Total No. of Questions : 8]

SEAT No. :

P5362

[Total No. of Pages : 3

[5562]-219
M.E. (Electrical Power Systems)
COMPUTER APPLICATIONS IN POWER SYSTEM
(2017 Course) (Semester - I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Sovle Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) a) What are the theorems used in optimizing single variable functions? **[4]**

b) Minimise $f(x) = x_1^2 - x_2^2$ subjected to $g(x) = x_1 x_2 - 1 = 0$ using direct substitution method. **[5]**

OR

Q2) a) Draw surface constraint diagram showing behavior and side constraints. Also indicate bounded and unbounded, acceptable and unacceptable points on surface constraint. **[4]**

b) Minimize $f(X) = 2x_1^2 + x_2^2$ using Univariate Method from starting point $X=[1\ 2]^T$. Perform one iterations. Take probe length as $\varepsilon = 0.01$. **[5]**

Q3) a) What are the assumptions made in decupled and fast decoupled load flow method? **[4]**

b) Derive the equation used in three phase load flow analysis. **[5]**

OR

Q4) a) What information can be extracted from load flow analysis? **[4]**

b) Derive equations of Newton Raphson load flow analysis in rectangular ordinates. **[5]**

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Q5) a) Define economical load dispatch problem without considering and with considering losses. **[6]**

b) The incremental production costs of both the units are **[10]**

$$\frac{dF_1}{dP_1} = 0.4P_1 + 40 \text{ Rs/MWh and} \frac{dF_2}{dP_2} = 0.5P_2 + 30 \text{ Rs/MWh}$$

Determine economical schedule for the sharing of 180MW demand considering generation limit on each unit as 25MW and 100MW. Determine the saving obtained by economical loading over equal load sharing.

OR

Q6) a) Explain solution economic load dispatch problem using NR method.**[6]**

b) A two bus system is shown figure is having following incremental cost curves of the plants: **[10]**

$$\frac{dF_1}{dP_1} = 0.025P_1 + 15 \text{and} \frac{dF_2}{dP_2} = 0.05P_2 + 20$$

When load of 125MW is transmitted from plant 1 to the load, a loss of 15.625MW is incurred. Determine the generation schedule and load demand if the cost of received power is Rs.24/MWhr. Solve the problem using penalty factor.

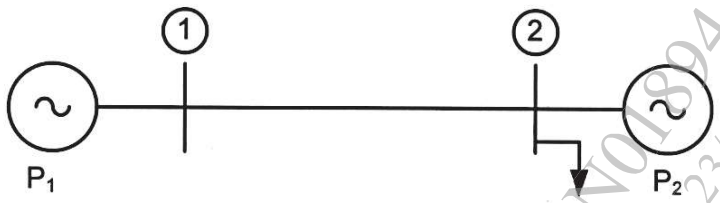

Fig 1

Q7) a) The transmission loss coefficients B_{mn} expressed in pu on the base of 100MVA of a power system network having three plants are given by **[10]**

$$B = \begin{bmatrix} 0.01 & -0.001 & -0.002 \\ -0.001 & 0.02 & -0.003 \\ -0.002 & -0.003 & 0.03 \end{bmatrix}$$

Three plants supply power of 100MW, 200MW and 300MW respectively into the network. Calculate the transmission loss and incremental transmission losses of the plant in MW

b) Derive transmission loss coefficient using sensitivity factor. **[6]**

OR

Q8) For the system shown in Fig.2 find the loss of coefficients in MW^{-1}, if the base is 100MV A. **[16]**

Given that $I_{L1} = (1.0 - j0.2)pu \quad I_{L2} = (0.5 - j1.0)pu$

$Za = (0.02 + j0.1)pu, \quad Zb = (0.03 + j0.15)pu,$

$Zc = (0.05 + j0.25)pu$

$I_{21} = (0.25 - j0.05)pu, V1 = 1.0 + j0\ pu$

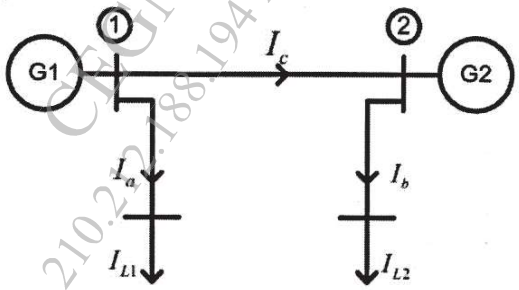

Fig 2

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