Subject : Electrical power generation (22327)

SYLLABUS

Chapter No.	Name of chapter	Marks With Option
1	Thermal Power Plant	22
2	Large and Micro hydro Power Plant	20
3	Solar and Biomass Power Plant	22
4	Wind Power Plant	18
5	Economics of Power Generation and Interconnected load	20
	Total Marks :-	102

BOARD THEORY PAPER PATTERN FOR ALL BRANCHES

Q.1		**Attempt any FIVE**	**5*2=10**
	a)	Thermal Power Plant	
	b)	Large and Micro hydro Power Plant	
	c)	Large and Micro hydro Power Plant	
	d)	Solar and Biomass Power Plant	
	e)	Solar and Biomass Power Plant	
	f)	Wind Power Plant	
	g)	Economics of Power Generation and Interconnected load	
Q.2		**Attempt any THREE**	**3*4=12**
	a)	Thermal Power Plant	
	b)	Large and Micro hydro Power Plant	
	c)	Large and Micro hydro Power Plant	
	d)	Economics of Power Generation and Interconnected load	
Q.3		**Attempt any THREE**	**3*4=12**
	a)	Thermal Power Plant	
	b)	Large and Micro hydro Power Plant	
	c)	Solar and Biomass Power Plant	
	d)	Wind Power Plant	
Q.4		**Attempt any FOUR**	**3*4=12**
	a)	Thermal Power Plant	
	b)	Solar and Biomass Power Plant	
	c)	Wind Power Plant	
	d)	Economics of Power Generation and Interconnected load	
	e)	Economics of Power Generation and Interconnected load	

Q.5		**Attempt any TWO** **2*6=12**
	a)	Thermal Power Plant
	b)	Large and Micro hydro Power Plant
	c)	Solar and Biomass Power Plant
Q.6		**Attempt any FOUR** **2*6=12**
	a)	Large and Micro hydro Power Plant
	b)	Solar and Biomass Power Plant
	c)	Economics of Power Generation and Interconnected load

CLASS TEST - I
PAPER PATTERN

Syllabus:-

Unit No.	Name of the Unit	Course Outcome (CO)
1	Thermal Power Plant	CO.327.1
2	Large and Micro hydro Power Plant	CO.327.2

Q.1	Attempt any FOUR 4*2=8Marks	Course Outcome (CO)
a)	Thermal Power Plant	CO.327.1
b)	Large and Micro hydro Power Plant	CO.327.2
c)	Thermal Power Plant	CO.327.1
d)	Large and Micro hydro Power Plant	CO.327.2
e)	Thermal Power Plant	CO.327.1
f)	Large and Micro hydro Power Plant	CO.327.2
Q.2	Attempt any THREE 3*4=12 Marks	
a)	Thermal Power Plant	CO.327.1
b)	Thermal Power Plant	CO.327.1
c)	Thermal Power Plant	CO.327.1
d)	Large and Micro hydro Power Plant	CO.327.2

CLASS TEST - II
PAPER PATTERN

Syllabus:-

Unit No.	Name of the Unit	Course Outcome (CO)
3	Solar and Biomass Power Plant	CO.327.3
4	Wind Power Plant	CO.327.4
5	Economics of Power Generation and Interconnected load	CO.327.5

Q.1	Attempt any FOUR 4*2=8Marks	Course Outcome (CO)
a)	Solar and Biomass Power Plant	CO.327.3
b)	Wind Power Plant	CO.327.4
c)	Economics of Power Generation and Interconnected load	CO.327.5
d)	Solar and Biomass Power Plant	CO.327.3
e)	Solar and Biomass Power Plant	CO.327.3
f)	Solar and Biomass Power Plant	CO.327.3
Q.2	Attempt any THREE 3*4=12 Marks	
a)	Solar and Biomass Power Plant	CO.327.3
b)	Solar and Biomass Power Plant	CO.327.3
c)	Wind Power Plant	CO.327.4
d)	Economics of Power Generation and Interconnected load	CO.327.5

COURSE OUTCOME (CO)

COURSE: - Electrical power Generation (22327) **PROGRAMME: - ALL**

CO.NO	Course Outcome
CO-327.1	Maintain the optimized working of the thermal Power plant
CO-327.2	Maintain the optimized working of the large and micro hydro Power plant
CO-327.3	Maintain the optimized working of the solar and biomass base Power plant
CO-327.4	Maintain the optimized working of Wind Power plant
CO-327.5	Select the adequate mix of power generation based on economics operation

1. THERMAL POWER PLANT

Position in Question Paper **Total Marks-22**

Q.1. a) 2-Marks.
Q.1. b) 2-Marks.
Q.2. a) 4-Marks.
Q.3. a) 4-Marks.
Q.3. d) 4-Marks.
Q.4. a) 6-Marks.

Descriptive Question

1. Describe in brief the various thermal plants.
2. Describe various fuels and their properties in case of thermal plant.
3. Draw a neat layout of thermal steam turbine power station.
4. Give comparison of Fire Tube Boiler and Water Tube Boiler.
5. state advantages of economizer.
6. Draw a simple line diagram representing the power production by thermal system.
7. List & explain the factors for selection of site for gas power plant.
8. State the fuels used in gas turbine power plant.
9. Draw layout of gas turbine power plant.
10. with suitable diagram explain the working of gas turbine power plant.
11. Write advantages and disadvantages of open cycle gas turbine
12. State the application of gas turbine plant.
13. state any 4 gas turbine power plants in India with their capacity.
14. Draw the block diagram of diesel electrical power plant.
15. In case of diesel electric power station explain engine lubricating oil system

MCQ Question

(Total number of Question=Marks*3=22*3=66)

Note: Correct answer is marked with **bold.**

1. In steam power plant which of the following component needs more maintenance:
   a) Condenser
   b) Boiler
   c) Turbine
   d) Coal carrying system
2. The pH value of the water used in boiler is:
   a) Unity
   b) 7
   c) Slightly less than seven
   d) Slightly more than se
3. For the flue gas flow, tick the correct sequence:
   a) Boiler-Air preheater- economizer- ID fan- Chimney
   b) Boiler- ID fan -Air preheater- Economizer- Chimney
   c) **Boiler- Economizer- Air preheater- ID fan- Chimney**
   d) None of the above
4. Hydrogen cooling employed in large thermal power plant alternator:
   a) Increases the insulation life
   b) Decreases the insulation life
   c) Does not affect the insulation life
   d) None of the above
5. Hydrogen cooling is employed in:
   a) Turbo Generators only
   b) Water wheel Generators only
   c) Can b used in both turbo generators and water wheel generators
   d) None of the above
6. The efficiency of the electro static precipitators will be of the order:
   a) 99.6%
   b) 90%
   c) 85%
   d) 80%
7. Economizer is normally employed when boiler pressure exceeds:
   a) 70 kg/cm2
   b) 50 kg/cm2
   c) 30 kg/cm2
   d) Can be used for all pressures
8. The sizing of the generator in power plant is based on:
   a) Current carrying capacity ratings only
   b) Insulation strength ratings only
   c) Both (a) and (b)
   d) None of the above
9. Without Electro static precipitators:

a) ID fan rating should be increased
b) Economizer rating should be increased
c) Chimney height should be reduced
d) none of the above

