INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
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ELECTRICAL AND ELECTRONICS ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	**POWER SYSTEM ANALYSIS**
Course Code	:	**AEE012**
Program	:	**B.Tech**
Semester	:	**VI**
Branch	:	**Electrical and Electronics Engineering**
Section	:	**A&B**
Course Faculty	:	**Mr. T. Anil Kumar, Assistant Professor** **Mr. P. Mabu Hussain, Assistant Professor**

OBJECTIVES:

I	To help students to consider in depth the terminology and nomenclature used in the syllabus.
II	To focus on the meaning of new words / terminology/nomenclature

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO 1	CLO	CLO Code
	UNIT-I					
1	Define graph of original network.	Graph is the pictorial representation of original network where all the elements are replaced with straight lines.	Remember	CO 1	01	AEE012.01
2	Define bus.	Bus is the point or junction where two or more than two elements of power system are connected . The bus is named after known variables at respective buses as generator bus, load bus and slack bus.	Remember	CO 1	01	AEE012.01
3	Explain incidence matrix.	Incidence matrix gives the information of connection of elements between buses and current flow in the network.	Understand	CO 1	01	AEE012.01
4	Discuss about primitive network.	Primitive network is the representation of power system governed with impedance and admittance performance equations.	Understand	CO 1	02	AEE012.02
5	State single line diagram.	A single line diagram is a diagrammatic representation of power system in which the components are represented by their symbols and the interconnection between them are shown by a single straight line.	Remember	CO 1	02	AEE012.02
6	Classify components of power systems.	The components of a power system are Generators, Power transformers, transmission lines, Substation transformers, distribution transformers and Loads.	Understand	CO 1	02	AEE012.02
7	Define bus admittance matrix.	The matrix consisting of the self and mutual admittance of the network of a power system is called bus admittance matrix.	Remember	CO 1	02	AEE012.02

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8	Define bus impedance matrix.	The matrix consisting of driving point impedances and transfer impedances of the network of a power system is called bus impedance matrix.	Remember	CO 1	02	AEE012.02
9	Name the diagonal and off-diagonal elements of bus impedance matrix.	The diagonal elements of bus impedance matrix are called driving point impedances of the buses and off-diagonal elements are called transfer impedances of the buses.	Understand	CO 1	02	AEE012.02
10	Define tree.	Tree is the sub graph of original graph with same number of buses without closed loop.	Remember	CO 1	01	AEE012.01
11	Define addition of branch.	The new element connected between existing bus and newly added bus.	Remember	CO 1	03	AEE012.03
12	State addition of link.	The new element connected between already existing pair of buses.	Remember	CO 1	03	AEE012.03
13	Give the order of bus impedance matrix for addition of branch.	The order of impedance matrix for addition of branch is (m+1)x1. Where, m-original number of buses in power system.	Remember	CO 1	02	AEE012.02
14	Give the order of impedance matrix for addition of link.	The order of impedance matrix for addition of link is mx1. Where, m-original number of buses in power system.	Remember	CO 1	02	AEE012.02
15	Write performance equations of partial network.	$E_{Bus} = Z_{Bus} * I_{Bus}$ $I_{Bus\ s} = Z_{Bus} * E_{Bus}$	Remember	CO 1	03	AEE012.03
	UNIT-II					
1	Name the quantities defined at voltage controlled bus	The quantities defined at voltage controlled bus are P and V.	Remember	CO 2	04	AEE012.04
2	Write quantities to determined at generator bus.	The quantities to be determined at generator bus are Q and δ.	Remember	CO 2	04	AEE012.04
3	Define acceleration factor.	The acceleration factor speed ups the convergence of power system.	Remember	CO 2	05	AEE012.05
4	State tie line control.	The transmission lines that connect an area to its neighboring area are called tie-lines.	Remember	CO 2	04	AEE012.04
5	Name the quantities defined at load bus.	The quantities defined at load bus are P and Q.	Remember	CO 2	04	AEE012.04
6	Write quantities to be determined at load bus.	The quantities to be determined at load bus are V and δ.	Remember	CO 2	04	AEE012.04
7	Name the quantities defined at slack bus.	The quantities defined at load bus are V and δ.	Remember	CO 2	04	AEE012.04
8	Write unknown quantities at slack bus.	The unknown quantities at load bus are P and Q	Remember	CO 2	04	AEE012.04
9	Name iterative methods for load flow studies .	The iterative methods for load flow studies are: 1) Gauss siedel method 2) Newton Raphson method. 3) Decoupled methods. 4) Fast decoupled method.	Remember	CO 2	05	AEE012.05

