

B.E. Eighth Semester (Electrical Engineering) (CGS)
10468 : Power System Stability : 8 EE 01 / 8 EP 01 / 8 EL 01

P. Pages : 2

Time : Three Hours



AU - 3023

Max. Marks : 80

- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answer necessary with the help of neat sketches.

SECTION - A

1. a) Explain the three phase synchronous machine circuit representation? 7
b) Deduce Park's transformation relating the three phase currents of synchronous machine to its corresponding d - q - o variables. Prove that Park's transformation is power invariant. 7

OR

2. a) What do you mean by term time constant? State and explain various time constant from equivalent circuit? 7
b) What is power system stability? Classify the types of stability according to magnitude of disturbance? 7
3. a) Explain step by step procedure of constructing Clark diagram for two machine system with losses. 7
b) Explain effect of Inertia on steady state stability of two machine system with losses? 6

OR

4. a) What is conservative criteria? How it can be applicable for multimachine system? State proposed assumption for multi machine system. 6
b) Find the steady state stability limit of a two machine system, comprising a synchronous generator with equivalent reactance of 0.5 pu connected to infinite bus through a reactance of 0.9 pu. The terminal voltage of generator is held at 1.08 pu and voltage of infinite bus at 1.0 pu. Also find the maximum power at specified terminal voltages assuming the phase angle between V_1 and V_2 could be increased to the maximum without instability. 7
5. a) Explain the effect of governor action on steady stability limit. 7
b) Explain the effect of saturation and saturated reactance on stability? Explain the method of determination of saturated reactance. 6

OR

6. a) State the function of automatic voltage regular with the help of vector diagram and power angle curve. Explain the effect of automatic voltage regulator on stability of a two machine. 7

- vi) Output digital voltmeter with 2V output.

OR

6. Design an instrument using instrumentation amplifier to indicate temperature to meet the following specifications. 13
- i) Temperature range = 0°C to 250°C .
 - ii) Platinum RTD sensor has 120Ω at 0°C & its variation is $0.345\Omega/^{\circ}\text{C}$.
 - iii) Sensor current = 10mA.
 - iv) Digital indication of 2 & $\frac{1}{2}$ digit display.
 - v) Input to digital volt-meter = $2V_{\text{max}}$.

SECTION - B

7. Draw and briefly explain the physical layout of following circuits; 13
- i) 1 : 4 D_{MUX}.
 - ii) 3 : 8 Decoder.

OR

8. Realize the following implementations using CMOS devices. 13
- i) $Z = \overline{(A \cdot B \cdot C)} + (D + E + F)$.
 - ii) Full-adder.
 - iii) NOR-gate.

9. With reference to VHDL language, Explain the following with suitable examples : 13
- i) Signals & Variables.
 - ii) Component.
 - iii) With select.

OR

10. a) Explain the inertial & propagation delays with reference to VHDL. 7
- b) Briefly compare the Verilog & VHDL languages. 6
11. a) Write a VHDL code to implement BCD to Seven-Segment decoder. 7
- b) Write a VHDL code to implement four-bit adder using full adder as a component. 7

OR

12. Write and explain the VHDL code for 1011 sequence detection using mealy machine design. Draw & explain the State-Diagram for the same. 14