10. In thermal power plants the condenser used is of:
a) Surface type
b) Jet type
c) Can be both surface type and jet type
d) None of the above

11. Coal rank classifies coal as per its:
a) Specific gravity
b) Degree of metamorphism
c) Carbon percentage
d) Ash content

12. Induced draft fans are used to:
a) Cool the steam let out by the turbine in the thermal power station
b) Cool the hot gases coming out of boiler
c) Forces the air inside the coal furnace
d) Pull the gases out of furnace

13. Generally the speed of turbine generators employed in thermal power plants will be in the range of:
a) 750 rpm
b) 1000 rpm
c) 3000 rpm
d) 5000 rpm

14. Large size thermal power plants will be:
a) peak load plants
b) Base load plants
c) Can be operate either as peak load
or base load plants
d) None of the above

15. The auxiliary consumption of thermal power plants will be in the range:
a) 2-5% of plant power generated
b) 8-10% of power generated
c) 15-20% of power generated
d) 20-25% of power generated

16. Which of the following equipment is installed in steam power plant to reduce air pollution:
a) Air filer
b) HEPA filter
c) Electro static precipitator
d) All the above can be used

17. Burning of low grade coal can be improved by:
a) Pulverizing the coal
b) Blending with high quality coal
c) Oil assisted ignition
d) All the above

18. Equipment used for pulverizing the coal is:

a) hopper
c) Ball mill
b) Stoker
d) Electro static precipitator

19. The percentage of carbon in anthracite is usually:
a) More than 90%
c) About 50%
b) About 70%
d) Below 40%

20. for the same power the size of the turbine:
a) Increases with speed
c) Constant irrespective of speed
b) Decreases with speed
d) None of the above

21. Which type of coal has lowest calorific value?
a) Peat
c) Bituminous
b) Lignite
d) Anthracite

22. Pipes carrying steam in thermal power plant are generally made of:
a) Steel
c) aluminium
b) Cast iron
d) Cobalt

23. Economizer of boiler has main function of:
a) Heat up the incoming water with excess steam
b) Heat up the pulverized fuel by exhaust gases
c) Heat up the incoming air by exhaust gases
d) Heat up the incoming water by exhaust gases

24. In a super heater:
a) Pressure rises and temperature drops
b) Temperature rises and pressure drops
c) Temperature rises and pressure remains unchanged
d) Pressure rises and temperature remains the same

25. Steam turbine works on the principle of:
a) carnot cycle
c) rankine cycle
b) brayton cycle
d) None of the above

26. The steam power plant efficiency can be improved by:
a) Using large quantity of water
b) Burning large quantity of coal
c) Using high temperature and pressure of steam
d) Decreasing the load on the plant

27. As the size of the thermal power plant increases, the capital cost per kW of installed capacity:
a) Increases
c) Remains the same
b) Decreases
d) May increase and decrease

28. Vacuum can be measured by using:

a) rotameter
c) U tube manometer
b) pitot tube
d) ventrimeter

29. Electrostatic precipitator is installed between:
a) Induced fan and chimney
c) Economizer and air preheater
b) air preheater and induced fan
d) Boiler furnace and economiser

30. Belt conveyors can be employed for transporting coal at inclination up to:
a) 75 deg
c) 30 deg
b) 60 deg
d) 15 deg

31. In a shell and tube surface condenser:
a) Steam passes through the tubes and cooling water surrounds them
b) Cooling water passes through the tubes and steam surrounds them
c) Steam and water mix to give condensate
d) None of the above

32. The purpose of Spray pond in Thermal power plant is:
a) To deposit the ash coming out of the thermal power plant
b) To cool the water coming out of condensate
c) To remove the dissolved gases in the feed water
d) None of the above

33. For the forced draft the blower is located:
a) At the top of the chimney
c) Near the base of the boiler
b) Near the base of the chimney
d) None of the above

34. It is important the heat the water before feeding to boiler because:
a) The dissolved gases which corrodes the boiler are removed
b) Thermal stresses arises due to the cold water entering the boiler can be reduced
c) Some impurities carried by steam and condensate due to corrosion in boiler and condenser are precipitated outside the boiler
d) All the above

35. Which type of alternator is employed in thermal power plant?
a) Salient type
c) Both can be used
b) Non salient pole type
d) None of the above

36. The indication to determine the incomplete combustion is:
a) High percentage of carbon dioxide content in the flue gases
b) High percentage of CO content in the flue gases
c) High temperature of the flue gases
d) All the above

37. For the same drought required, the power of forced draught fan will be __ than the induced draught fan:

a) Higher
b) Lower
c) The same
d) May be more or less

38. What are the combustible elements in the fuel:
a) Carbon and hydrogen
b) Carbon, hydrogen and ash
c) Carbon, hydrogen and sulphur
d) None of the above

39. The efficiency of the thermal power plant is of the order:
a) 15%
b) 30%
c) 50%
d) 60%

40. The coal which has highest ash content is:
a) Lignite
b) Coke
c) Bituminous coal
d) Peat

41. The commercial sources of energy are
a) solar, wind and biomass
b) fossil fuels, hydropower and nuclear energy
c) wood, animal wastes and agriculture wastes
d) none of the above

42. In India largest thermal power station is located at
a) Kota
b) Sarni
c) Chandrapur
d) Neyveli

43. The percentage O2 by Weight in atmospheric air is
a) 18%
b) 23%
c) 77%
d) 79%

44. The percentage 02 by volume in atmosphere air is
a) 21%
b) 23%
c) 77%
d) 79%

45. The proper indication of incomplete combustion is
a) high CO content in flue gases at exit
b) high CO2 content in flue gases at exit
c) high temperature of flue gases
d) the smoking exhaust from chimney

46. The main source of production of biogas is
a) human waste
b) wet cow dung
c) wet livestock waste
d) all above

47. India's first nuclear power plant was installed at
a) Tarapore
b) Kota
c) Kalpakkam
d) none of the above

48. Solar thermal power generation can be achieved by
a) using focusing collector or heliostates
b) using flat plate collectors
c) using a solar pond
d) any of the above system

