



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MECHANICAL ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	POWER PLANT ENGINEERING
Course Code	:	A70353
Class	:	IV B. Tech I Semester, JNTUH-R-15
Branch	:	Mechanical Engineering
Year	:	2018–2019
Course Coordinator	:	Mr. G.Sarat Raju, Assistant Professor, Department of Mechanical Engineering.
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Course Objective:

The Present course concentrates on developing basic understanding about various requirements that are involved in establishment of power plants. This course enables the student to explore requirements for the establishment of various types of power plants, their economic analysis and pollution effects. The course focuses on all fundamentals in establishing various types of steam, internal combustion engine, hydro electric and nuclear power plants. Also, in this course; students will gain a broad understanding of the power plant economics and environmental considerations. Student can understand and get knowledge about key factors and features, advantages and disadvantages of various types of power plants.

S No	QUESTION	Blooms Taxonomy level	Course Outcomes
UNIT - I			
STEAM POWER PLANT			
Part - A (Short Answer Questions)			
1	Define sources of energy.	Remember	1
2	What are the major sources of energy?	Understand	1
3	Mention the prime mover in steam power plant?	Understand	1
4	Write the function of super heater?	Understand	1
5	Write a function of a steam turbine.	Understand	1
6	List out the methods of coal handling.	Remember	2
7	List the different parts in steam power plant.	Remember	2
8	What is the function of a reheater?	Remember	2
9	Write the methods of coal storage?	Remember	2
10	Write the use of economizer.	Understand	2
11	What is the function of a coal crusher?	Understand	2
12	Name the 4 systems of ash handling.	Remember	3
13	What is the necessity of a stoker.	Understand	3

14	Name the types of mechanical dust collectors.	Remember	3
15	Define any 2 systems of ash handling.	Remember	3
16	What are the primary objects of water treatment?	Understand	4
17	Write the function of a steam turbine?	Understand	2
18	What is under feed fuel bed?	Understand	3
19	Write the function of an air heater.	Understand	2
20	Explain the function of a generator.	Understand	2
21	What is over feed fuel bed?	Remember	3
22	Write the function of cooling tower?	Understand	3
23	What is weather ability?	Understand	4
24	Define ash softening temperature?	Remember	4
25	What is float-sink test?	Understand	4
Part - B (Long Answer Questions)			
1	a) Discuss about the resources for power development in India? b) What is the present position of power in India?	Remember	2
2	Write briefly on fuel and combustion.	Understand	3
3	Write briefly on steam generators.	Understand	2
4	Write the different types of coal? Explain each.	Remember	3
5	Explain with a neat diagram of coal handling from coal mines to combustion chamber.	Understand	3
6	Explain different method of coal handling.	Remember	3
7	Write briefly about belt conveyors and screw conveyors.	Understand	3
8	Explain about ash handling system and different types of ash handling Equipments.	Understand	4
9	Explain with neat diagram working of different circuits in thermal power plants.	Understand	2
10	Explain bituminous coal, semi anthracite coal and anthracite coal.	Remember	3
11	Make neat sketch and explain the working of a) chain grate stoker (b) spreader stoker (c) multi retort stoker.	Understand	4
12	Write about over feed and under feed fuel beds.	Understand	4
13	What is cooling tower? Explain about cooling ponds, natural draught cooling and mechanical draught cooling towers.	Understand	4
14	Name the different types of pulverizing mills. Write briefly about bowl mill.	Understand	4
15	Describe various types of burners used to burn pulverized coal.	Remember	4
16	Write briefly about cyclone furnace, design and construction.	Understand	4
17	Write briefly about feed water treatment, thermal and chemical processes.	Understand	4
18	Explain about dust collectors and its types.	Understand	3
19	Write briefly about pulverized fuel burning system and its components.	Understand	3
20	Explain briefly about wet type dust collectors.	Understand	3
21	Explain briefly about dry type dust collectors.	Remember	3
22	Explain about different components of pulverized fuel burning system.	Understand	3
23	Write briefly about pneumatic ash handling system.	Understand	3
24	Explain briefly about electrical dust collectors.	Remember	3
25	Write briefly about Hydraulic ash handling system.	Understand	3
Part - C (Problem Solving and Critical Thinking Questions)			
1	Explain with neat diagram working of different circuits in thermal power plants.	Understand	2
2	Differentiate between wet type and dry type dust collectors.	Understand	3

