University of Mumbai
QUESTION BANK

Course Code-EEC802 Course Name: FACTS

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1.	In shunt compensation, the FACTS devices are connected in _____ with the transmission line.
Option A:	Series
Option B:	parallel
Option C:	cascade
Option D:	combination
2.	Two methods of shunt compensation are -
Option A:	resistance and inductance
Option B:	capacitance and resistance
Option C:	impedance and admittance
Option D:	capacitance and inductance
3.	Ideal midpoint shunt compensator maintains a voltage _____ the busbar voltage.
Option A:	equal to
Option B:	less than
Option C:	more than
Option D:	double
4.	For which among the following cases is the equal area criterion of stability most suitably used?
Option A:	two machine and slack bus
Option B:	One machine and infinite bus bar
Option C:	No load on bus ba
Option D:	3 machine and 9 bus system
5.	Which are the static VAR generator presently used?
Option A:	variable impedance type and switching converter type
Option B:	Switching converter type and voltage regulator type
Option C:	variable impedance type only
Option D:	voltage regulator type only
6.	The reactor is needed in a TSC to-
Option A:	limit the surge current in the thyristor valve
Option B:	limit fault currents in line
Option C:	protection from harmonics
Option D:	to store extra charge
7.	The maximum applicable voltage and the corresponding current are limited by-
Option A:	length of transmission line

Option B:	the impedance of TSC module
Option C:	the ratings of the TSC components (capacitor and thyristor valve)
Option D:	time constant of capacitor
8.	At maximum capacitive VAR output of FC-TCR, for what value of α is the thyristor-controlled reactor off?
Option A:	180°
Option B:	60°
Option C:	90°
Option D:	360°
9.	AC to AC switching converters are also known as -
Option A:	frequency changers or cyclo-converters
Option B:	Synthesizers
Option C:	frequency adapters
Option D:	Inverters
10.	Which one of the following VAR generators, gives highest losses with zero output?
Option A:	TSR
Option B:	Synchronous Voltage Source
Option C:	TCR-TSC
Option D:	FC-TCR
11.	For an uncompensated system, active power, P becomes maximum at _____ i.e. _____.
Option A:	180°, (Vs*Vr)/X
Option B:	180°, (Vs*Vr)*X
Option C:	90°, (Vs*Vr)/X
Option D:	90°, (Vs*Vr)*X
12.	The_____ at each P v/s V curve for a specific power factor represents the voltage instability in the radial network.
Option A:	break-point
Option B:	knee-point
Option C:	avalanche-point
Option D:	nose-point
13.	In the case of an _____ power system, any minor disturbance can cause the machine angle to oscillate around its steady-state value at the natural frequency
Option A:	under-damped
Option B:	over-damped
Option C:	critically damped
Option D:	Undamped
14.	The harmonics generated by the TCR cannot be eliminated by which of the following methods?
Option A:	Connecting 3 single-phase TCRs in delta
Option B:	Employing a 12-pulse TCR arrangement
Option C:	Employing harmonic filters
Option D:	Employing m (m≥0) series-connected TCRs
15.	The current in the TSC branch varies_____ with the applied voltage according to the admittance of the capacitor.

Option A:	in 180° phase shift
Option B:	Parabolically
Option C:	Linear
Option D:	Exponentially
16.	With a further decrease of angle α of FC-TCR, the inductive current becomes _____ the capacitive current, resulting in a net inductive VAR output.
Option A:	equal to
Option B:	smaller than
Option C:	Half
Option D:	larger than
17.	Decreasing E below V (i.e., operating under-excited) results in a _____ current, that is, the machine is seen as a reactor (inductor) by the AC system.
Option A:	Lagging
Option B:	Leading
Option C:	in phase
Option D:	180° apart
18.	Which one of the following VAR generators has negligible theoretical delay?
Option A:	FC-TCR
Option B:	TSR
Option C:	TCR-TSC
Option D:	Synchronous voltage source type
19.	When is the shunt inductive compensation not used ?
Option A:	when charging the transmission line
Option B:	when there is very low load at the receiving end
Option C:	when power factor is to be improved
Option D:	when a very low current flows through the transmission line
20.	Which of the following chain of events occurs in a Thyristor Controlled Reactor (TCR) operation?
Option A:	delay angle increases - the offset increases - valve conduction angle reduces - reactor current reduces
Option B:	delay angle decreases - the offset decreases - valve conduction angle reduces - reactor current reduces
Option C:	delay angle decreases - the offset decreases - reactor current reduces - valve conduction angle reduces
Option D:	delay angle increases - the offset increases - valve conduction angle increases - reactor current shoots
21.	An ideal compensator consumes
Option A:	low power
Option B:	high power
Option C:	very high power
Option D:	zero average power
22.	Voltage regulation can be defined as
Option A:	the proportional change in supply voltage magnitude associated with a defined change in load current