49. The energy radiated by sun on a bright sunny day is approximately
a) 700 W/m2
b) 800 W/m2
c) 1 kW/m2
d) 2 kW/m2

50. Thorium Breeder Reactors are most suitable for India because
a) these develop more power

b) its technology is simple
c) abundance of thorium deposits are available in India
d) these can be easily designed

51. The overall efficiency of thermal power plant is equal to
a) Rankine cycle efficiency
b) Carnot cycle efficiency
c) Regenerative cycle efficiency
d) Boiler efficiency x turbine efficiency x generator efficiency

52. Rankine cycle efficiency of a good steam power plant may be in the range of
a) 15 to 20 per cent
b) **35 to 45 per cent**
c)70 to 80 per cent
d)90 to 95 per ceu

53. Rankine cycle operating on low pressure limit of p1 an 1 high pressure limit of p2has higher the renal efficiency than the carnot cycle operating between same pressure limits
a) has lower the"nal efficiency than carnot cycle operating between same pressure limit?
b) has same thermal efficiency as carnot cycle operating between same pressure limits
c) may be more or less depending upon the magnitude of p1 and p2

54. Rankine efficiency of a steam power plant
a) improves in summer as compared to that in winter
b) improves in winter as compared to that in summer
c) is unaffected by climatic conditions
d) none of the above

55. Carnot cycle comprises of
a) two isentropic processes and two constant volume processes
b) two isentropic processes and two constant pressure processes
c) two isothermal processes and three constant pressure processes
d) none of the above

56. In Rankine cycle the work output from the turbine is given by
a) change of internal energy between inlet and outlet
b) change of enthaply between inlet and outlet
c) change of entropy between inlet and outlet
d) change of temperature between inlet and outlet

57. Regenerative cycle thermal efficiency
a) is always greater than simple Rankine thermal efficiency
b) is greater than simple Rankine cycle thermal efficiency only when steam is bled at particular pressure
c) is same as simple Rankine cycle thermal efficiency
d) is always less than simple Rankine cycle thermal efficiency

58. In a regenerative feed heating cycle, the optimum value of the fraction of steam extracted for feed heating
a) decreases with increase in Rankine cycle efficiency
b) increases with increase in Rankine cycle efficiency
c) is unaffected by increase in Rankine cycle efficiency
d) none of the above

59. In a regenerative feed heating cycle, the greatest economy is affected
a) when steam is extracted from only one suitable point of steam turbine
b) when steam is extracted from several places in different stages of steam turbine
c) when steam is extracted only from the last stage of steam turbine

60. when steam is extracted only from the first stage of steam turbineThe maximum percentage gain in Regenerative feed heating cycle thermal efficiency
a) increases with number of feed heaters increasing
b) decreases with number of feed heaters increasing
c) remains same unaffected by number of feed heaters
d) none of the above

61. In regenerative cycle feed water is heated by
a) exhaust gases
b) heaters
c) draining steam from the turbine
d) all above

62. Reheat cycle in steam power plant is used to
a) utilise heat of flue gases
b) increase thermal efficiency
c) improve condenser performance
d) reduce loss of heat

63. Mercury is a choice with steam in binary vapour cycle because it has
a) higher critical temperature and pressure
b) higher saturation temperature than other
c) relatively low vapourisation pressure
d) all above

64. Binary'vapour cycles are used to
a) increase the performance of the condens
b) increase the efficiency of the plant
c) increase efficiency of the turbine

65. A steam power station requires space
a) equal to diesel power station
b) more than diesel power stationless than diesel power station

66. Economiser is used to heat
a) air
b) feed water
c) flue gases
d) all above

2.LARGE AND MICRO HYDRO POWER PLANT

Position in Question Paper **Total Marks-20**

Q.1. a) 2-Marks.
Q.2. a) 4-Marks.
Q.3. a) 4-Marks.
Q.3. d) 4-Marks.
Q.4. a) 6-Marks.

Descriptive Question

1. Write note on energy conservation process of hydropower plant.
2. Give the classification of hydroelectric power plants.
3. what is the range of capacity for
   a) large hydro
   b) Medium hydro
   c) Small hydro
   d) Mini hydro and micro hydro plant
4. Write note on mini/micro hydro power plants.
5. write the details of bulb turbine for mini hydro project
6. Draw a general layout of hydro power plant.
7. Give the meaning of the following terms in hydro power plant
   (a) Reservoir (b) Dam (c) Trash rock
8. Give various types of turbine used in hydroelectric power plant.
9. Compare impulse turbine and reaction turbine.
10. Explain Peloton wheel.
11. Explain Francis turbine.
12. Explain Kaplan turbine.
13. Compare Francis and Kaplan turbines.
14. with sketch explain pumped storage power plant.
15. Give advantages of pumped storage power plant.

MCQ Question

(Total number of Question=Marks*3=20*3=60)

Note: Correct answer is marked with **bold.**

1. The modern steam turbines are
   a)impulse turbines
   b) reaction turbines
   c)impulse-reaction turbines
   d) none of the above
2. The draught which a chimney produces is called
   a) induced draught
   b) natural draught
   c) forced draught
   d) balanced draught
3. The draught produced by steel chimney as compared to that produced by brick chimney for the same height is
   a) less
   b) more
   c) same
   d) may be more or less
4. In a boiler installation the natural draught is produced
   a) due to the fact that furnace gases being light go through the chimney giving place to cold air from outside to rush in
   b) due to the fact that pressure at the grate due to cold column is higher than the pressure at the chimney base due to hot column
   c) due to the fact that at the chimney top the pressure is more than its environmental pressure
   d) all of the above
5. The draught produced, for a given height of the chimney and given mean temperature of chimney gases
   a) decreases with increase in outside air temperature
   b) increases with increase in outside air temperature
   c) remains the same irrespective of outside air temperaturemay increase or
   d) decrease with increase in outside air temperature
6. The draught produced by chimney of given height at given outside temperature
   a) decreases if the chimney gas temperature increases
   b) increases if the chimney gas temperature increases
   c) remains same irrespective of chimney gas temperature
   d) may increase or decrease
7. For forced draught system, the function of chimney is mainly
   a) to produce draught to accelerate the combustion of fuel
   b) to discharge gases high up in the atmosphere to avoid hazard
   c) to reduce the temperature of the hot gases discharged
   d) none of the above
8. Artificial draught is produced by
   a) induced fan
   b) forced fan
   c) induced and forced fan
   d) all of the above
9. The draught in locomotive boilers is produced by

a) forced fan
b) chimney
c) steam jet
d) only motion of locomotive

10. For the same draught produced the power of induced draught fan as compared to forced draught fan is
a) less
b) more
c) same
d) not predictable

