Code No: **R41024** **R10** **Set No. 1**

IV B.Tech I Semester Supplementary Examinations, February/March - 2018

POWER SYSTEM OPERATION AND CONTROL

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) Define the following
i) Heat rate curve,
ii) Cost curve
iii) Production cost [6]

b) Three power plants of a total capacity of 425 MW are scheduled for operation to supply a total load of 310 MW. Determine the optimum generation scheduling if the plants having the following characteristics

$\frac{dC_1}{dP_1} = 30 + 0.15P_1$, $25 \le P_1 \le 125$; $\frac{dC_2}{dP_2} = 40 + 0.2P_2$, $30 \le P_2 \le 100$

and $\frac{dC_3}{dP_3} = 15 + 0.18P_3$, $50 \le P_3 \le 200$. [9]

2 A system having two plants 1 and 2 connected to buses 1and 2 respectively as shown in below figure 2. There are two loads and a network of four branches. The ref bus with a voltage of $1.0\angle 0^o$ p.u is shown on the diagram. The branch currents and impedances are :

$I_a = 3 - j\,0.8$ p.u. $Z_a = 0.01 + j\,0.03$ p.u
$I_b = 1.2 - j\,0.3$ p.u $Z_b = 0.015 + j\,0.06$ p.u.
$I_c = 1 - j\,0.2$ .u. $Z_c = 0.01 + j\,0.04$ p.u.
$I_d = 2.6 - j\,0.9$ p.u. $Z_d = 0.01 + j\,0.04$ p.u

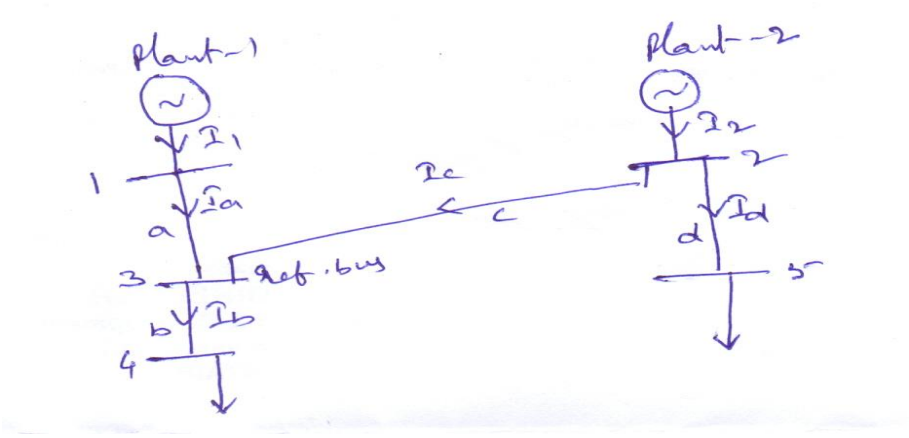

Figure 2

Determine the B- coefficients of the system. [15]

3 a) What is the need of hydro –thermal coordination? [5]

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b) A load is feeded by two plants, one is thermal and other is a hydro plant. The load is located near the thermal plant. The characteristics of the plants are
$F_T = 0.04P_T^2 + 30P_T + 20$ Rs/hr , $w_H = 0.0012P_H^2 + 7.5P_H$ m^3/Sec
$\gamma_H = 2.5 \times 10^{-3}$ Rs/m^3 and $B_{22} = 0.0015$ $(MW)^{-1}$
Find the power generation of both plants and load connected, when λ = 25 Rs./ MWh. [10]

4 a) Explain the constraints for Unit Commitment solution method. [10]
b) What are the advantages of dynamic programming method? [5]

5 a) Describe the necessity of keeping frequency constant. [5]
b) Obtain the mathematical modeling of speed governing system. [10]

6 a) Obtain the mathematical modeling of tie line power in an interconnected system and its block diagram. [8]
b) Two generating stations A and B have the capacities 400MWand 700MW respectively are inter-connected by a short line. The percentage speed regulations from no-load to full load of the two stations are 2 and 3 respectively. Find the power generation at each station and power transfer through the line if the load on bus of each station is 200MW. [7]

7 Explain the combined load frequency control and economic dispatch control with neat block diagram. [15]

8 a) What are the advantages and disadvantages of different types of compensating equipment for transmission systems? [8]
b) What is the need of flexible alternating current transmission system in now a days? [7]

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