Option B:	the proportional change in supply frequency associated with a defined change in load current
Option C:	the proportional change in current magnitude associated with a defined change in load voltage
Option D:	the proportional change in resistance magnitude associated with a defined change in load current
23.	Any unbalanced linear ungrounded three-phase load can be transformed into a balanced, real three-phase load without changing the real power exchange between source and load by
Option A:	connecting a shunt reactor in parallel with it
Option B:	connecting an ideal compensating network in series with it
Option C:	connecting an ideal compensating network in parallel with it
Option D:	connecting a shunt reactor in series with it
24.	What are the limits permitted in voltage fluctuation in case of large motor starts?
Option A:	1-3% at distribution voltages
Option B:	1-3% depending on frequency
Option C:	1/2%-1% at transmission voltages
Option D:	1%-2% depending on frequency
25.	Combined series-shunt Controllers are also called as:
Option A:	Synchronous controller
Option B:	Interline Power Flow Controller
Option C:	Unified Power Flow Controller
Option D:	Static Controller
26.	Combined series-series Controllers are also called as:
Option A:	Unified Power Flow Controller
Option B:	Interline Power Flow Controller
Option C:	Static Controller
Option D:	Synchronous controller
27.	What does Shunt controllers do when connected in the system?
Option A:	Inject current into the system at the point of connection
Option B:	Inject voltage into the system at the point of connection
Option C:	Inject current and voltage into the system at the point of connection
Option D:	Increase capacitance
28.	What does Series controllers do when connected in the system?
Option A:	Inject voltage in series
Option B:	Inject current in series
Option C:	Inject voltage in parallel
Option D:	Inject current in parallel
29.	By varying the amplitude and phase angle of the voltage injected in series,
Option A:	active current flow can be influenced.
Option B:	reactive current flow can be influenced
Option C:	no change occurs
Option D:	both the active andreactive current flow can be influenced.

30.	Thermal capability of an overhead line is a function of
Option A:	ambient temperature only
Option B:	wind conditions only
Option C:	condition of the conductor only
Option D:	ambient temperature, wind conditions, condition of the conductor, and ground clearance
31.	In shunt compensation, the FACTS devices are connected in _____ with the transmission line.
Option A:	Series
Option B:	Parallel
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32.	Two methods of shunt compensation are -
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33.	Ideal midpoint shunt compensator maintains a voltage _____ the busbar voltage.
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34.	For which among the following cases is the equal area criterion of stability most suitably used?
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Option A:	ambient temperature only
Option B:	wind conditions only
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Option D:	ambient temperature, wind conditions, condition of the conductor, and ground clearance
42.	By varying the amplitude and phase angle of the voltage injected in series,
Option A:	active current flow can be influenced.
Option B:	reactive current flow can be influenced
Option C:	no change occurs
Option D:	both the active and reactive current flow can be influenced.
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Option A:	Inject voltage in series
Option B:	Inject current in series
Option C:	Inject voltage in parallel
Option D:	Inject current in parallel
44.	What does Shunt controllers do when connected in the system?
Option A:	Inject current into the system at the point of connection
Option B:	Inject voltage into the system at the point of connection
Option C:	Inject current and voltage into the system at the point of connection
Option D:	Increase capacitance
45.	Combined series-series Controllers are also called as:
Option A:	Unified Power Flow Controller
Option B:	Interline Power Flow Controller