11. Artificial draught is produced by
a) air fans
b) steam jet
c) fan or steam jet
d) all of the above

12. The artificial draught normally is designed to produce
a) less smoke
b) more draught
c) less chimney gas temperature
d) all of the above

13. For the induced draught the fan is located
a) near bottom of chimney
b) near bottom of furnace
c) at the top of the chimney
d)anywhere permissible

14. The pressure at the furnace is minimum in case of
a) forced draught system
b) induced draught system
c) balanced draught system
d) natural draught system

15. The efficiency of chimney is approximately
a) 80%
b) 40%
c) 20%
d) **0.25%**

16. The isentropic expansion of steam through nozzle for the steam initially superheated at inlet is approximated by equation
a) pvls=C
b) pv1126 = C
c) pv1A = C
d) pv = C

17. The ratio of exit pressure to inlet pressure for maximum mass flow rate per unit area of steam through a nozzle when steam is initially dry saturated is
a) 0.6
b) 0.578
c)0.555
d)0.5457

18. The ratio of exit pressure to inlet pressure of maximum mass flow rate per area of steam through a nozzle when steam is initially superheated is
a) 0.555
b) 0.578
c)0.5457
d)0.6

19. The critical pressure ratio of a convergent nozzle is defined as
a) the ratio of outlet pressure to inlet pressure of nozzle
b) the ratio of inlet pressure to outlet pressure of nozzle
c) the ratio of outlet pressure to inlet pressure only when mass flow rate per unit area is minimum
d) the ratio of outlet pressure to inlet pressure only when mass flow rate = c

20. The isentropic expansion of steam through nozzle for the steam initially dry saturated at inlet is approximated by equation.
a) pv = C
b) (b)
c)pv1i = C
d)pv

21. The effect of considering friction losses in steam nozzle for the same pressure ratio leads to
a) increase in exit velocity from the nozzle
b) decrease in exit velocity from the nozzle
c) no change in exit velocity from the nozzle
d) increase or decrease depending upon the exit quality of steam

22. The effect of considering friction in steam nozzles for the same pressure ratio leads to
a) increase in dryness fraction of exit steam
b) decrease in dryness fraction of exit steam
c) no change in the quality of exit steam
d) decrease or increase of dryness fraction of exit steam depending upon inlet quality

23. In case of impulse steam turbine
a) there is enthalpy drop in fixed and movi
b) there is enthalpy drop only in moving bl
c) there is enthalpy drop in nozzles
d) none of the above

24. The pressure on the two sides of the impulse wheel of a steam turbine
a) is sameis different
b) increases from one side
c) decreases from one side to the other side

25. In De Laval steam turbine
a) the pressure in the turbine rotor is approximately same as in con¬denser
b) the pressure in the turbine rotor is higher than pressure in the con¬denser
c) the pressure in the turbine rotor gradually decreases from inlet to exit from condenser
d) none from the above

26. Incase of reaction steam turbine
a) there is enthalpy drop both in fixed and moving blades
b) there is enthalpy drop only in fixed blades
c) there is enthalpy drop only in moving blades
d) none of the above

27. Curtis turbine is
a) reaction steam turbine
b) pressure velocity compounded steam turbine
c) pressure compounded impulse steam turbine
d) velocity compounded impulse steam turbine

28. Rateau steam turbine is
a) reaction steam turbine
b) velocity compounded impulse steam turbine
c) pressure compounded impulse steam turbine
d) pressure velocity compounded steam turbine

29. Parson's turbine is
a) pressure compounded steam turbine
b) simple single wheel, impulse steam turbine
c) simple single wheel reaction steam turbine
d) multi wheel reaction steam turbine

30. For Parson's reaction steam turbine, degree of reaction is
a) 100%
b) **50%**
c)75%
d)100%

31. Reheat factor in steam turbines depends on
a) exit pressure only
b) stage efficiency only
c) initial pressures and temperature only
d) all of the above

32. The value of reheat factor normally varies from
a) 0.5 to 0.6
b) 0.9 to 0.95
c) **1.02 to 1.06**
d) 1.2 to 1.6

33. Steam turbines are governed by the following methods
a) Throttle governing
b) Nozzle control governing
c) By-pass governing
d) all of the above

34. In steam turbines the reheat factor
a) increases with the increase in number of stages
b) decreases with the increase in number of stages
c) remains same irrespective of number of stages
d) none of the above

35. The thermal efficiency of the engine with condenser as compared to without condenser, for a given pressure and temperature of steam, is
a) higher
b) lower
c) same as long as initial pressure and temperature
d) none of the above

36. In jet type condensers
a) cooling water passes through tubes and steam surrounds them
b) steam passes through tubes and cooling water surrounds them
c) steam and cooling water mix
d) steam and cooling water do not mix

37. In a shell and tube surface condenser
a) steam and cooling water mix to give the condensate
b) cooling water passes through the tubes and steam surrounds them
c) steam passes through the cooling tubes and cooling water surrounds them
d) all of the above varying with situation

38. In a surface condenser if air is removed, there is
a) fall in absolute pressure maintained in condenser
b) rise in absolute pressure maintained in condenser
c) no change in absolute pressure in the condenser
d) rise in temperature of condensed steam

39. cooling section in the surface condenser
a) increases the quantity of vapour extracted along with air
b) reduces the quantity of vapour extracted along with air
c) does not affect vapour quantity extracted but reduces pump capacity of air extraction
d) none of the above

40. The ratio of the volume of charge admitted at N.T.P. to the swept volume of the piston is called?
a) overall efficiency
b)mechanical efficiency
c) relative efficiency
d)**volumetric efficiency**

41. A moderator generally used in nuclear power plants is?
a) heavy water
b) concrete
c**) graphite & concrete**
d)graphite

42. In a diesel engine, the duration between the time of injection and ignition is known as?
a**) delay period**
b)period of ignition
c) burning period
d)pre-ignition period

43. Surge tank in Hydropower plant:
a) Is the main reservoir
c) Reduce surge frequency of electricity
b) Absorbs pressure swing
d) Is used with Kaplan turbines

44. Role of penstock:
a) Carries water to the turbine
b) Absorbs pressure swing
c) Is used with Kaplan turbines
d) Reduces load

45. Reaction turbines are employed for:
a)Low heads
b)Medium heads
c)Both of these
d)None of these

46. Impulse turbines are used for:
a)Low heads
b)Medium heads
c)Both of these
d)None of these

3. Solar and Biomass Power Plant

Position in Question Paper **Total Marks-22**

Q.1. a) 2-Marks.
Q.1. b) 2-Marks.
Q.2. a) 4-Marks.
Q.3. a) 4-Marks.
Q.3. d) 4-Marks.
Q.4. a) 6-Marks.

