Printed pages: 2 **Sub Code: REE051**

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B.TECH.

(SEM V) THEORY EXAMINATION 2018-19

POWER SYSTEM OPTIMIZATION

Time: 3 Hours **Total Marks: 70**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief. 2 x 7 = 14

a. What do you understand by optimization? Write any two application of optimization in electrical engineering field.
b. Under what condition is the solution of LPP; 1-Unbound 2-Infinite?
c. Derive and explain the significance of the golden mean ratio.
d. What is the basic difference between DFP and BFGS methods?
e. What is a multistage decision problem?
f. Define genetic algorithm.
g. What do you understand by economic dispatch problem?

SECTION B

2. Attempt any three of the following: 3 x 7 = 21

a. Mention the rules for primal-dual conversion and using it write the dual of the following LPP
minimize $Z=3x_1+7x_2+4x_3$
subject to
$4x_1+5x_2+x_3\geq 9$
$2x_1+3x_2+2x_3\geq 7$
$2x_1+4x_2+6x_3\geq 12$
$5x_1+5x_2+2x_3\geq 12$ x_1, x_2, x_3 all are ≥ 0
b. Find the number of experiments to obtain a value of $L_n/L_0=0.001$ for (a) Fibonacci method (b) interval halving method (c) exhaustive search.
c. What are the similarities and differences between the traditional methods and genetic algorithm
d. How is the final value problem converted into an initial value problem? Also draw the block diagram representation of both the types of problem.
e. A constant load of 300 MW is supplied by two 200 MW generators, 1 and 2, for which the respective incremental fuel costs are

$$dC1/dPG1=0.10PG1+20$$

$$dC2/dPG2=0.12PG2+15$$

with powers P_G in MW and costs C in Rs/hr. Determine (a) the most economical division of load between the generators and (b) the saving in Rs/day thereby obtained compared to equal load sharing between machines.

SECTION C

3. Attempt any one part of the following: 7 x 1 = 7

(a) Use the Simplex method to find the maximum value of

$Z = 2x_1-x_2+ 2x_3$

s. t

$2x_1+x_2\leq 10$

$x_1+ 2x_2-2x_3 \leq 20$

$x_2 +2x_3 \leq 5$

$x_1,x_2,x_3 \geq 0$

(b) Solve using dual simplex method

Minimize $f=20x_1+16x_2$

Subject to

$x_1\geq 2.5$

$x_2\geq 6$

$2x_1+x_2\geq 17$

$x_1+x_2\geq 12$

$x_i\geq 0$ i=1,2

4. Attempt any one part of the following: 7 x 1 = 7

(a) Find the minimum of f= x(x-1.5) in the interval (0, 1) to within 10% of the exact value using dichotomous method (use $\delta = 0.001$).

(b) How is interior penalty function method different from exterior penalty function method?

5. Attempt any one part of the following: 7 x 1 = 7

(a) Explain the concept of sub-optimization and principle of optimality.

(b) Represent a multistage decision problem; explain the terms associated with it. What are the different types of multistage decision problems?

6. Attempt any one part of the following: 7 x 1 = 7

(a) What are the various types of GA operators, explain each in detail. Draw the flow chart for accomplishing GA.

(b) How is GA used in solving global optimization problem?

7. Attempt any one part of the following: 7 x 1 = 7

(a) Explain the optimal generator scheduling for the thermal units when losses are considering. Also explain ITL and penalty factor and write the algorithm for the same.

(b) What is the difference in the optimal scheduling of thermal and hydro thermal units and how is it accomplished in the hydrothermal unit?