3	Explain about ash handling system and different types of ash handling Equipments.	Understand	3
4	Enumerate the difference between over feed and under feed fuel supply.	Understand	3
5	Differentiate between electrical and dry type dust collectors.	Remember	3
6	Explain about different components of pulverized fuel burning system.	Understand	3
7	Explain about cooling ponds, natural draught cooling and mechanical Draught cooling towers.	Understand	4
8	Make neat sketch and explain the working of a) chain grate stoker (b) Spreader stoker (c) multi retort stoker.	Understand	3
9	Differentiate between wet type and electrical dust collectors.	Understand	3
10	Explain different method of coal handling.	Remember	2
UNIT - II			
INTERNAL COMBUSTION ENGINE PLANT			
Part – A (Short Answer Questions)			
1	What is the prime mover in an IC Engine power plant?	Understand	5
2	List the direct energy conversion systems.	Understand	5
3	What is the function of a fuel cell?	Remember	7
4	Write the principle of MHD generation.	Understand	7
5	What is the prime mover in Gas turbine power plant?	Understand	6
6	Define Internal Combustion Engine.	Understand	5
7	List the various types of lubricating system.	Understand	5
8	Define the process of Super Charging.	Remember	7
9	Write three advantages of gas turbine power plant.	Understand	6
10	Name the three major components of a Gas turbine.	Understand	6
11	What do you mean by solar energy?	Understand	7
12	Define thermo electric conversion.	Understand	7
13	What is thermo ionic conversion?	Understand	7
14	Write the principle of open cycle gas turbine.	Remember	6
15	Write the principle of closed cycle gas turbine.	Understand	6
16	Give the thermal efficiency of a gas turbine plant.	Understand	6
17	Define the function of air rate.	Remember	5
18	What is the definition of work ratio?	Understand	5
19	Define the term pressure ratio.	Understand	5
20	What is the function of regeneration?	Remember	5
21	Name and define any component of gas turbine.	Understand	6
22	Write two disadvantages of gas turbine plant.	Understand	6
23	Name and define a type of lubricating system.	Remember	5
24	State the advantages of combined power plants.	Understand	6
25	Name the parts of I.C Engine.	Understand	5
Part - B (Long Answer Questions)			
1	Explain the working of a diesel power plant with a neat sketch.	Understand	5
2	Write briefly about super charging and mention the advantages of a super charger.	Remember	6
3	Discuss the advantages and disadvantages of a diesel engine. State the applications of a diesel power plant.	Understand	5

4	Write briefly about fuel system and lubrication system of diesel power plant.	Understand	5
5	How air intake and admission of diesel power plant works.	Remember	5
6	Name and explain various types of fuel injection systems.	Understand	5
7	Give the advantages and limitations of gas turbine power plant.	Understand	6
8	Name the major components of a gas turbine plant. Draw a simple line diagram for a simple open cycle gas turbine plant.	Understand	6
9	Derive an expression for the thermal efficiency. Write about air-rate and work-ratio.	Remember	6
10	Discuss combined steam and gas turbine power plants.	Understand	6
11	Explain about the different components of a gas turbine power plant with a neat sketch.	Remember	6
12	Discuss combined gas turbine and diesel power plant.	Understand	6
13	Write briefly about closed cycle gas turbines.	Remember	6
14	Write briefly about lubricating system in diesel power plant.	Understand	6
15	Explain with the neat diagram the working of different types of wet type mechanical dust collectors.	Understand	6
16	Explain the constructional details of auxiliary components used in diesel engine power plants along with the required diagrams.	Understand	6
17	Differentiate among open, closed and semi closed gas turbine power plants with their applications.	Remember	6
18	What are the essential components of a simple open cycle gas turbine plant?	Understand	6
19	With a neat sketch explain the working of a simple constant pressure gas turbine.	Understand	6
20	Explain different types of direct energy conversion systems.	Remember	7
21	Write a note on exhaust system of diesel power plant.	Remember	5
22	Mention the applications of the gas turbine plant.	Understand	6
23	Write briefly about open cycle gas turbines.	Understand	6
24	How inter cooling and regeneration help in improving thermal efficiency of the gas power plant?	Understand	6
25	Mention the advantages and disadvantages of a constant pressure gas turbine.	Remember	6

