AQ – 2728

First Semester M. E. Electrical (Electrical Power System) Examination

POWER SYSTEM OPTIMIZATION

Paper – 1 SEPS 1

P. Pages : 2

Time : Three Hours] [Max. Marks : 80

Note : (1) Separate answer book must be used for each section in the subject Geology, Engineering material of civil branch and Separate answer book must be used for Section A and B in Pharmacy and Cosmetic Tech.
(2) All question carry equal marks.
(3) Answer **Two** questions from Section A and **Two** questions from Section B.
(4) Assume suitable data wherever necessary.
(5) Use pen of Blue/Black ink/refill only for writing the answer book.

SECTION A

1. (a) Minimize

$$F(x) = \frac{1}{2}\left(x_1^2 + x_2^2 + x_3^2\right)$$

Subject to $g_1(x) = x_1 - x_2 = 0$

$g_2(x) = x_1 + x_2 + x_3 = 1$

using Lagrange's multiplier method. 10

(b) Solve the following LPP using simplex method :

Minimize $f(x) = 2x_1 + x_2$

Subject to $3x_1 + x_2 = 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 3$

and $x_1, x_2 \geq 0$. 10

2. (a) Maximize $f(x) = x(x - 1{\cdot}5)$ in the interval $(0 - 1)$ by Fibonacci method using $N = 6$. 10

(b) What are the various steps in unrestricted search technique of elimination method ? What are the limitations ? 10

3. (a) Use steepest descent method to solve :

Minimize $f(x) = 2x_1^2 + x_2^2$ starting from point $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$ perform three iterations. 10

(b) Mathematically formulate the Transportation Problem as a L.P.P. Explain degeneracy in T. P. 10

SECTION B

4. (a) Explain the following in detail :—

(i) Multistage decision process and its representation.

(ii) Conversion of final value problem into initial value problem. 10

(b) Determine the critical path for the network shown in figure 4 b. The numbers indicate time in weeks.

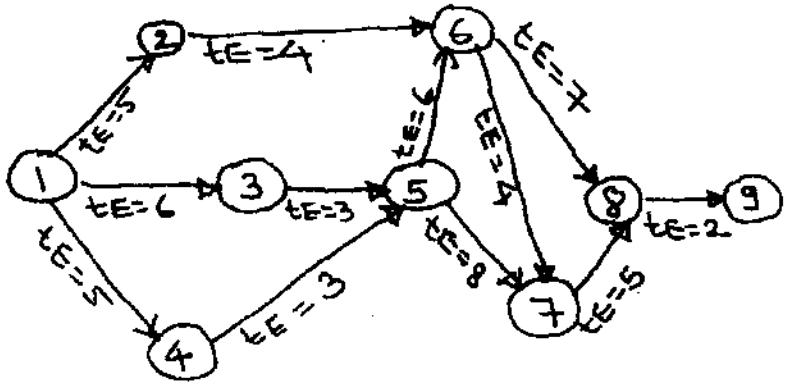

Fig. 4 b 10

5. (a) How the fitness function is modified when Genetic Algorithm is used for unconstrained optimization ? 10

(b) What are the various advantages of GA over traditional methods ? 10

6. Formulate the optimal power flow problem. Explain in detail NLP technique to solve optimal power flow problem. 20