Descriptive Question

1. State the principal of solar cell and give its ratings.
2. Draw the block diagram of solar system used for generation of electrical energy.
3. what is solar collector? Give any three advantages of collecting collector over flat type collector.
4. Describe the basic principle, construction and working of photovoltaic cell.
5. Explain the characteristics of solar cell.
6. what are the different types of materials used for the solar photovoltaic?
7. Explain stand- alone type photovoltaic power plant with block diagram.
8. Define: Diffuse radiation, solar constant.
9. Explain how power is generated using solar energy.
10. Draw the block diagram of electricity generation using biomass.
11. Draw the schematic of municipal waste thermo chemical based power plant. Also explain the process.
12. Write the advantages and examples of biomass fuels.

MCQ Question

(Total number of Question=Marks*3=22*3=66)

Note: Correct answer is marked with **bold.**

1. Direct Solar energy is used for
   a) Water heating
   b) Distillation
   c) Drying
   d) **All of the above**
2. The power from the sun intercepted by the earth is approximately
   a) 1.8 x 108 MW
   b) 1.8 x 1011 MW
   c) 1.8 x 1014 MW
   d) 1.8 x 1017 MW
3. The following is indirect method of Solar energy utilization
   a) Wind energy
   b) Biomass energy
   c) Wave energy
   d) All of the above
4. A liquid flat plate collector is usually held tilted in a fixed position, facing _____ if located in the northern hemisphere.
   a) North
   b) South
   c) East
   d) West
5. The collection efficiency of Flat plate collector can be improved by
   a) putting a selective coating on the plate
   b) evacuating the space above the absorber plate
   c) both (A) and (B)
   d) None of the above
6. The efficiency of various types of collectors _____ with _____ temperature.
   a) increases, decreasing
   b) decreases, increasing
   c) remains same, increasing
   d) depends upon type of collector
7. Maximum efficiency is obtained in
   a) Flat plate collector
   b) Evacuated tube collector
   c) Line focussing collector
   d) Paraboloid dish collector
8. The following type of energy is stored as latent heat
   a) Thermal energy
   b) Chemical energy
   c) Electrical energy
   d) Mechanical energy
9. Which of the following type of collector is used for low temperature systems?
   a) Flat plate collector
   b) Line focussing parabolic collector
   c) Paraboloid dish collector
   d) All of the above
10. In the paraboloid dish concept, the concentrator tracks the sun by rotating about
   a) One axes
   b) Two axes
   c) Three axes
   d) None of the above
11. The sun subtends an angle of _____ minutes at the earth's surface.
   a) 22
   b) 32
   c) 42
   d) 52
12. The value of Solar Constant is

a) 1347 W/m2
c) 1367 W/m2
b) 1357 W/m2
d) 1377 W/m2

13. The extraterrestrial radiation flux varies by ____ % over a year.
a) ± 1.1
c) ± 3.3
b) ± 2.2
d) ± 4.4

14. The following is (are) laws of black body radiation.
a) Plank's law
c) both (A) and (B)
b) Stefan-Boltzmann law

15. Absorption of Solar radiations at earth's surface occur due to presence of
a) Ozone
c) Carbon di-oxide
b) Water vapours
d) All of the above

16. Global radiation =
a) Direct radiation – Diffuse Radiation
b) Direct radiation + Diffuse Radiation
c) Direct radiation / Diffuse Radiation
d) Diffuse Radiation / Direct radiation

17. The zenith angle is the angle made by the sun's rays with the ____ to a _____ surface.
a) normal, horizontal
c) normal, vertical
b) tangent, horizontal
d) tangent, vertical

18. The angle made by the plane surface with the horizontal is known as
a) Latitude
c) Surface azimuth angle
b) Slope
d) Declination

19. The angle made in the horizontal plane between the horizontal line due south and the projection of the normal to the surface on the horizontal plane is
a) Hour angle
c) Surface azimuth angle
b) Declination
d) Solar altitude angle

20. Surface azimuth angle varies from
a) 0 to 90°
c) 0 to 180°
b) -90 to 90°
d) -180° to 180°

21. The hour angle is equivalent to
a) 10° per hour
b) 20° per hour
b) 15° per hour
d) 25° per hour

22. The complement of zenith angle is
a) Solar altitude angle
c) Solar azimuth angle
b) Surface azimuth angle
d) Slope

23. The correction has a magnitude of ___ minutes for every degree difference in longitude.
a) 2
c) 6
b) 4
d) 8

24. The global radiation reaching a horizontal surface on the earth is given by
a) Hourly beam radiation + Hourly diffuse radiation
b) Hourly beam radiation – Hourly diffuse radiation

c) Hourly beam radiation / Hourly diffuse radiation
d) Hourly diffuse radiation / Hourly beam radiation

25. The ratio of the beam radiation flux falling on a tilted surface to that falling on a horizontal surface is called the
a) Radiation shape factor
b) Tilt factor
c) Slope
d)None of the above

25. Which of the following is used to make a glass-glass evacuated tubes?
a) Borosilicate glass
b) Carbon
c) **Wood**
d) Plastic coating

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b) Because evacuated tube collector is compact
c) Because of the vacuum gap in evacuated tube collectors
d) Because of the vacuum gap in flat plate collector

28. _____ lose more heat to the environment than evacuated-tube solar collectors.
a) Photovoltaics
b) Solar stills
c) Solar air conditioners
d) Flat-plate collectors

29. Which of the following are combined to form an evacuated flat plate solar collector?
a) Flat plate solar collectors and evacuated-tube solar collectors
b) Flat plate solar collectors and bowl collectors
c) Bowl collectors and evacuated-tube solar collectors
d) Polymer collectors and bowl collectors

30. Which of the following provides highest energy conversion efficiency in non-concentrating solar collectors?
a) Flat plate collectors
b) Evacuated flat plate collectors
c) Evacuated-tube collectors
d) Parabolic collectors

31. What is the metal sheet absorber surrounded with in an evacuated flat plate collector?
a) Low volume inside flat envelope
b) Low vacuum inside curved envelope
c) **High vacuum inside flat envelope**
d) Low vacuum inside thick curved envelope

32. Which of the following organisations developed first high vacuum insulation?
a) NASA
b) IIT
c) Stanford
d) CERN

33. Why does an evacuated flat plate collector require a glass-metal seal?
a) To join the glass plate to the rest of metal envelope
b) To join the glass plate to a part of metal envelope
c) To disconnect the glass plate to the rest of plastic envelope
d) To disconnect the glass plate to the rest of metal envelope

