G 757 (Pages : 4) Reg. No..................

Name..................

B.TECH. DEGREE EXAMINATION, MAY 2014

Seventh Semester

Branch : Applied Electronics and Instrumentation Engineering / Electronics and Instrumentation / Electronics and Communication Engineering

AI 010 706 L03 / EC 010 706 L01 / EI 010 706 L01—OPTIMIZATION TECHNIQUES (AI, EC, EI)

(2010 Admissions)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Explain different one dimensional minimization methods.
2. Mention certain areas where requirement of linear programming lanes.
3. What is the slope of post optimality analysis.
4. Define forecasting models.
5. Explain briefly single server models.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Find the maxima and minima, if any, if the function $f(x) = 4x^3 - 18x^2 + 27x - 7$.

7. Solve the following LP problem graphically

Minimize $f = -3x_1 + 2x_2$

subject to $0 \le x_1 \le 4$

$1 \le x_2 \le 6$

$x_1 + x_2 \le 5$

Turn over

8. Six jobs are to be processed on two machines A and B. Time in hours taken by each job on each machine is given below :

	JOBS					
	1	2	3	4	5	6
Machine A	5	3	2	10	12	6
Machine B	3	2	5	11	10	7

Determine the optimum sequence of jobs that minimizes the total elapsed time to complete the jobs. Compute the minimum time.

9. Solve the following pay-off matrix for optimal strategies and the value of the game :

$$\begin{array}{cc} & Y \\ X & \begin{bmatrix} 5 & 1 \\ 3 & 4 \end{bmatrix}. \end{array}$$

10. Explain the various states in queueing system.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. (a) Minimize $f = 2x_1^2 + x_2^2$ by using the steepest descent method starting from (1, 2).

Or

(b) Find the minimum of $f = x(x - 1.5)$ by starting from 0.0 with an initial step size of 0.05.

12. (a) Solve the following LP problem graphically :

Maximize $f = x_1 + x_2$

subject to $-x_1 + x_2 \le 2$

$2x_1 + x_2 \le 4$

$x_1, x_2 \ge 0$.

Or

(b) Use dual simplex method to solve the LPP.

Minimize $Z = -3x_1 - 2x_2$

subject to $x_1 - x_2 \geq 2$

$x_1 + x_2 \leq 14$

$x_1 + 2 \geq 20$

$x_2 \leq 6$

$x_1, x_2 \geq 0$.

13. (a) Explain how to convert the unbalanced transportation problem into a balanced one.

Or

(b) Using VAM solve the following problem :

	W_1	W_2	W_3	W_4	W_5	*Available*
F_1	3	4	6	8	9	
F_2	2	10	1	5	8	
F_3	7	11	20	40	3	
F_4	2	1	9	14	16	
Required	40	6	8	18	6	

14. (a) Solve the following game problem using the principle of dominance :

Player Y

$$\textit{Player } X \begin{bmatrix} 1 & 7 & 2 \\ 6 & 2 & 7 \\ 5 & 1 & 6 \end{bmatrix}.$$

Or

(b) Solve graphically :

$$\begin{array}{c} \textit{Player Y} \\ \textit{Player X}\begin{bmatrix} 1 & 3 & 11 \\ 8 & 5 & 2 \end{bmatrix}. \end{array}$$

15. (a) Explain the elements of a queuing model.

Or

(b) A barber shop has two barbers and 3 chairs for customers. The customers are assumed to arrive in Poisson fashion at a rate of 5 per hour. Each barber services according to an exponential distribution with a mean 15 minutes. Further if a customer arrives and there are no empty chairs in the shop, he will leave. Compute the expected number of customers in the shop.

(5 × 12 = 60 marks)