Roll No. : .....

Total No. of Questions : **9**] [Total No. of Pages : **4**

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B.Tech. (EE) 6th Semester (Supplementary) Examination, July-2021

(G Scheme)

POWER SYSTEM-II

Paper-PCC-EE-302-G

*Time : **Three** Hours]* *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note :- Attempt *five* questions in all. Question No. **1** is compulsory. Attempt *four* more questions from the Sections-A, B, C and D by selecting *one* question from each Section.

1. (a) What do you mean by control area in Power System ? Explain it.

   (b) What are the advantages and disadvantages of GS method ?

(c) Define the term ITL.

(d) What is the significance of Incremental Cost (λ) ?

(e) In which condition generator bus is treated as load bus ?

(f) What is the objective of the economic dispatch problem ? $2\frac{1}{2}\times6=15$

Section–A 15 each

2. Detail the algorithm to perform load flow using NR method and also draw its flowchart.

3. The load flow data for the sample power system are given below. The voltage magnitude at bus 2 is to be maintained at 1.04 p.u. the max and min reactive power limlits of the generator at bus 2 are 0.35 and 0.0 p.u. respectively. Determine the set of load flow equation at the end of first iteration by using G-S method :

Bus Code	Impedance	Line charging Admittance
1–2	0.08 + j 0.24	0
1–3	0.02 + j 0.06	0
2–3	0.06 + j 0.18	0

Schedule of generation of loads :

Bus Code	Assumed Voltage	Generation		Load	
		MW	MVAR	MW	MVAR
1	1.06 + j 0.0	0	0	0	0
2	1.00 + j 0.0	0.2	0	0	0
3	1.00 + j 0.0	0	0	0.6	0.25

Section–B

4. Incremental fuel cost in rupees per MWh for a plant consisting of two units are :

$$dC_1/dP_{G1} = 0.20\ P_{G1} + 40$$

$$dC_2/dP_{G2} = 0.40\ P_{G2} + 30$$

and the generator limits are as follows :

$$30\ MW \le P_{G1} \le 175\ MW$$

$$20\ MW \le P_{G2} \le 125\ MW$$

Assume that both units are operating at all times. How will the load be shared between the two units as the system load varies over the full range of the load values ? What are the corresponding value of the plant incremental costs ? 15

5. (a) What is the significance of Incremental Cost (Lambda) ?

(b) Derive expression for representation of transmission loss by B-coefficients. 7½,7½

Section–C 15 each

6. What are the different methods for Voltage Control ? Explain them in brief.

7. Explain with block diagram of two area load frequency control.

Section–D

8. (a) Draw power angle curve and also derive an expression for this.

(b) Define Transient Stability. Discuss various assumptions made during analysis of the system. 7½,7½

9. What do you understand by equal area criteria and plot a δ *Vs.* t curve for the stable and unstable system ? 15

B. Tech. (EE) 6th Semester (G Scheme)

Examination, July-2022

POWER SYSTEMS-II

Paper-PCC-EE-302G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all. **Question No. 1 is compulsory**. Attempt four more questions from the **Sections A, B, C & D** by selecting at least **one** question from each section.*

1. (a) Explain Area Control Error (ACE) in detail.

(b) Define steady state stability.

(c) What is the significance of incremental cost (λ) ?

(d) What are the different types of buses ?

(e) What are the information that are obtained from a load flow study ?

(f) What is the objective of the economic dispatch problem ? 6×2.5=15

Section-A

2. What is the importance of load flow analysis in power system ? Derive basic load flow equation for n bus system. 15

3. The load flow data for the sample power system are given below. The voltage magnitude at bus 2 is to be maintained at 1.04 p.u. the max and min reactive power limits of the generator at bus 2 are 0.35 and 0.0 p.u. respectively. Determine the set of load flow equation at the end of first iteration by using N-R method : 15

Bus code	Impedance	Line charging admitance
1 - 2	0.08 + j0.24	0
1 - 3	0.02 + j0.06	0
2 - 3	0.06 + j0.18	0

Schedule of generation of loads :

Bus code	Assumed voltage	Generation		Load	
		MW	MVAR	MW	MVAR
1	1.06 + j0.0	0	0	0	0
2	1.00 + j0.0	0.2	0	0	0
3	1.00 + j0.0	0	0	0.6	0.25

Section-B

4. Incremental fuel cost in rupees per MWh for a plant consisting of two units are :

$dC_1/dP_{G1} = 0.20\ P_{G1} + 40$

$dC_2/dP_{G2} = 0.40\ P_{G2} + 30$

and the generator limits are as follows :

$$30\ MW \leq P_{G1} \leq 175\ MW$$

$$20\ MW \leq P_{G2} \leq 125\ MW$$

Assume that both units are operating at all times. How will the load be shared between the two units as the system load varies over the full range of the load values ? What are the corresponding value of the plants incremental costs ? 15

5. State the generation scheduling problem on a bus bar and describe the procedure to find a solution. 15

Section-C

6. How is automatic generation control achieved ? Draw the block diagram. 15

7. Explain with block diagram of single area load frequency control. 15

Section-D

8. (a) Draw power angle curve and also derive an expression for this. 7.5

(b) Define transient stability. Discuss various assumption made during analysis of the system. 7.5

9. What do you understand by equal area criteria and plot a δ *vs* t curve for the stable and unstable system ? 15

Roll No. .....

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B. Tech. 6th Semester (EE)
Examination – May, 2023

POWER SYSTEMS - II

Paper : PCC-EE-302-G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : (i) Question No.1 is ***compulsory*** from Section-A

(ii) Attempt four questions remaining four sections, selecting one question from each section.

(iii) Use of non-programmable calculator is allowed.

SECTION – A

1. (a) Discuss optimal system operation.

(b) What is necessity of power flow studies ?

(c) Write power balance equations at a node.

(d) Define steady state and transient stability.

(e) Explain the need of economic dispatch.

(f) Explain the methods of voltage controls.

$2.5 \times 6 = 15$

SECTION – B

2. Draw and explain the structure of power systems with their components. 15

3. Discuss the algorithm procedure for load flow analysis using Newton-Raphson's method in polar coordinates. 15

SECTION – C

4. Derive the expression for economic load schedule for an n-plants system neglecting the transmission losses. 15

5. State unit commitment problem. In brief explain dynamic programming method. 15

SECTION – D

6. Explain load frequency control for single area case with suitable diagram. 15

7. (a) Discuss the excitation systems and their components. 7.5

(b) Explain the concept of multi area AGC. 7.5

SECTION – E

8. Illustrate the transient stability algorithm using modified Euler's method. 15

9. (a) Derive swing equation. 7.5

(b) Explain transient stability. Discuss factors affecting transient stability. 7.5