Part – C (Problem Solving and Critical Thinking)

1	An engine has a swept volume of 33.7 cub m/min at sea level and is to operate at 2745 m where the air pressure is 0.707 bar. The volumetric efficiency of the engine is 80% of the compressor 75% under the conditions named and the overall isothermal efficiency of the compressors is 60%. Find the swept volume of the compressor and the power required to drive it.	Remember	5
2	A diesel engine has a compression ratio of 14 and cut-off takes place at 6% of the stroke. Calculate the air standard efficiency of the engine.	Understand	5
3	A 4 stroke diesel engine has a piston diameter of 16.5cm and a stroke of 27m. The compression ratio is 14.3, the cut off 4.23% of the stroke and the mean effective pressure 4.12 bar. The engine speed is 264 rev/min and the fuel consumption is 1.076 kg of oil per hour, having a calorific value of 39150 KJ/kg. Calculate the relative efficiency of the engine.	Remember	5
4	A diesel power station has a fuel consumption of 0.25 kg per kWh, the calorific value of the oil being 43963.5 kJ/kg. Determine the overall efficiency of the power station.	Understand	5
5	Find the brake thermal efficiency of an engine which consumes 7.35kg of fuel in 20mins while developing a power output of 92 kW B.P. The fuel has a heating value of 44800 kJ/kg.	Remember	5

6	A regenerative gas turbine power plant consists of two stage compressor with perfect cooling and single turbine. All the components of the plants are mounted on a single shaft. The overall pressure ratio is 8. The max.temperature of the cycle is limited to 590 deg. The regenerator receives 60% of the available energy from the exhaust gases. The compressor and turbine isentropic efficiencies are 83% and 86% respectively. Find the efficiency and ratio of useful work to the turbine work.	Remember	6
7	A four stroke cycle gas engine has a bore 15.24cm and a stroke of 22.86cm. The compression ratio is 4 and the m.e.p 3.43 bar. If the engine speed is 300 rev/min and the thermal efficiency is 30%. Calculate the fuel consumption in m ³ /kW hr and the efficiency relative to the air standard cycle. Calorific value of gas is 18297.2 kJ/m ³ .	Understand	6
8	In an open cycle regenerative gas turbine plant, the air enters the compressor at 1 bar abs 32 °C and leaves at 6.9 bar abs . the temperature at the end of combustion chamber is 816 °C. The isentropic efficiencies of compressor and turbine are resp 0.84 and 0.85. Combustion efficiency is 90% and the regenerator effectiveness is 60%. Determine thermal efficiency, air rate and work ratio.	Remember	6
9	A gas turbine plant generates 25MW of electric power. Air enters the compressor at 10 °C AND 0.981 bar and leaves at 4.2 bar and gas enters the turbine at 850 °C. If the turbine and compressor efficiencies are each 80% determine (1) the temperature at each point in the cycle (2) the specific work of the cycle	Understand	6
10	For the above problem (9), determine 1. The specific work of the turbine and the compressor, 2. The thermal efficiencies of the actual and ideal cycle 3. The required air flow rate.	Remember	6

**UNIT-III
HYDRO ELECTRIC POWER PLANT, HYDRO PROJECTS AND PLANT,
POWER FROM NON-CONVENTIONAL SOURCES**

Part - A (Short Answer Questions)

MID-1

1	What is catchment area?	Remember	8
2	List out the drainage area characteristics.	Understand	8
3	Define the use of Hydro graph.	Understand	8
4	What is the use of mass curve?	Understand	8
5	What is the function of tracking?	Understand	8
6	List out the points for the selection of site for a hydro electric plant.	Understand	8
7	Define the use of a reservoir.	Remember	9
8	What is dam and intake house?	Remember	9
9	What are inlet water ways?	Understand	9
10	Define a power house?	Remember	9
11	Define the use of tail race.	Understand	9
12	What are the different types of hydro electric plant?	Understand	9
13	What is a hydrological cycle?	Remember	8

MID-II

14	What is the use of a solar pond?	Understand	9
15	Define VWAT with its full form.	Remember	10
16	Define the function of solar furnace.	Understand	9
17	Define HWAT with its full form.	Remember	10
18	What are the advantages of solar energy for power generation?	Understand	10

