Advanced Power System Analysis
Lecture 14
Assessment/Evaluation modalities

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Final exam on Advanced Power System Analysis

The exam contains Three parts:

Part I:Multiple choice, Part II: True-False and Part III: Subjective questions

The total Mark is : 100%

Time allowed: 1:30 hrs

Name:_____

ID no:_____

Instruction I: Multiple choice questions

- For the questions, Question number one up to question number 25 choose the correct answer from the given multiple choices and circle the right answer.

  Each question weights : **2 marks .**

Question number one and two

1. Which one of the following power system component is the pace where energy conversion takes palce

A. Generation

B. Load

C. Transmission Line

D. Distribution system

2. Power flow needs

A. The basic understanding of network parameters

B. linearization of complex equations

C. the network analysis techniques and types of network buses

D. All

Question number Three and Four

3. ----------is transmission line parameter produced by the presence of magnetic fields around the conductors

A. Shunt capacitance

B. Series resistance

C. Series inductance

D. shunt conductance

4. One of the following model is more appropriate for long-transmission line while using load flow analysis

A. Series resistance and reactance

B. T-method

C. Nominal π-Method

D. A and B

Question number Five and Six

5. Which one of the following is not true about per phase analysis

A. All loads and sources are Y connected

B. Mutual Inductance between phases

C. All neutrals are at the same potential

D. All phases are completely decoupled

6. Which one is true for the successful operation of static power flow analysis

A. Generation must supplies demand (load) and loss.

B. Node voltage magnitudes must be remain close to rated values.

C. Generator must operates within specified real and reactive power limits.

D. All

Question number seven and eight

7. One of the following load flow analysis does not consider the rotor angle effect in reactive load

A. Fast decoupled

B. Newton Raphson

C. Gauss Seidal

D. none

8. Which one of the following bus in power system is the place where power mismatch takes place

A. Swing bus

B. PV bus

C. Generator bus

D. Load bus

Question number nine and ten

9. which, one of the following is not used as reactive power compensator to increase voltage magnitude

A. Shunt capacitor

B. Tap-changing transformers

C. Shunt reactor

D. SVC

10. Which one of the following is power flow simulation software

A. PSAT.

B. ETAP

C. Powerworld simulator

D. All

Question number eleven and twelve

11.Faults usually occurs due to:

A. Insulation failure of equipment.

B. Flashover of lines initiated by a lighting stroke.

C. Permanent damage to conductors and towers or accidental faulty operations.

D. All

12. One of the following currant during fault is much-much greater than the others

A. The rated current

B. Sub-transient current

C. Steady current

D. Transient current

Question number 13 and 14

13. One of the following not true about balanced three phase fault

A. The most frequent fault in power system

B. The most severe types of fault

C. Fault current symmetrical in all phases

D. A & C

14. The three symmetrical currents are equal in one of the following fault condition

A. Line to line

B. Three phase

C. Line to ground

D. Double line to ground

Question number 15 and 16

15. The zero sequence current is not existing in;

A. Line to ground fault .

B. Double line fault

C. Double line to ground fault

D. None.

16. One of the following not true

A. Negative sequence current flow in opposite to positive sequence current

B. Both negative sequence and positive sequence reactance diagram have source voltage

C. For line to line fault the positive and negative sequence currents are equal in magnitude and opposite in sign

D. All

Question number 17 and 18

17. One of the following types of transformer connection is act as a transmission line reactance model wh ile developing zero sequence diagram

A. Star (Y)-star(Y) grounded from both side

B. Star grounded in primary and delta in secondary

C. primarily delta whereas secondary star-grounded

D. Both side are delta

18. One of the following not true

A. All phases have fault current for single line to ground fault

B. The unbalanced fault makes system unbalance at point of fault

C. Double line to ground fault have zero sequence current

D. All

Question number 19 and 20

19. Which one of the following is not true about the need of frequency stability analysis:

A. It is an indicator of the balance between generation and demand. Unstable network frequency results in

B. Generator tripping

C. Load shedding doesn’t lead to frequency instability

D. None

20.Which one of the following true while doing Transient Stability Analysis

A. Mechanical input to the generator remains constant

B. machine damping and AVR neglected

C. Loads are represented as constant impedance/admittance

D. All

Question number 21 and 22

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21. One of the following is true for power angle curve

A. Power is maximum when rotor angle is 90 degree

B. Power is minimum when rotor angle is 45 degree

C. For loaded machine, the acceleration power is zero

D. None

22. For two machines operating at the equilibrium point δ0, the corresponding to the mechanical and ele ctrical power are related as: Pm0 = Pe0 as shown in the Fig.3..