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10	Write the objective of DC load flow studies.	The objective of a DC load flow studies is calculation of bus voltage values with specified system loads and sources.	Understand	CO 2	05	AEE012.05
11	Give the value of acceleration factor used in the Gauss Siedel method.	The value of acceleration factor used in the Gauss Siedel method ranges form 1.6-2.0.	Remember	CO 2	05	AEE012.05
12	Give the main assumption to solve a load flow problem by Gauss Siedel method.	All the buses are to be considered as PQ bus excluding the slack bus in Gauss Siedel method.	Understand	CO 2	05	AEE012.05
13	Write drawback of Newton Raphson method in load flow studies.	A large memory allocation is required to store the Jacobian Matrix in Newton Raphson method	Understand	CO 2	05	AEE012.05
14	Which types of equations are solved using Newton Raphson method?	The equations are solved using Newton Raphson method are Non linear algebraic equations	Understand	CO 2	05	AEE012.05
15	Select best method with high accuracy in load flow studies.	The best method in load flow studies with high accuracy is Newton Raphson method	Understand	CO 2	05	AEE012.05
UNIT-III						
1	Define per unit system in power system.	A per-unit system is the expression of system quantities as fractions of a defined base unit quantity in power system..	Remember	CO 3	07	AEE012.07
2	State symmetrical fault in power system.	A symmetrical fault is a fault where all phases are affected so that the power system remains balanced.	Remember	CO 3	08	AEE012.08
3	Write about unsymmetrical faults in three phase system.	Unsymmetrical faults are the faults which leads unequal currents with unequal phase shifts in a three phase system.	Remember	CO 3	09	AEE012.09
4	How unsymmetrical faults are occurred?	The unsymmetrical fault occurs in a system due to presence of an open circuit or short circuit of transmission or distribution line.	Understand	CO 3	09	AEE012.09
5	Name types symmetrical faults.	The types of symmetrical faults are – i) line to line to line to ground (L-L-L-G). ii) line to line to line (L-L-L)	Remember	CO 3	08	AEE012.08
6	Name types unsymmetrical faults.	The types of unsymmetrical faults are – i) line to ground (L-G) ii) line to line (L-L) iii) double line to ground (LL-G) .	Remember	CO 3	09	AEE012.09

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7	Define earth fault impedance.	Earth fault loop impedance is the path followed by fault current when a lowimpedance fault occurs between the phase conductor and earth	Remember		08	AEE012.08
8	Write about positive sequence components.	A balanced three-phase system with the same phase sequence as the original sequence is positive sequence component.	Understand	CO 3	08	AEE012.08
9	Write about negative sequence components.	A balanced three-phase system with the opposite phase sequence as the original sequence negative sequence component.	Understand	CO 3	08	AEE012.08
10	Write about zero sequence components.	A three phase system with Three phasors that are equal in magnitude and phase zero sequence component.	Understand	CO 3	08	AEE012.08
11	Give the importance of series reactor.	Series reactors are used as current limiting reactors to increase the impedance of a system.	Understand	CO 3	08	AEE012.08
12	State fault level.	Fault level at any given point of the Power system is the maximum current that would flow in case of a short circuit fault at that point.	Remember	CO 3	08	AEE012.08
13	Name the factors on which fault current depends.	The factors on which fault current depends- i) Total impedance upto the fault. ii) Voltage at the fault point	Understand	CO 3	09	AEE012.09
14	Mention the methods used for calculation of symmetrical faults.	The methods used for calculation of symmetrical faults- **i)** Thevenin's theorem **ii)** Kirchhoff's laws.	Understand	CO 3	08	AEE012.08
15	Give the value of zero sequence impedance in line to line faults.	The value of zero sequence impedance in line to line faults is zero.	Understand	CO 3	08	AEE012.08
		UNIT-IV				
1	Define steady state stability of power system.	The steady state stability of a power system refers to the ability of a system to return back to its steady state when subjected to a disturbance.	Remember	CO 4	10	AEE012.10
2	Write about stability limit in power system.	The stability limit defines the maximum power permissible to flow through a particular part of the system for which it is subjected to line disturbances or faulty flow of power.	Understand	CO 4	11	AEE012.11
3	State dynamic stability.	Dynamic stability of a system denotes the artificial stability given to an inherently unstable system by automatically controlled means. It is concerned to small disturbances lasting for about 10 to 30 seconds.	Remember	CO 4	10	AEE012.10
4	Give the condition for steady state stability.	The steady state stability plays role for very gradual and infinitesimally small power change.	Understand	CO 4	10	AEE012.10
5	Name the method to improve steady state stability of the synchronous generator for a better performance.	The method to improve steady state stability of the synchronous generator for a better performance Increasing the excitation.	Understand	CO 4	12	AEE012.12

