

B.Tech VI Sem Main/Back (New Scheme) Examination 2025-26

Electrical Engineering

(6EE4-03)- Power System-II

Time :3Hours

Maximum Marks: 70

Min. Passing Marks:

Instructions to Candidates:

Part-A: Short answer questions (up to 25 words) 10x2 marks = 20 marks. All ten questions are compulsory.

Part- B: Analytical/Problem Solving questions 5x4 marks = 20 marks. Candidates have to answer 5 questions out of 7.

Part – C: Descriptive/Analytical/Problem Solving questions 3x10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

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

1 ___NIL___

2 ___NIL___

Part-A

[10x2=20]

- Q.1. What is the importance of the per unit quantities? [2]
 Q.2. What is single line diagram? [2]
 Q.3. Define bus impedance matrix. [2]
 Q.4. What is PQ bus (load bus)? [2]
 Q.5. What are the difference between symmetrical and unsymmetrical faults? [2]
 Q.6. Define positive, negative and zero sequence components. [2]
 Q.7. Why three- phase fault is considered the most severe fault? [2]
 Q.8. Write the swing equation. [2]
 Q.9. What is Automatic Voltage Regulator (AVR) in power systems? [2]
 Q.10. What do you understand by frequency dependent loads? [2]

PART-B

[5x4=20]

- Q.1. What are the basic steps for calculating bus admittance matrix? [4]
 Q.2. A 3-bus power system has the following p.u. line impedances:
 $Z_{12} = j0.2$ p.u., $Z_{13} = j0.4$ p.u., $Z_{23} = j0.25$ p.u.
 From the Y-bus matrix. [4]
 Q.3. Derive the real and reactive power equations in Newton- Raphson method. [4]
 Q.4. What is the Equal Area Criterion in power system for stability analysis? [4]
 Q.5. Derive the steady-state frequency deviation expression in a single-area power system. [4]
 Q.6. How does droop control contribute to frequency regulation in power systems? Explain it using droop characteristic. [4]

P.T.O

Q.1. Explain the operation of the automatic generation control during frequency deviation.

[4]

PART-C

[3x10=30]

Q.1 Solve a 3-bus load flow problem using Gauss-Seidel method up to two iterations and comment on convergence. [10]

Q.2 Describe the phenomenon of loss of synchronism in a single machine infinite bus system? Also define critical Clearing angle and critical clearing time. [10]

Q.3 Derive expressions for fault currents in line-to-line (LL) and double line-to-ground (LLG) faults. [10]

Q.4. Derive and explain the power-angle equation and discuss conditions for steady-state stability. [10]

Q.5. Explain the Rung-Kutta method for solving and analysis of swing equation with appropriate derivations. [10]
