Code No: 156CK **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, July - 2023

POWER SYSTEM OPERATION AND CONTROL

(Electrical and Electronics Engineering)

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

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	What are the advantages of building Y_{Bus} Matrix?	[2]
b)	List the advantages of N-R Method.	[3]
c)	What is a penalty factor in economic scheduling?	[2]
d)	Define the incremental fuel and production costs.	[3]
e)	What is the need of p-f control in two area system?	[2]
f)	Obtain the mathematical modeling of speed governing system.	[3]
g)	Define steady state stability limit.	[2]
h)	Distinguish between steady state and transient stability.	[3]
i)	Define SCADA.	[2]
j)	What is the importance of Load Forecasting?	[3]

PART – B

(50 Marks)

2. Draw and explain the flow chart of Gauss Seidal load flow method when P-V buses are absent. [10]

OR

3.a) Derive the expression for bus admittance matrix Y_{BUS} in terms of primitive admittance matrix and bus incidence matrix.

b) What are the assumptions made in Fast decoupled load flow method to speed up the rate of convergence? [5+5]

4. The fuel cost of two units are given by

$C_1 = 0.1P_{G1}^2 + 25P_{G1} + 1.6\,Rs/hr$

$C_2 = 0.1P_{G2}^2 + 32P_{G2} + 2.1\,Rs/hr$

If the total demand on the generators is 250 MW, find the economical load distribution of the two units. [10]

OR

5. Explain the various factors to be considered in allocating generation to different power stations for optimum operation. [10]

6.a) Draw the schematic diagram of Speed –governor System and explain its components.
b) Explain the Generator Load model of Single area LFC system. [5+5]

OR

7. Explain the p-f control of single area system for the uncontrolled case. [10]

8.a) Derive the expression for critical clearance angle.
b) Explain methods to improve steady state stability. [5+5]

OR

9.a) What is equal area criterion? Discuss its application and limitation in the study of power system stability.
b) What is meant by swing curve and how is it determined? [5+5]

10.a) Discuss the functions of energy control centre.
b) Explain the data acquisition system with block diagram. [5+5]

OR

11.a) Explain the techniques used for the load forecasting.
b) Discuss the necessity of computer control in power systems. [5+5]

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