19	Draw the sketch for solar low temperature Rankine cycle	Remember	10
20	Write the disadvantages of solar energy for power generation?	Understand	10
21	Define flat-plate collectors of solar energy.	Remember	10
22	How do you define Tidal energy?	Understand	10
23	What are concentrating collectors of solar energy?	Remember	10
24	List out different types of Wind energy.	Understand	10
25	What is the principle of working of a solar collector?	Understand	10
Part – B (Long Answer Questions)			
MID-I			
1	Name the various types of dams. Give the advantages of earth dams.	Understand	8
2	Discuss the factors affecting the run off. Write the parameters in the measurement of run-off.	Understand	8
3	With the help of neat diagram explain high head plant.	Understand	8
4	Discuss a pumped storage power plant with neat diagram.	Remember	8
5	Draw and discuss the plant layout of a hydro-plant.	Remember	8
6	Discuss the function of a draft tube in a hydro plant and explain various types of draft tubes.	Understand	8
7	With the help of a neat diagram explain low head plant.	Understand	8
8	Compare hydro and thermal power plants.	Understand	8
9	Name the various types of dams. Give the drawbacks of earth dams.	Remember	9
10	Discuss the various factors for selecting a site for hydro power plants	Remember	9
11	Write the parameters in the measurement of run-off.	Understand	9
12	Discuss hydrograph and flow duration curve and their use for hydro plants.	Understand	9
13	With the help of a diagram, explain the essential features of a hydro power Plant.	Understand	9
MID-II			
14	Write briefly about Tidal energy.	Remember	10
15	Discuss in detail the flat plate solar collector with neat sketch.	Understand	10
16	Explain in detail the concentrating solar collector with neat sketch.	Remember	10
17	Describe the two forms of sensible heat storage with neat sketches.	Understand	10
18	Explain the working and utilization of solar collectors.	Understand	10
19	Enumerate various types of windmill rotors with neat sketches.	Remember	10
20	Explain windmill with definition, classification and functions in detail.	Understand	10
21	Explain with neat sketch photovoltaic conversion of solar energy.	Understand	10
22	Discuss HWAT and VWAT in detail with neat sketches.	Remember	10
23	Explain the advantages and disadvantages of HWAT.	Remember	10
24	Explain the detailed classification of solar energy utilization.	Understand	10
25	Explain the advantages and disadvantages of VWAT.	Remember	10
Part – C (Problem Solving and Critical Thinking)			
MID-I			
1	Explain the satellite solar power station concept with neat sketch.	Remember	10
2	Differentiate between solar low and high temperature Rankine cycles.	Understand	10

3	Explain with neat sketch solar hydrogen energy system.	Understand	10
4	Differentiate between HWAT and VWAT.	Understand	10
MID-II			
5	In a hydro site available head= 50m total catchment area = 50 sq km Rain fall= 1500mm per year.. 70% of the rain fall can be utilized. Calculate the suitable capacity of a turbo generator, given turbo efficiency 80%, generator efficiency 91% and penstock efficiency 75%.	Understand	10
6	In a pelton turbine; mean speed of wheel = 13.5 m/s, available head = 42m, rate of water flow= 0.8 cumecs, water jet is deflected by the buckets by 165° . Determine: power of the turbine and efficiency of the turbine.	Remember	10
7	Sketch and describe the general layout of power plant suitable for the site in problem (1)	Understand	10
8	What type of turbine will be selected for the plant with available head=250m, total catchment area=60 sq km, annual rainfall= 1600 mm, run-Off=70%.	Remember	10
9	A hydro electric installation has a catchment area of 64 sq km and the run – Off is 70%. The average rainfall per year is 1300mm and h=the head is 450m. Find the available power if the overall efficiency is 80%.	Understand	10
10	A hydro plant operates under a mean head of 40m. The reservoir has a catchment area of 480sq km. Find the capacity of the plant in KW if average annual rainfall in the area is 1100mm and 20% of the rainfall is lost due to evaporation etc. The loss of head in the penstock is estimated to be 10%. The turbine efficiency is 85% and the generator efficiency is 92%.	Understand	10
UNIT-IV			
NUCLEAR POWER STATION, TYPES OF REACTORS			
Part – A (Short Answer Questions)			
1	Define Isotope.	Remember	11
2	What is half life period?	Remember	11
3	What is the name of unit of radio activity?	Remember	11
4	Define binding energy.	Understand	11
5	What is the main fuel of nuclear power plants?	Remember	11
6	What is a fertile material?	Remember	11
7	What is a breeding material?	Understand	11
8	Define the use of converter reactor.	Remember	11
9	Write the function of a Breeder reactor.	Understand	11
10	Draw the schematic figure of a Burner reactor.	Remember	12
11	Write the moderator in Gas Cooled Reactor.	Remember	12
12	Write the moderator in Water Cooled Reactor.	Understand	12
13	What is the moderator in Gas Cooled Reactor?	Remember	12
14	Write the function of Reactor core.	Remember	12
15	What is the function of Moderator?	Understand	12
16	Write the function of thermal shielding.	Remember	12
17	Write the function of reflector.	Understand	12
18	Mention the various types of fast breeders.	Remember	12
19	What is the function of coolant flow?	Understand	12
20	Mention the desirable density of a coolant.	Remember	12