34. Which of the following pumps is used in an evacuated-tube solar collector?
a) Non-evaporable getter
c) Heat pump
b) Flash getter pump
d) Water pump

35. Edward's air pump
a) removes air and also vapour from condenser
b) removes only air from condenser
c) removes only un-condensed vapour from condenser
d) removes air alongwith vapour and also the condensed water from condenser

36. In a steam power plant, the function of a condenser is
a) to maintain pressure below atmospheric to increase work output from the primemover
b) to receive large volumes of steam exhausted from steam prime mover
c) to condense large volumes of steam to water which may be used again in boiler
d) all of the above

37. In a regenerative surface condenser
a) there is one pump to remove air and condensate
b) there are two pumps to remove air and condensate
c) there are three pumps to remove air, vapour and condensate
d) there is no pump, the condensate gets removed by gravity

38. Evaporative type of condenser has
a) steam in pipes surrounded by water
c) either (a) or (b)
b) water in pipes surrounded by steam
d) none of the above

39. Pipes carrying steam are generally made up of
a) steel
c) copper
b) cast iron
d) aluminium

40. For the safety of a steam boiler the number of safety valves fitted are
a) four
c) two
b) three
d) One

41. Steam turbines commonly used in steam power station are
a) condensing type
c) none of the above
b) non-condensing type

42. Belt conveyer can be used to transport coal at inclinations upto
(a) **30°**
(c) 80°
(b) 60°
(d) 90°

43. The maximum length of a screw conveyer is about
a) 30 metres
c) 60 metres
b) 40 metres
d) 100 metres

44. The efficiency of a modern boiler using coal and heat recovery equipment is about
(a) 25 to 30%
(c) 65 to 70%
(b) 40 to 50%
(d) **85 to 90%**

45. The average ash content in Indian co als is about
(a) 5%
(c) 15%
(b) 10%
(d) 20%

46. Load center in a power station is
a) center of coal fields
b) center of maximum load of equipments

c)center of gravity of electrical system

47. Steam pressure in a steam power station, which is usually kept now-a-days is of the order of
a) 20 kgf/cm2
b) 50 kgf/cm2
c) 100 kgf/cm2
d) 150 kgf/cm2

48. Economisers improve boiler efficiency by
a) 1 to 5%
c) 10 to 12%
b) 4 to 10%

49. The capacity of large turbo-generators varies from
a) 20 to 100 MW
b) 50 to 300 MW
c) 70 to 400 MW
d) 100 to 650 MW

50. Caking coals are those which
a) burn completely
b) burn freely
c) do not form ash
d) form lumps or masses of coke

51. Primary air is that air which is used to
a) reduce the flame length
b) increase the flame length
c) transport and dry the coal
d) provide air around burners for get¬ting optimum combustion

52. Secondary air is the air used to
a) reduce the flame length
b) increase the flame lengthtransport and dry the coal
c) provide air round the burners for getting optimum combustion

53. In coal preparation plant, magnetic separators are used to remove
a) dust
b) clinkers
c) iron particles
d) Sand

54. Load carrying capacity of belt conveyor is about
a) 20 to 40 tonnes/hr
b) 50 to 100 tonnes/hr
c) 100 to 150 tonnes/hr
d) 150 to 200 tonnes/hr

55. Method which is commonly applied for unloading the coal for small power plant is
a) lift trucks
b) coal accelerators
c) tower cranes
d) belt conveyor

56. Bucket elevators are used for
a) carrying coal in horizontal direction
b) carrying coal in vertical direction
c) carrying coal in any direction

57. The amount of air which is supplied for complete combustion is called
a) primary air
b) secondary air
c) tertiary air

58. In_____system fuel from a central pulverizing unit is delivered to a bunker and then to the various burners
a) unit
b) central
c)none of the above

59. Under-feed stokers work best for_____coals high in volatile matter and with caking tendency
a) anthracite
b) lignite
c) semibituminous and bituminous

60. Example of overfeed type stoker is
a) chain grate
b) spreader
c) travelling grate
d) all of the above

61. Where unpulverised coal has to be used and boiler capacity is large, the stoker which is used is
a) underfeed stoker
b) overfeed stoker
c) any

62. TravelUng grate stoker can burn coals at the rates of
a) 50—75 kg/m per hour
b) 75—100 kg/m per hour
c) 100—150 kg/m per hour
d) 150—200 kg/m2 per hour

63. Blowing down of boiler water is the process
a) to reduce the boiler pressure
b) to increase the steam temperature
c) **to control the solid concentration in the boiler water by removing some of the concentrated saline water**
d) none of the above

64. Deaerative heating is done to
a) heat the water
b) heat the air in the water
c) remove dissolved gases in the water

65. Reheat factor is the ratio of
a) isentropic heat drop to useful heat drop
b) adiabatic heat drop to isentropic heat drop
c) cumulative actual enthalpy drop for the stages to total is isentropic enthalpy heat drop

66. The value of the reheat factor is of the order of
a) 0.8 to 1.0
b) 1.0 to 1.05
c) 1.1 to 1.5
d) above 1.5

67. Compounding of steam turbine is done for
a) reducing the work done
b) increasing the rotor speed
c) reducing the rotor speed
d) balancing the turbine

4. Wind Power Plant

Position in Question Paper **Total Marks-18**

Q.1. a) 2-Marks.
Q.1. b) 2-Marks.
Q.2. a) 4-Marks.
Q.3. a) 4-Marks.
Q.4. a) 6-Marks.

Descriptive Question

1. write note on site selection for wind power plant
2. State various wind power stations, location and total capacity table.
3. Draw the block diagram of wind energy conversion, name the blocks .
4. Write note on gear wind power plant and direct drive plant.
5. Give the classification of wind turbine power plant.
6. Explain constant speed squirrel cage induction generator.
7. Explain constant speed wound rotor induction generator.
8. Explain doubly fed induction generator
9. Explain wound rotor synchronous generator plant.
10. Explain permanent magnet synchronous generator (PMSG) plant.
11. Draw a sketch and explain horizontal axis small wind turbine
12. Draw a sketch and explain vertical axis small wind turbine.
13. Give comparison between horizontal axis wind turbine and Vertical axis wind turbaned.
14. Compare fixed speed turbine and variable speed wind turbine.

