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M.Tech (Power System) (Sem.-1) **POWER SYSTEM ANALYSIS** Subject Code : MTPS-101-18 M.Code : 75774 Date of Examination : 17-01-2023

Time: 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 1. Attempt any FIVE questions out of EIGHT questions.
- 2. Each question carries TWELVE marks.
 - 1. What are the assumption mode in obtaining fast decoupled load flow equation? Write steps to solve the load flow problem using Newton Raphson load flow method.
 - 2. Explain the role of AVR load flow. Develop a mathematical model for load flow analysis using discrete variable.
 - 3. Define constant matrix. How Q-max violation in constant matrix is controlled? Explain with an example.
 - 4. Draw and explain the security state diagram. What are the power modelling techniques followed for the Contingency Analysis and which power system model is preferred the most and why?
 - 5. a) Explain the voltage collapse proximity indices used in power system voltage stability analysis.
 - b) How the PV characteristics with constant load power factor affect the voltage that follows the stability of the power system?

6. Write short notes on the following :

- a) Tracking state estimation
- b) Sources of errors in measurement.

- 7. What is the significance of the network sensitivity factors for determining and for quick calculation of possible overloads in a power network? Briefly explain the above using the Generation shift factors and Line outage Distribution factors.
- 8. a) Discuss the mechanism of multiple line outages of power system.
 - b) A 50 Hz turbo-generator is rated 550 MVA, 33 kV. It is Y-connected, solidly grounded and is operating at rated voltage at no load. It is disconnected from the rest of the system. Its reactance's are, $X_d = X_1 = X_2 = X_0 = 0.05$ p.u. Find the ratio of the sub transient line current for a L -L fault to the sub transient current for a symmetrical three phase fault on the generator.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.