

APJ Abdul Kalam Technological University
Second Semester M. Tech Degree Examination, April 2017

Cluster: **Kollam**

Branch:

Specialisation: POWER SYSTEMS

Subject: **02EE6222- POWER SYSTEM DYNAMICS AND
CONTROL**

Time: 3 Hrs

Max. Marks: 60

Instructions: Answer All Questions from *Part A*.

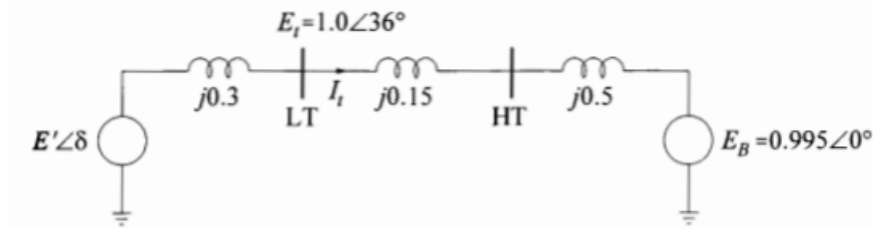
Answer *Two Full* questions from *Part B*.

PART A

1. (a) Differentiate between rotor angle stability and voltage stability?
(5 marks)
(b) How the load-power factor affect the power- voltage characteristics of the system ?
(4 marks)
2. Obtain the special characteristics of hydraulic turbine using classic transfer function.
3. A synchronous machine is connected to an infinite bus through a transformer and a double circuit line. The network reactances are in p.u. Resistances are negligible. The following datas are given.

$$P = 0.9, \quad Q = 0.3, \quad E_t = 1.0 \angle 36^\circ, \quad E_b = 0.995 \angle 0^\circ, \quad X_d' = 0.3, \quad H = 3.5 \text{ MWs/MVA}$$

Write the linearised state equations of the system. Determine the eigen values, damped frequency of oscillation in Hz, damping ratio and undamped natural frequency of oscillation for damping coefficient 10.



4. What is power system stabilizer and why it is used? How can you model a power system stabilizer?

(4 x 9=36)

PART B

5. A small system consists of 4 identical 500 MVA generating units feeding a total load of 1020 MW. The inertia constant H of each unit is 5.0 on 500 MVA base. The load varies by 1.5% for a 1% change in frequency. When there is a sudden drop in load by 20 MW,
- (i) Determine the system block diagram with constants H and D expressed on 2000 MVA base.
 - (ii) Find the frequency deviation, assuming that there is no speed-governing action.
6. Explain the reactive power and voltage control using shunt reactors, shunt capacitors, series capacitors and synchronous condenser.
7. With the help of neat diagram, explain AGC in single area and multiarea system.

(2 x 12=24)