A. Pm0 > Pe0

B. Pm0 = Pe0

C. Pm0 < Pe0

D. A & B

Question number 23 and 24

23. The sudden three phase fault at the beginning of one of two parallel connected transmission line that connects ge

nerator to infinite bus results in

A. The power transfer to grid during fault is greater than pre-fault current

B. No net power transfer to the grid during fault

C. The power transfer to grid during fault greater than post-fault current

D. A and c

24. Power System Security is very important in Modern Grid to:

A. Assures Reliable Power Supply

B. Prevents service disruptions, blackouts, and blackouts

C. Protects against physical and cyber-threats(in modern grid)

D. All

Question number 25

25. System state after contingency analysis and corrective actions have been applied to maintain security is:

a. Optimal dispatch

b. Secure dispatch

c. Secure-post contingency dispatch

d. post-contingency dispatch

Instruction II. Say true if the statement is correct and sa
y false if the presented statement wrong

Each questions worth: 2 points

Question 1-5

1. Three phase fault is the most frequent types of fault in power system
2. Inductance exist in power transmission line due to the magnetic field between conductors
3. Per unit analysis reduce the errors occur in power system analysis related the presence of large nu mber of Transformers
4. Load bus is a voltage controlled bus
5. Swing bus is the place where power mismatch is calculated

Question 6-10

6. The circuit breaker momentary current is equal to transient current

7. Guess seidal load flow has better convergence than Newton raphson power flow

8. Three phase fault in power transmission line is one of the source for steady state stability pro blem

9. Synchronism means when two or more parallel connected generators are spinning at the sa me speed, frequency and the same phase shift

10. Power system security similar with power stability

Question 11-15

11. The zero sequence current for double line fault is equivalent to zero

12. N bus power system will have N*N admittance matrix

13. Transient current in power system is greater than sub-transient current

14. The fault analysis is helpful in sizing switch gears

15. Unsymmetrical fault analysis uses the symmetrical matrix while calculating fault currents and voltage

Instruction III. Answer the following four questions as per the Request in space provided

Total mark= 20%

Each question weights five marks

Question number 31

31. Synchronism requires that the rotors turn at exactly the:

Question number 32

32. Present the balanced and unbalanced types of faults in descending order based on their frequency of occurrence

Question number 33

33. The common sources of voltage stability problem are:

Question number 34

34. The types of power stability are:

Answer Q. 1- Q.25

Instruction I:

1	A	11	D	21	A
2	D	12	B	22	B
3	C	13	A	23	B
4	C	14	C	24	D
5	B	15	B	25	C
6	D	16	B		
7	A	17	A		
8	A	18	A		
9	C	19	C		
10	D	20	D		

Answer For True-False Questions Q. 1- Q.15

1. False
2. True
3. True
4. False
5. True
6. False
7. False
8. False
9. True
10. False
11. True
12. True
13. False
14. True
15. True

Answer Q. 31

31.

- Speed
- Frequency
- The same phase shifts .

Answer Q. 32

32.

- Line to Ground (85%)
- Double line.
- Double line to ground
- Balanced three Phase fault

Answer Q. 33

33.

- Load behaviors
- Inadequate reactive power support
- Long transmission lines
- High power transfer levels
- Generator reactive power limits

Answer Q. 34

34.

- Angle stability
- Voltage stability
- Frequency stability

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Project Assignment

1. The system data for a load flow solution are given in the following Tables. Determine: a. the voltages at the end of 2nd iteration using Gauss–Seidel and NR methods then compare results. Take a = 1.2.

Table 1. Line parameter

Bus code	x
1-2	0.15
1-3	0.3
1-4	0.4
2-3	0.3
3-4	0.15

Table 2. Bus data

Bus	P	Q	V	Remarks
1	-	-	1.0	Swing bus
2	0.5	-0.2	-	PQ Bus
3	-1.0	0.5	-	PQ Bus
4	0.3	-0.1	-	PQ Bus

b. Use the power simulator software's(PSAT) and determine the results and compare it with answer in a.

Thank you !