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7E7045

Roll No.

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B. Tech. VII Sem. (Main/Back) Exam., Nov. – Dec. - 2017
Electrical & Electronics Engineering
7EX5A Power System Enginering
EE,EX

Time: 3 Hours | **Maximum Marks: 80** | **Min. Passing Marks: 26**

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT-I

Q.1 Incremental fuel cost (λ) in rupees per MWh for a plant consisting of two units are

$$\frac{dC1}{dPG1} = 0.20PG_1 + 40$$

$$\frac{dC2}{dPG2} = 0.25PG_2 + 30$$

Assume both units are operating at all to times and total load varies from 40 MW to 250 MW, and the maximum and minimum load on each units are to be 125MW and 20 MW respectively. How will be the load shared between the two units if the system load varies over the full range? What are the corresponding values of the plant incremental cost? [16]

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OR

Q.1 (a) What do you understand by economics loading of generating units and stations? Explain why the fuel cost is generally taken as the operating cost in economic generation scheduling? [8]

(b) Define Input –Output curves and Incremental rate curves with the help of neat and clean diagram? [8]

UNIT-II

Q.2 (a) Explain and derive Swing Equation? [8]

(b) Explain Steady State stabilities and Steady state stability limits? [8]

OR

Q.2 (a) A 100MVA, 2 Pole, 60 Hz generator has a moment of inertia 5×10^3 Kg-m^2. Calculate energy stored in rotor at rated speed. Also calculate the inertia constant H and angular momentum of the rotor at rated speed? *[8]*

(b) Explain power angle curve under steady state and transient condition, in detail? [8]

UNIT-III

Q.3 Explain Equal area criterion and its application to transient stability under basic disturbance in detail? [16]

OR

Q.3 (a) A double circuit three phase feeder connects a single generator to a large network. The power corresponding to the limit of study state stability for each circuit is 100 MW. The line is transmitting 80 MW when one of the circuit is suddenly switch out. Determine with reference to appropriate diagram weather the generation is likely to remain in synchronism? [8]

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(b) Explain the phenomena of Critical clearing angle and critical clearing time with help of suitable example? [8]

UNIT-IV

Q.4 (a) Describe in detail the concept of brushless excitation system. [8]

(b) Explain Reserve Capacity of Power Plant, why is it needed? [8]

OR

Q.4 (a) Explain with help of advantage and disadvantage an Interconnected and Isolated power system. [8]

(b) Describe the phenomena of Excitation system of a synchronous machine? [8]

UNIT-V

Q.5 (a) Explain the concept of Power System Security and explain why in modern era it has become important in power system engineering? [8]

(b) Explain Series compensation of transmission line and its use in power system? [8]

OR

Q.5 (a) Write Short note on Tap Changing Transformer with a suitable diagram? [8]

(b) Explain concept of Location and Protection of series capacitor? [8]

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