

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (EE) (Sem.-6)**  
**POWER SYSTEMS-II (OPERATION AND CONTROL)**

Subject Code : BTEE-601-18

M.Code : 79312

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :
  - a) What is the significance of bus admittance matrix?
  - b) Swing Equation explained?
  - c) Describe the power-angle curve.
  - d) What is infinite bus?
  - e) Why is shunt compensation necessary in transmission systems?
  - f) Define phasor measurement units.
  - g) What is the need of speed governors?
  - h) Why is an integrated controller necessary for the LFC system?
  - i) Briefly discuss the single area load frequency control.
  - j) What do you understand by Vertically Integrated Utilities?

## SECTION - B

2. Draw the block diagram of automatic voltage regulator and discuss its operation.
3. Derive the load flow equations in rectangular form for Newton-Raphson method of analysis. Also, write the algorithm for the same.
4. An alternator with negligible damping is connected to an infinite bus. Write the swing equation in usual form and define the inertia constant (H) here. Deduce equal area criterion condition for stability analysis.
5. Two generators of same installed capacity have frequency droop characteristics of 4% and 5%, respectively. At the end of a certain operational time block, which generator will get more money towards frequency regulation?
6. What are the objectives of reactive shunt compensation? Explain how midpoint voltage regulation of a transmission line increases the power transfer capacity of the lines.

## SECTION - C

7. Enlist the role of FACTS in power system? Explain the working of STATCOM with the help of suitable diagram.
8. Deduce "equal area criterion" for stability analysis. A 6-pole, 30 MVA, 11 KV, 50 Hz generator has an inertia constant of  $H = 12 \text{ KW}^{-\text{s}}/\text{KVA}$ , supplying power at 0.85 pf lag. When a fault reduces the electric power output by 30%, find the accelerating torque at the time of fault occurs. Neglect the losses and assume the generator input to be constant.
9. Discuss in detail the importance of vertical integrated utilities in today's power scenario. Also, discuss operating conflicts between wholesale and retail electricity markets.

**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.**