Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Engineering
End Sem Examination Dec-2023
EE3EW01 / EX3EW01 Advanced Power System Analysis

Programme: B.Tech. Branch/Specialisation: EE / EX

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. In ZIP load model, meaning of 'Z' is- **1**
(a) Constant power (b) Constant current
(c) Constant Impedance (d) None of these

ii. Thevenin equivalent is a method of- **1**
(a) Current reduction (b) Network reduction
(c) Voltage reduction (d) Power reduction

iii. Which is strongly coupled? **1**
(a) Reactive power and load angle
(b) Reactive power and Voltage
(c) Active power and Voltage
(d) None of these

iv. The technique which increases the line loadability- **1**
(a) Compensation (b) Depreciation
(c) Completion (d) None of these

v. The sensitivity of real power with respect to the bus angle is- **1**
(a) Very low almost zero (b) High
(c) Infinite (d) Can't say

vi. In Line outage distribution factor calculation, line outage is realized by- **1**
(a) Depreciation injection theorem
(b) Compensation injection theorem
(c) Compensation rejection theorem
(d) None of these

vii. Contingency analysis are used to study **1**
(a) Economic operation (b) Unit commitment
(c) Outage events (d) None of these

viii. The power system needs to be- **1**
(a) Secure (b) Insecure (c) Instable (d) None of these

ix. Which is one of the voltage stability criteria? **1**
(a) Deformity (b) Ductility (c) Proximity (d) None of these

x. PV curve is utilized for the analysis of **1**
(a) Voltage stability (b) Phase displacement
(c) Angle stability (d) None of these

Q.2 i. Write about static load modelling. **2**
ii. Explain line loadability in detail using suitable diagram. **3**
iii. Draw and explain the capability curves of alternator. **5**
OR iv. Demonstrate any one network reduction method in detail. **5**

Q.3 i. Write and explain any two effects of compensation in power system. **4**
ii. Describe in detail the uniform series compensation with suitable diagram and mathematical relations. **6**
OR iii. Demonstrate any two effects of compensation on loadability of transmission line with suitable mathematical relations. **6**

Q.4 i. Explain the meaning of sensitivity analysis. **3**
ii. Derive for and explain the line outage distribution factor. **7**
OR iii. Formulate and explain the generation shift distribution factor. **7**

Q.5 i. Explain the meaning of security analysis. **3**
ii. Discuss in detail the three functions of contingency analysis. **7**
OR iii. List and explain the different levels of power system security. **7**

Q.6 Attempt any two:
i. Elaborate in detail the mechanism criteria for voltage stability. **5**
ii. Differentiate between voltage stability and angle stability. **5**
iii. Write and explain any two effects of shunt compensation on voltage stability. **5**

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Marking Scheme

EE3EW01 (T)- Advanced Power System Analysis

Q.1	i)	c) Constant Impedance	**1**
	ii)	b) Network reduction	**1**
	iii)	b) Reactive power and Voltage	**1**
	iv)	a) Compensation	**1**
	v)	b) High	**1**
	vi)	b) Compensation injection theorem	**1**
	vii)	c) Outage events	**1**
	viii)	a) Secure	**1**
	ix)	c) Proximity	**1**
	x)	a) Voltage stability	**1**
Q.2	i.	Static load modelling.	**2**
	ii.	Line loadability, diagram.	**2,1**
	iii.	Figure, Explanation of capability curves of alternator.	**2.5x2**
OR	iv.	One network reduction method explanation, solution	**3,2**
Q.3	i.	Effects of compensation	**2x2**
	ii.	Uniform series compensation diagram, relation and explanation	**3x2**
OR	iii.	Two effects of compensation on loadability	**3x2**
Q.4	i.	Meaning of sensitivity analysis.	**3**
	ii.	Derive and explain the line outage distribution factor.	**4,3**
OR	iii.	Formulate and explain the generation shift distribution factor.	**4,3**
Q.5	i.	Meaning of security analysis.	**3**
	ii.	Discussion, three functions of contingency analysis.	**1,6**
OR	iii.	Seven levels of power system security.	**1x7**
Q.6			
	i.	Mechanism criteria for voltage stability.	**5**
	ii.	Differentiate between voltage stability and angle stability.	**2.5x2**
	iii.	Two Effects of shunt compensation on voltage stability.	**2.5x2**

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