MCQ Question

(Total number of Question=Marks*3=18*3=54)

Note: Correct answer is marked with **bold.**

1. Which of the following generation station has minimum running cost?

a) Thermal power station
b) **Hydro-electric power station**
c) Nuclear power station
d) None of these

2. Which of the following method of generating electric power from sea water is more advantageous?

a) Wave power
b) Ocean Currents
c) **Tidal power**
d) None of these

3. The principal type of failure in wind power generation is in

a) **Aerodynamic system**
b) Electrical system
c) Mechanical system
d) Both (b) and (c) above

4. The magnitude of power constant in wind mill depends on

a) Shape of rotor blades
b) **Wind velocity**
c) Orientation of rotor blades
d) Both (a) and (b) above

5. Wind energy

a) Is clean, almost free and domestically produced
b) Has higher cost comparatively
c) Develops power proportional to the power of the wind
d) **All of the above**

6. The rating of MHD generator per unit volume is proportional to

a) The electrical conductivity of the fluid
b) Square of the flow velocity of the fluid
c) Square of magnetic flux density
d) **All of these**

7. The conduction used in MHD generator is

a) **Gas**
b) Liquid
c) Copper
d) Aluminum

8. The current developed in MHD generators is

a) ac
b) pulsating
c) dc
d) Either (a) or (b) above

9. In MHD generation, emf induced is

a) Motionally induced emf
b) Static emf
c) Hall emf
d) Both (a) and (c) above

10. What is the inherent weakness of all wind machines?

a) Their efficiencies
b) Requires powerful winds to make fan rotate
c) Their dependency on the wind speed
d) Cannot be easily repaired

11. Why severe fluctuations in power are always undesirable in windmill?
a) Because they pose power oscillations problems
b) Damage of parts due to fluctuations
c) The efficiency of the plant will be reduced
d) Results in damage to the whole plant

12. Maintenance of constant output at all wind speeds above rating is called _____
a) Numeric rating scale
c) Flat Rating
b) Tenancy
d) TRP

13. A wind turbine designed too to come into operation at a minimum wind speed is called
a) Cut in velocity
c) Cut out velocity
b) Windward
d) Upwind location

14. Why is wind turbine designed to stop operation at cut out velocity?
a) To protect wheel against damage
b) To make a quick stop in emergencies
c) To improve the efficiency
d) In order to adjust the blades to wind direction

15. The fraction of time during a given period that the turbine is actually on line is called?
a) Availability factor
c) Cut in velocity
b) Flat rating
d) Cut out velocity

16. Over load factor is also called as _____
a) availability factor
c) flat rating
b) plant operating factor
d) cut out velocity

17. How many of windmills are there?
a) 2
c) 4
b) 3
d) 5

18. Name the windmill which has four blades mounted on a central post.
a) Post mill
c) Tower mill
b) Smock mill
d) Fan mill

19. The angle made by the plane surface with the horizontal is known as
a) Latitude
c) Surface azimuth angle
b) Slope
d) **Declination**

20. The angle made in the horizontal plane between the horizontal line due south and the projection of the normal to the surface on the horizontal plane is
a)Hour angle
c)Surface azimuth angle
b)Declination
d)Solar altitude angle

21. Surface azimuth angle varies from

a)0 to 90°
b)-90 to 90°
c)0 to 180°
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a) 10° per hour
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5. Economics of Power Generation and Interconnected load

Position in Question Paper **Total Marks-20**

Q.1. a) 2-Marks.
Q.2. a) 4-Marks.
Q.3. a) 4-Marks.
Q.3. d) 4-Marks.
Q.4. a) 6-Marks.

Descriptive Question

1.Define and explain the following terms

(a) Connected Load
(b) Firm power
(c) Cold / Hot reserve
(d) Spinning reserve

2.Define the following factors

(a) Demand factor
(b) Plant capacity factor
(c) Plant use factor
(d) Diversity factor
(e) Load factor
(f) Plant load factor

3.State the advantages of high load factor.

4.State the advantages and difficulties in choice of size and number of Generator units in a power plant.

5.State the factor for selecting number of generating units in a plant.

6.Explain base Load and peak load plants.

7.State the advantages of integrated system.

8.state the limitations of integrated system.

9.State the advantages of grid system.

10. State the causes of grid failure.

11. State the impacts of grid failure(fault).

12. what is Blackout and Brownout?

13. Compare Blackout and Brownout?

MCQ Question

(Total number of Question=Marks*3=20*3=60)

Note: Correct answer is marked with **bold.**

1. Load factor of a power station is generally_____?

A. equal to unity
C. more than unity
B. less than unity
D. equal to zero Diversity factor is always

2. In two part tariff, variation in load factor will affect_____?
A. fixed charges
C. both A. and (b)
B. operating or running charges
D. either A. or (b)

3. Which plant can never have 100 percent load factor?
A. Peak load plant
C. Nuclear power plant
B. Base load plant
D. Hydro electric plant

4. Which of the following generating station has minimum running cost ?
A. Nuclear
C. Thermal
B. Hydro
D. Diesel

5. Static capacitors are rated in terms of_____?
A. kW
C. kVAR
B. kWh
D. none of the above

6. For a power plant which of the following constitutes running cost?
A. Cost of wages
C. Cost of lubricants
B. Cost of fuel
D. All of the above

7. Generators for peak load plants are usually designed for maximum efficiency at_____?
A. 25 to 50 percent full load
C. full load
B. 50 to 75 percent full load
D. 25 percent overload

8. A power transformer is usually rated in_____?
A. kW
C. kWh
B. kVAR
D. kVA

9. Most efficient plants are normally used as_____?
A.peak load plants
C. either A. or (b)
B. base load plants
D. none of the above

10. In a load curve the highest point represents_____?
A. peak demand
C. diversified demand
B. average demand
D. none of the above

11. The primary reason for low power factor is supply system is due to installation of_____?

A. induction motors
B. synchronous motors
C. single phase motors
D. d.c. motors

12. The efficiency of a plant is of least concern when it is selected as_____?
A. peak load plant
C. either A. or (b)
B. casual run plant
D. base load plant

13. Which of the following is the disadvantage of static capacitor for power factor improvement?
A. Easily damaged by high voltage
C. Short service life
B. Cannot be repaired
D. All of the above

14. Which lightening stroke is most dangerous?
A. Direct stroke on line conductor
C. Direct stroke on tower top
B. Indirect stroke on conductor
D. Direct stroke on ground wire

15. For the same cylinder dimensions and speed, which of the following engine will produce least power?
A. Supercharged engine
D. All of the above engines will equal power
B. Diesel engine
C. Petrol engine

16. The expected useful life of an hydroelectric power station is around_____?
A. 15 years
C. 60 years
B. 30 years
D. 100 years

17. The load factor of domestic load is usually_____?
A. 10 to 15%
C. 50 to 60%
B. 30 to 40%
D. 60 to 70%

18. A load curve indicates_____?
A. average power used during the period
B. average kWh (kW) energy consumption during the period
C. either of the above
D. none of the above

19. A consumer has to pay lesser fixed charges in_____?
A. flat rate tariff
C. maximum demand tariff
B. two part tariff
D. any of the above

20. The area under a load curve gives_____?
A. average demand
C. maximum demand
B. energy consumed
D. none of the above

21. Diversity factor has direct effect on the_____?
A. fixed cost of unit generated
C. both A. and B.
B. running cost of unit generated
D. neither A. nor B.

