

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (OLD) EXAMINATION – WINTER 2023****Subject Code:2170901****Date:16-12-2023****Subject Name: Interconnected Power System****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

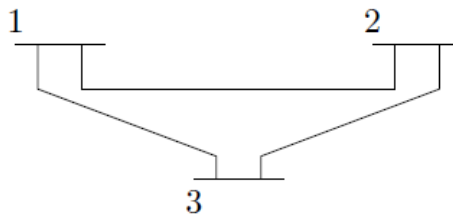
- Q.1**
- | | | |
|------------|---|-----------|
| (a) | What is islanding of the interconnected system? | 03 |
| (b) | How the buses in power systems are classified? | 04 |
| (c) | What is cascade tripping in a power system? When can it occur? Explain power system restoration after it. | 07 |

- Q.2**
- | | | |
|------------|---|-----------|
| (a) | Explain Properties of Y- bus matrix. | 03 |
| (b) | Write about differences between Gauss-Seidel and Newton Raphson methods. | 04 |
| (c) | State the assumptions made for load flow studies and applications of load flow studies. | 07 |

OR

- | | | |
|------------|--|-----------|
| (c) | Explain need of load flow analysis, Derive static load flow equations. | 07 |
|------------|--|-----------|

- Q.3**
- | | | |
|------------|--|-----------|
| (a) | What are the assumptions made in solving swing equation? | 03 |
| (b) | Explain Shunt and series compensation for voltage control. | 04 |
| (c) | Form Y-Bus matrix for the network. | 07 |



Line	Series Reactance p.u.	Shunt Admittance p.u
1-2	j 0.2	j 0.24
2-3	j 0.1	j 0.16
1-3	j 0.25	j 0.30

OR

- Q.3**
- | | | |
|------------|--|-----------|
| (a) | Give the relation between inertia constant H and angular momentum M. State their significance. | 03 |
| (b) | Explain speed governing mechanism for frequency control. | 04 |
| (c) | Explain Tie line load bias control. | 07 |

- Q.4**
- | | | |
|------------|---|-----------|
| (a) | What is flat frequency control method for regulating frequency within limits? | 03 |
| (b) | Draw Block diagram of Automatic Generation Control (AGC). | 04 |
| (c) | Two generating units of a power system are having the following cost curves: | 07 |

$$F_1(P_1) = 0.05 P_1^2 + 22 P_1 + 120$$

$$F_2(P_2) = 0.06 P_2^2 + 16 P_2 + 120$$

P_1, P_2 are in MW. Both the units operate all the time. Maximum and Minimum load on each unit are 100MW and 20 MW respectively. Determine the economic dispatch for the units for a total load of 80MW, neglecting the transmission lines losses.

OR

- Q.4** (a) What are the type load frequency control for interconnected power system **03**
(b) Explain the terms critical clearing angle and critical clearing time in connection with transient stability of a power system. **04**
(c) Give typical block diagram for a two-area system inter connected by tie line and explain each block. **07**

- Q.5** (a) Define penalty factor **03**
(b) Define following : **04**
1) Steady-state stability
2) Transient stability.
(c) Explain equal area criteria for stability. **07**

OR

- Q.5** (a) Discuss factors affecting voltage stability. **03**
(b) List the equality and inequality constraints considered in the economic dispatch problem. **04**

Describe unit commitment problem? List the constraints that are to be accounted in unit commitment problem.

- (c) Explain methods used for voltage control in power systems. **07**