Option C:	Static Controller
Option D:	Synchronous controller
46.	Combined series-shunt Controllers are also called as:
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48.	Any unbalanced linear ungrounded three-phase load can be transformed into a balanced, real three-phase load without changing the real power exchange between source and load by
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Option C:	connecting an ideal compensating network in parallel with it
Option D:	connecting a shunt reactor in series with it
49.	Voltage regulation can be defined as
Option A:	the proportional change in supply voltage magnitude associated with a defined change in load current
Option B:	the proportional change in supply frequency associated with a defined change in load current
Option C:	the proportional change in current magnitude associated with a defined change in load voltage
Option D:	the proportional change in resistance magnitude associated with a defined change in load current
50.	An ideal compensator consumes
Option A:	low power
Option B:	high power
Option C:	very high power
Option D:	zero average power
51.	The degree of voltage variation is assessed at
Option A:	Point of common coupling
Option B:	Supply point
Option C:	Load end
Option D:	Receiving end
52.	For a transmission line connecting two systems,which is the best location for var compensation?
Option A:	Load end
Option B:	Source end
Option C:	Midpoint of the transmission line
Option D:	Junctions

53.	Shunt connected, fixed or mechanically switched reactors are applied to:
Option A:	minimize line overvoltage under light load conditions
Option B:	maximize line overvoltage under light load conditions
Option C:	maintain voltage levels under heavy load conditions
Option D:	maximize voltage levels under heavy load conditions
54.	For a radial feed to the load,which is the best location for var compensation?
Option A:	Load end
Option B:	Source end
Option C:	Midpoint of the transmission line
Option D:	Junctions
55.	The basic idea behind series capacitive compensation is to _____the overall effective series transmission impedance from the sending end to the receiving end.
Option A:	increase
Option B:	decrease
Option C:	maintain constant
Option D:	nullify
56.	For increasing the voltage stability limit of overhead transmission,which compensation is more effective?
Option A:	Shunt compensation
Option B:	Series and Shunt Compensation
Option C:	Neither Series nor Shunt Compensation
Option D:	Series Compensation
57.	The basic concept of voltage and phase angle regulation is the addition of an appropriate in-phase or a quadrature component to the prevailing terminal voltage in order to
Option A:	increaseits magnitude or angle to the value specified (or desired).
Option B:	decreaseits magnitude or angle to the value specified (or desired).
Option C:	Increase or decrease its magnitude or angle to the value specified (or desired).
Option D:	maintain constant value
58.	Reason for the application of Thyristor-Controlled Voltage and Phase Angle Regulators instead of mechanical on-load tap changers is
Option A:	reliability
Option B:	highspeed of response necessary for dynamic system control.
Option C:	long life
Option D:	flexible operation
59.	The Unified Power Flow Controller (UPFC) concept was proposed by
Option A:	Gyugyi
Option B:	Hingorani
Option C:	Larsen
Option D:	Nyati
60.	UPFC can control
Option A:	Real power and reactive power independently

Option B:	Real power only
Option C:	Reactive power only
Option D:	Neither real nor reactive power

Q2	**Solve any Two Questions out of Three** **10 marks each**
1.	Explain the various parameters which limit the loading capabilities of transmission line.
2.	Explain load compensation and the objectives of load compensation.
3.	Explain the methods of controllable var generation.
4.	Explain the various parameters which limit the loading capabilities of transmission line.
5.	Explain load compensation and the objectives of load compensation.
6.	Explain the methods of controllable var generation.
7.	Explain power flow through mesh transmission line
8.	Explain switching converter type series compensation (SSSC)
9.	Explain power flow through mesh transmission line
10.	Explain switching converter type series compensation (SSSC)
11.	Explain the Thyristor Controlled Phase Angle Regulator (TCPAR).
12.	Explain the Unified Power Flow Controller (UPFC) with its phasor diagram.

	Solve any **5 marks each**
1.	Explain why we need transmission interconnections.
2.	Draw and explain reactive power characteristics ($V-Q$) with a varying inductive load.
3.	Explain midpoint voltage regulation of line segmentation.
4.	Explain the basic operating principle of UPFC
5.	What is meant by reactive power biasing?
6.	Explain the properties of Ideal Compensator
7.	Explain why we need transmission interconnection?
8.	What is load compensation? State its objective
9.	What are the objectives of shunt compensation?

10	What are the objectives of series compensation?
11	Explain the Thyristor controlled Phase Angle Regulator
12	Explain the importance of UPFC
13	Explain the basic operating principle of UPFC
14	What is meant by reactive power biasing?
15	Explain the properties of Ideal Compensator