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6	Define synchronizing coefficient.	The term P_{max} .cosδ is called synchronizing coefficient.	Remember	CO 4	11	AEE012.11
7	For what value of synchronizing coefficient system is stable.	The system is stable if synchronizing coefficient is positive.	Understand	CO 4	11	AEE012.11
8	Define power angle.	The power angle or torque angle is defined as the angular displacement of the rotor from synchronously rotating reference frame.	Remember	CO 4	11	AEE012.11
9	Write the units of inertia constant.	The units of inertia constant are MJ/MVA or MW.sec/MVA .	Remember	CO 4	10	AEE012.10
10	Name the parameters for which swing curve is plotted.	The swing curve is the plot or graph between the power angle δ and time t.	Remember	CO 4	11	AEE012.11
11	State the assumptions made in stability studies	The assumptions made in stability studies- i) The losses in the system are Neglected. ii) The voltage behind transient reactance assumed to remain constant. is	Understand	CO 4	11	AEE012.11
12	Define rotor angle stability.	Rotor angle stability is the ability of interconnected synchronous machines of a power system to remain in synchronism.	Remember	CO 4	10	AEE012.10
13	Explain voltage stability.	Voltage stability is the ability of a power system to maintain steady acceptable voltages at all buses in the system under normal operating conditions and after being subjected to a disturbance.	Remember	CO 4	10	AEE012.10
14	State the causes of voltage instability.	A system enters a state of voltage instability when a disturbance, increase in load demand, or change in system condition causes a progressive and uncontrollable drop in voltage	Understand	CO 4	10	AEE012.10
15	Give the factor causing instability of power system.	The main factor causing instability is the inability of the power system to meet the demand for reactive power.	Understand	CO 4	10	AEE012.10
UNIT-V						
1	Define transient stability.	Transient stability is defined as the ability of the power system to bring it to a stable condition or remain in synchronism after a large disturbance.	Remember	CO 5	14	AEE012.14
2	State transient stability limit.	The transient stability limit is the maximum power that can be transferred by a machine to a fault or a receiving system during a transient state without loss of synchronism.	Understand	CO 5	14	AEE012.14
3	Compare steady state and transient state limit.	Transient stability limit is always less than steady state stability limit.	Understand	CO 5	14	AEE012.14
4	Give the methods to determine transient stability of power system.	The methods to determine transient stability of power system- i) Equal area criteria. ii) Point by point method.	Remember	CO 5	14	AEE012.14

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5	Define critical clearing angle.	The critical clearing angle is the maximum allowable change in the power angle δ before clearing the fault, without loss of synchronism.	Remember	CO 5	14	AEE012.14
6	Methods to improve transient stability.	Methods to improve transient stability are- i) Higher system voltage. ii) Reduce the series reactance. iii) High speed circuit breakers and auto reclosing breakers.	Understand	CO 5	14	AEE012.14
7	Define automatic voltage regulator.	The automatic voltage regulator is used to regulate the voltage. It takes the fluctuate voltage and changes them into a constant voltage. The fluctuation in the voltage mainly occurs due to the variation in load on the supply system.	Remember	CO 5	15	AEE012.15
8	Name the component for which transient stability limit of a power system can be improved.	The component for which transient stability limit of a power system can be improved Series capacitor.	Understand	CO 5	14	AEE012.14
9	What are the common assumptions made for the equal area criterion?	The common assumptions made for the equal area criterion- i) The transmission line and machine resistances are neglected. ii) Rotor speed of the machine is constant iii) Mechanical input remains constant.	Understand	CO 5	14	AEE012.14
10	Give the case for which equal area criteria is used.	The equal area criteria is used for One machine and infinite bus bar.	Understand	CO 5	14	AEE012.14
11	Name the stability from equal area criteria.	The stability from equal area criteria Absolute stability.	Remember	CO 5	14	AEE012.14
12	Under what condition is the system stable under equal area criterion?	The area under the curve $P_a - \delta$ curve must reduce to zero.	Understand	CO 5	14	AEE012.14
13	Give the use of swing curve.	Swing curve is usually plotted for a transient state to study the nature of variation in power angle for a sudden large disturbance. From the nature of variation in power angle the stability of a system for any disturbance can be determined.	Understand	CO 5	12	AEE012.12
14	Define critical clearing time	The critical clearing time is defined as the maximum time delay that can be allowed to clear a fault, without loss of synchronism.	Remember	CO 5	14	AEE012.14
15	State Equal area criterion.	Equal area criterion for stability states that the system is stable if the area under $P_a - \delta$ curve reduces to zero at some value of δ.	Remember	CO 5	14	AEE012.14

Signature of the Faculty **Signature of HOD**