Registration No. : | | | | | | | | | | |

Total number of printed pages – 3

B. Tech.
HSSM 3302

Fifth Semester (Back / Special) Examination – 2013

OPTIMIZATION IN ENGINEERING

BRANCH : CSE, FASHION, IT, MM, MME, TEXTILE, MANUFACT

QUESTION CODE : D 299

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

(a) Define basic feasible solution, non degenerate basic feasible solution and degenerate basic feasible solution of a LPP.

(b) Obtain the dual problem of the following primal LP problem

Maximize $z = 8x_1 + x_2$

subject to $x_1 + 2x_2 + 4x_3 \geq 2$

$x_1 + 2x_2 + 4x_3 = 1$

and $x_1, x_2 \geq 0$

(c) What is the condition that the solution of a LPP is unbounded in simplex method ?

(d) What is the importance of revised simplex in comparison to simplex method ?

(e) Write the mathematical model of a Transportation problem .

(f) Differentiate between Transshipment problem and transportation problem.

P.T.O.

(g) What is Markovian Queing model ?

(h) What is queue capacity and queue discipline ?

(i) What is a search Techinque to solve the unconstraint optimization ?

(j) Explain Kuhn – Tuker condition.

2. (a) Solve the following LPP using simplex method 5

Minimize $Z = x_1 + 2x_2 + 3x_3$

Subject to $x_1 + 2x_2 + 3x_3 \leq 10$

$x_1 + x_2 \leq 5$

$x_1, x_2, x_3 \geq 0$

(b) Solve the following LPP using Big M method. 5

Maximize $Z = 6x_1 + 4x_2$

Subject to $2x_1 + 3x_2 \leq 30$

$3x_1 + 2x_2 \leq 24$

$x_1 + x_3 \geq 3$

$x_1, x_2 \geq 0.$

3. Using revised Simplex method solve the following LPP 10

Maximize $Z = x_1 + 2x_2,$

subject to $2x_1 + 5x_2 \geq 6$

$x_1 + x_2 \geq 2$

$x_1, x_2 \geq 0$

4. (a) Solve the following Transportation problem 5

Source/Destination	D1	D2	D3	D4	Supply
S1	6	1	9	3	70
S2	11	5	2	8	55
S3	10	12	41	7	70
Demand	85	35	50	45	

(b) Five men are available to do five different jobs. From the past records, the time (in 2 hours) that each men takes to do each job is known and given in the following table. Find the assignment of men to jobs that will minimize the total time taken. 5

Job/persons	A	B	C	D	E
1	30	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

5. Find the optimum integer solution to the following LPP 10

Maximize $Z = x_1 + 4x_2$

Subject to $2x_1 + 4x_2 \leq 7$

$5x_1 + 3x_2 \leq 15$

$x_1, x_2 \geq 0$ and integers.

6. Solve the following problem using golden search method for 5 iterations. 10

Minimize $Z = 10 + x^3 - 2x - 5e^x$ in the interval $(-5, 5)$

7. Optimize $Z = 2x_1 + 3x_2 - (x_1^2 - x_2^2 - x_3^2)$

Subject to $x_1 + x_2 \leq 1$

$2x_1 + 3x_2 \leq 6, x_1, x_2 \geq 0$

using Kuhn-Tucker condition. 10

8. Write notes on the following : 5×2

(a) Quadratic programming

(b) Genetic Algorithm.