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BIEEE-007

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

00535 **Term-End Examination**

June, 2019

BIEEE-007 : COMPUTER APPLICATIONS IN POWER SYSTEMS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any* ***five*** *questions. Each question carries equal marks. Use of scientific calculator is permitted.*

1. (a) What are the different steps required to apply the digital computers for the solution of power system problems ? Explain it. 7

(b) What is meant by restructuring and deregulation of power system ? 7

2. For the power system network shown in Figure 1, the primitive impedances are as follows :

Element Number	Bus Number		Primitive Impedance
	From	To	
1	1	0	0·05
2	3	0	0·10
3	1	2	0·50
4	2	3	0·40
5	1	3	0·25

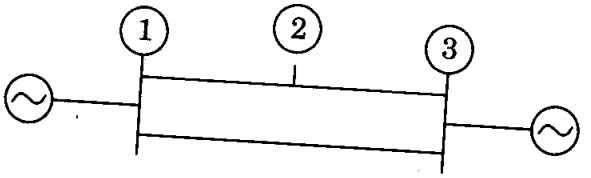

Figure 1

(a) Draw the oriented connected graph of the network.

(b) Compute the Y_{BUS} matrix by considering mutual coupling of 0·2 between elements 4 and 5.

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3. Explain the 'Newton Raphson Method' for load flow studies.

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4. (a) Explain optimal load scheduling. 6

(b) Prove that all the thermal power plants must operate at equal incremental cost for optimal operation. 8

5. Consider three generating units of a thermal power plant with the following specifications :

Generator unit	P_i (max)	P_i (min)	I/O curve
1	600 MW	150 MW	H_1 (MBtu/hr) = 510 + 7·2 P_1 + 0·00142 P_1^2
2	400 MW	100 MW	H_2 (MBtu/hr) = 310 + 7·85 P_2 + 0·00194 P_2^2
3	200 MW	50 MW	H_3 (MBtu/hr) = 78 + 7·97 P_3 + 0·00482 P_3^2

where P_i is the electrical power generated by each unit.

Determine the economic operating point when delivering a total load of 850 MW. Let the fuel costs be : 14

Unit 1 : 1·1 ₹/MBtu

Unit 2 : 1·0 ₹/MBtu

Unit 3 : 1·0 ₹/MBtu

6. Write short notes on any ***two*** of :

(a) Transmission and Distribution System.

(b) Bus Admittance Matrix Formulation (Consider suitable example)

(c) Demand Side Management

7. (a) Explain contigency analysis in power system operation. 7

(b) Explain economic load scheduling of hydrothermal plants. 7