22. Load curve is useful in deciding the_____?

A. operating schedule of generating units
B. sizes of generating units

C. total installed capacity of the plant
D. all of the above

23. Load curve of a power plant has always_____?
A. zero slope
B. positive slope
C. negative slope
D. All of these

24. Annual depreciation of the plant it proportional to the earning capacity of the plant vide
A. sinking fund depreciation
B. straight line depreciation
C. reducing balances depreciation
D. none of the above

25. Load curve helps in deciding_____?
A. total installed capacity of the plant
B. sizes of the generating units
C. operating schedule of generating units
D. all of the above

26. A low utilization factor for a plant indicates that
A. plant is used for stand by purpose only
B. plant is under maintenance
C. plant is used for base load only
D. plant is used for peak load as well as base load

27. Low power factor is usually not due to_____?
A. arc lamps
B. induction motors
C. fluorescent tubes
D. incandescent lamp

28. Direct conversion of heat into electrical energy is possible through_____?
A. fuel cells
B. solar cells
C. MHD generators
D. none of the above

29. power plant is expected to have the longest life?
A. Steam
B. Diesel
C. Hydroelectric
D. Any of the above

30. The increased load during summer months is due to_____?
A. increased business activity
B. increased water supply
C. increased use of fans and air conditioners
D. none of the above

31. _____is the reserved generating capacity available for service under emergency conditions which is not kept in operation but in working order.
A. Hot reserve
B. Cold reserve
C. Spinning reserve
D. Firm power

32. _____ industry has the least power consumption per ton of product?
A. Soap
B. Sugar
C. Vegetable oil
D. Caustic soda

33. In a power plant if the maximum demand on the plant is equal to the plant capacity, then

A. plant reserve capacity will be zero
B. diversity factor will be unity
C. load factor will be unity
D. load factor will be nearly 60%

34. For which of the following power plants highly skilled engineers are required for running the plants?
A. Solar power plants
B. Gas turbine power plants
C. Nuclear power plants
D. Hydro-electric power plants

35.Large capacity generators are invariably_____?
A. water cooled
B. natural air cooled
C. forced air cooled
D. hydrogen cooled

36. Which of the following is the disadvantage due to low power factor?
A. Poor voltage regulation
B. Increased transmission losses
C. High cost of equipment for a given load
D. All of the above

37.A synchronous condenser is virtually which of the following?
A. Induction motor
B. Under excited synchronous motor
C. Over excited synchronous motor
D. D.C. generator

38. A pilot exciter is provided on generators for which of the following reasons?

A. To excite the poles of main exciter
B. To provide requisite starting torque to main exciter
C. To provide requisite starting torque to generator
D. None of the above

39. Which of the following are not repayable after a stipulated period?
A. Shares
B. Fixed deposits
C. Cash certificates
D. Bonds

40. In power plants insurance cover is provided for which of the following?
A. Unskilled workers only
B. Skilled workers only
C. Equipment only
D. All of the above

41. When the demand of consumers is not met by a power plant, it will resort to which of the following?

A. Efficient plant operation
B. Power factor improvement at the , generators
C. Penalising high load consumers by increasing the charges for electricity
D. Load shedding

42. An alternator coupled to a _____ runs at slow speed, as compared to as compared to others.
A. diesel engine
B. hydraulic turbine
C. steam turbine
D. gas turbine

43. Which of the following is an advantage of static capacitor for power factor improvement?
A. Little maintenance cost
B. Ease in installation
C. Low losses
D. All of the above

44. The connected load of a IVMIM uir consumer is around_____?
A. 5 kW
B. 40 kV
C. 80 kW
D. 120 kW

45. Which of the following is not an operating cost?
A. Maintenance cost
B. Fuel cost
C. Salaries of high officials
D. Salaries of operating staff

46. In which'of the following power plants the maintenance cost is usually high?
A. Nuclear power plant
B. Hydro-electric power plants
C. Thermal power plants
D. Diesel engine power plants

47.With reference to a power station which of the following is not a fixed cost?
A. Fuel cost
B. Interest on capital
C. Insurance charges
D. Depreciation

48. In _____ fuel transportation cost is least.
A. nuclear power plants
B. diesel generating plants
C. steam power stations
D. None

49. Which of the following, in a thermal power plant, is not a fixed cost?
A. Fuel cost
B. Interest on capital
C. Depreciation
D. Insurance charges

50. Air will not be the working substance in which of the following?
A. Open cycle gas turbine
B. Closed cycle gas turbine
C. Diesel engine
D. Petrol engine

A. Interconnected systems have the advantage of
A. Reduced reserve plant capacity, capital cost per kW and economy in operation.
B.Improved load factor, diversity factor and operation efficiency and increased reliability of supply.
C.**All of the above.**
D.None of the above.

51. Major share of power generated in India is through which means?
A.Hydroelectric power plants.
B.Nuclear power plants.
C.**Thermal power plants.**
D.Gas turbine power plants.

52. What is the modern trend in electric power generation?
A.To have a large number of small size thermal plants located at different places.
B.To have large size thermal plants near load centre.

C.To have large size thermal plants located near coal fields.
D. **None of the above.**

53. Which among the following plants have the least operating cost?
A.Steam plants
B.Hydro plants
C.**Nuclear plants**
D.Diesel plants.

54. What are the essential requirements for power plants to be operated as peak load plants?
A. Capability of quick start, synchronisation and taking up of system load.
B. Quick response to load variations.
C. Low capital cost.
D**. All of these.**

55. In a steam power station, electric power is generated at what power?
A. 440 V
B. 1 kV
C. 11 kV
D**. 33 kV**

56. Annual operating cost of a generating plant consists of
A. Fixed charges.
B. Semi fixed charges.
C. Operating or running charges.
D**. All of these.**

57. For a nuclear plant, what is its useful life?
A. 10 years.
B. 30 years
C. 100 years
D. 60 years

59. Operating plant factor is
A.**Average load on the machine**
B.Ratio of average load to the plant capacity
C. Ratio of maximum load to peak load
D.Ratio of average load to maximum load