21	Mention the desirable pumping power of a coolant.	Remember	12
22	Mention the desirable heat transfer coefficient of a coolant.	Understand	12
23	What is the desirable boiling point of a coolant?	Understand	12
24	State the advantages of fast breeder reactors.	Remember	12
25	How the nuclear reactors are classified.	Understand	12
Part – B (Long Answer Questions)			
1	Explain with neat diagram Pressurized water reactor.	Understand	12
2	Discuss boiling water reactor with neat diagram.	Understand	12
3	Explain with neat diagram sodium-graphite reactor.	Remember	12
4	Enumerate Fast breeder reactor with neat diagram.	Understand	12
5	Explain with neat diagram homogeneous reactor.	Remember	12
6	Briefly Explain with neat diagram gas cooled reactor.	Understand	12
7	Explain with neat diagram the simple layout of nuclear reactor.	Understand	11
8	State and explain the desirable properties of coolant.	Understand	11
9	Discuss the desirable properties of moderator.	Remember	11
10	Explain the classification of nuclear reactors based on type of fission.	Understand	11
11	State the advantages of fast reactor.	Remember	12
12	Explain the disadvantages of fast reactor.	Understand	12
13	Write the advantages of thermal reactor.	Understand	11
14	Explain the disadvantages of thermal reactor.	Remember	11
15	Discuss intermediate reactors.	Understand	11
16	Explain the classification of nuclear reactors based on type of fuel.	Understand	11
17	Explain the classification of nuclear reactors based on position of fissile and Fertile material.	Remember	11
18	Explain the classification of nuclear reactors based on state of fuel.	Understand	11
19	Discuss about the classification of nuclear reactors based on choice of moderator.	Understand	11
20	Explain the classification of nuclear reactors based on core composition.	Understand	11
21	Write the different methods of cooling the nuclear reactor.	Remember	12
22	Explain about exclusion area for nuclear plant site selection.	Understand	11
23	Discuss about low population area for nuclear plant site selection.	Understand	11
24	Explain about population centre distance for nuclear plant site selection.	Remember	11
25	Enumerate factors to be considered for nuclear plant site selection.	Understand	11
Part – C (Problem Solving and Critical Thinking)			
1	Does a reactor explode like an atomic bomb? Explain why?	Understand	12
2	Enumerate the reactor operating faults affecting reactor safety.	Understand	12
3	What are solid wastes of reactors and How they can be disposed?	Understand	111
4	What are liquid effluents of reactors and How they can be disposed?	Remember	13
5	What are gaseous effluents of reactors and How they can be disposed?	Understand	13
6	What are floating nuclear power plants? Why are they constructed?	Understand	13
7	Differentiate between burner, converter and breeder reactors.	Remember	13
8	Differentiate between one region and two region reactors.	Understand	13
9	Differentiate between homogeneous and heterogeneous reactors.	Understand	13
10	Differentiate between aqueous homogeneous and liquid metal fuelled reactors.	Understand	13

UNIT-V
POWER PLANT ECONOMICS AND ENVIRONMENTAL CONSIDERATIONS

Part - A (Short Answer Questions)

