.T.O.

Q4) a) An Engineering firm wants to Assign 5 works to 5 Engineers. Calculate then time and day require to complete the specific work by each Engineer is given below. Determine assignment to minimize total time. **[10]**

Engg	Prioject work				
	1	2	3	4	5
A	3	5	10	15	8
B	4	7	15	18	8
C	8	12	20	20	12
D	5	5	8	10	6
E	10	10	15	25	10

b) Explain Assignment Model and Enlist solution methods of Assignment problem. **[6]**

Q5) a) Explain: **[8]**

i) Single stage Decision process

ii) Multistage Decision process

b) Explain characteristics of dynamic programming. **[8]**

OR

Q6) a) Enlist applications of dynamic programming. **[4]**

b) Finance can lnvest his money in 3 different fields. The total finance available with him are 6 money units. There turn depends upon the level of investments. The return functions for each investments are, **[12]**

Resource allocated	Return from		
	Field 1	Field 2	Field 3
0	0	0	0
2	6	4	8
4	10	12	12
6	14	14	16

Use Dynamic programming and determine the maximum return and the allocation of various fields.

SECTION - II

Q7) a) Using Lagrange's multiplier method minimize $f(x) = 18/x_1x_2$ **[9]**

Subjected to $x_1^2 + x_2^2 = 9$

b) Using Lagrange's multiplier method **[9]**

Max $Z = x_1^2+3x_2^2+2x_1x_2+2x_1+6x_2$

Subjected to $2x_2-x_1=4$

OR

Q8) a) Enlist Direct search methods; and explain Fibonacci method. **[9]**

b) By using Fibonacci method solve maximize $F=16x-0.2x^2$ in the interval (0,100) to an accuracy of 0.1% **[9]**

Q9) a) Explain Queuing theory and state limitation of Queuing theory. **[8]**

b) Explain types of Queuing patterns with diagrams. **[8]**

OR

Q10)a) Dumper arrives of loading site in a pattern which can be characterized by the poisson distribution at an average of 18 trucks per hour. The loading by power shovel is done at a rate of 20 per hour per shovel. The cost of trucks Rs 500 per hour. Whereas the cost of shovel is Rs 300 per hour. Find the optimum numbers of shovels to be used. **[8]**

b) Explain Mont Carlo simulation. **[8]**

Q11)a) Solve the following games after reducing it to 2x2 game. **[10]**

PlayerA	B1	B2	B3
A1	1	7	2
A2	6	2	7
A3	5	1	6

b) Explain assumption of games and enlist the rules to determine saddle point. **[6]**

OR

Q12)a) A firm is considering replacement of a machine whose cost price is Rs.12,200/- and the scrap value is Rs.200/-. The Running cost is found from experience to be as follows. Find when should the machine replaced. **[8]**

Year	1	2	3	4	5	6	7	8
Running Cost	200	500	800	1200	1800	2500	3200	4000

b) The data on running cost per year and resale price of equipment A whose purchase Price is Rs.2,00,000/- are as follows find the optimum period of Replacement. **[8]**

Year	1	2	3	4	5	6	7
Running Cost (Rs)	30,000	38,000	46,000	58,000	72,000	90,000	1,10,000
Resale Value	1,00,000	50,000	25,000	12,000	8,000	8,000	8,000