

**B.Tech. - VIEP - ELECTRICAL ENGINEERING
(BTELVI)**

00103 Term-End Examination

December, 2018

**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 power system components ? Explain it with single-line diagram. Also represent the transmission line as a two-port network. 7

- (b) What are the different steps in modelling of transformers ? Develop the model of a single-phase two-winding transformer. 7

2. For the power system network shown in Figure 1, the primitive impedance data is 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

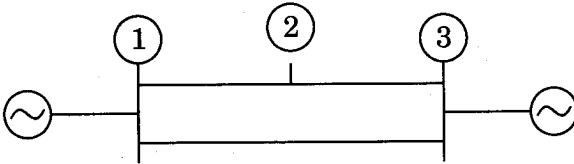


Figure 1

- (a) Draw the oriented graph of the network.
- (b) Compute the Y_{BUS} matrix. 14
3. (a) Considering Bus mismatch and Convergence criterion, explain the steps for numerical solutions of the power flow equation using iterative computation technique. 7
- (b) Explain the 'fast decoupled load flow method' for load flow studies. 7

4. (a) Explain the optimal load scheduling of hydro-thermal plants. Derive the corresponding expression for cost function. 10
- (b) Draw the flow chart for optimal load scheduling for thermal power plants. 4
5. Consider three generator 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 the following: 2×7=14

- (a) Modelling of Tap Changing Transformer
- (b) Bus Impedance Algorithm
- (c) Demand Side Management

7. (a) Discuss the Regulatory and Policy developments for power system after deregulation and restructuring. 7

(b) Explain the different aspects of power system control and management. 7
