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Code No: 156CK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, January/February - 2025

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)	Write the quantities that are associated with each bus in a system.	[2]
b)	What is load flow analysis? Give its significance in power system analysis.	[3]
c)	What are B- coefficients?	[2]
d)	What is the need of economic operation of power systems?	[3]
e)	Define control area.	[2]
f)	What is the importance of load frequency control?	[3]
g)	Define transient stability.	[2]
h)	List out the various applications of Equal are criterion.	[3]
i)	What is load dispatch centre?	[2]
j)	What is the importance of load forecasting?	[3]

PART - B

(50 Marks)

2.a) Classify and explain the various types of buses in a power system for load flow studies.
b) Compare Gauss-Seidel method and Newton-Raphson method of load flow studies. [5+5]

OR

3. With a neat flow chart, explain the computational procedure for load flow solution using Newton Raphson iterative method. [10]

4. A constant load of 400 MW is supplied by two 200 MW generators 1 and 2 for which the fuel cost characteristics are given as
$F_1 = 0.05P_1^2 + 20P_1 + 30$ Rs/hr;
$F_2 = 0.06P_2^2 + 15P_2 + 40$ Rs/hr;
The real power generation of units P_1 and P_2 are in MW and also determine the most economical load sharing between the generators. [10]

OR

5. Explain the general transmission line loss formula and derive its co efficient. [10]

6. Derive the mathematical modeling of speed governor system. [10]

OR

7. Discuss in detail the dynamic response of single area system of uncontrolled case and controlled case. [10]

8.a) Explain the methods for improving steady state stability.

b) Discuss the various factors affecting the transient stability of the system. [5+5]

OR

9. Explain with necessary equations the solution of swing equation by step by step method. [10]

10. Explain in detail, the block diagram of the SCADA System. [10]

OR

11. Explain the data acquisition system with block diagram. [10]

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