1	Define the use of Load factor.	Understand	14
2	What is the use of Utility factor?	Remember	14
3	Define Plant operating factor.	Remember	14
4	State the meaning of capacity factor.	Remember	14
5	Define the term demand factor.	Remember	14
6	Write about the use of diversity factor.	Understand	14
7	What is meant by load curve?	Remember	14
8	Define the term dump power.	Remember	14
9	What are fixed and operating costs?	Understand	14
10	Define the function of prime power.	Remember	14
11	What is the function of cold reserve?	Remember	14
12	Define the use of hot reserve.	Understand	14
13	What is spinning reserve?	Remember	14
14	Define the term depreciation.	Understand	14
15	Write any two harmful effects of carbon dioxide.	Remember	15
16	Define the term peak load.	Understand	14
17	Write any two harmful effects of compounds of Sulphur.	Remember	15
18	What is the significance of load curves?	Understand	14
19	List some disadvantages of pollutants.	Remember	15
20	What is thermal pollution?	Understand	15
21	What are the major sources of air pollutants?	Remember	15
22	Write some of the common pollutants.	Understand	15
23	Define the term average load.	Understand	14
24	Write any two harmful effects of carbon monoxide.	Remember	15
25	Define the term, base load.	Understand	14

Part - B (Long Answer Questions)

1	Explain the difference between demand factor and diversity factor.	Understand	14
2	Explain the advantages of diversity factor in a power system.	Understand	14
3	What is meant by load curve? Explain its importance in power generation.	Remember	14
4	Differentiate dump power, firm power and prime power.	Remember	14
5	Differentiate between fixed and running charges in the operation of a power Company.	Remember	14
6	Explain the significance of depreciation.	Understand	14
7	Discuss the factors to be considered for plant selection for a site.	Understand	14
8	Explain the cost elements of a thermal power plant.	Remember	14
9	Explain the cost elements of a nuclear power plant.	Understand	14
10	How the concentration of gaseous pollutants expressed?	Understand	15
11	How thermal power plants pollute air?	Remember	15

12	Discuss the harmful effects of carbon dioxide, carbon monoxide, compounds of Sulphur, and oxides of nitrogen.	Remember	15
13	Enumerate the two ways of control of atmospheres pollution. Which is more common?	Understand	15
14	What constitutes the control of atmospheric pollution due to thermal power plants?	Understand	15
15	Discuss the various methods of reduction Sulphur oxides in emissions.	Remember	15
16	Discuss the various methods of purifying flue gases from Sulphur oxides.	Understand	15
17	What are the drawbacks of wet methods of purifying flue gases from Sulphur oxides?	Remember	15
18	Discuss the dry process of purifying flue gases from Sulphur oxides.	Understand	15
19	Discuss the formation of nitrogen oxides in boiler furnaces.	Remember	15
20	Explain the various sources of waste water in thermal power stations.	Understand	15
21	Explain briefly on Pollution from hydro-electric plants.	Remember	14
22	Discuss the operational considerations while selecting equipment for a power plant.	Understand	14
23	Discuss the economic considerations while selecting equipment for a power Plant.	Remember	15
24	Discuss the thermodynamic considerations while selecting equipment for a power plant.	Understand	15
25	Explain the advantages of combined operation of power plants.	Remember	15
Part – C (Problem Solving and Critical Thinking)			
1	The peak load on a power plant is 60 MW. The loads having maximum demands of 30 MW, 20 MW, 10 MW and 14 MW are connected to the power plant. The capacity of the power plant is 80 MW and the annual load factor is 0.50. Estimate (a) the average load on the power plant, (b) the energy supplied per year, (c) the demand factor, (d) the diversity factor.	Remember	14
2	A thermal power plant of 210 MW capacity has the maximum load of 160 MW. Its annual load factor is 0.6. The coal consumption is 1 kg per kWh of energy generated and the cost of coal is Rs 450.00 per tonne. Calculate (a) the annual revenue earned if energy is sold at Re 1 per kWh and (b) the capacity factor of the plant.	Understand	14
3	A power plant has the following annual factors: Load factor = 0.75, capacity factor = 0.60, use factor = 0.65. Maximum demand is 60 MW. Estimate (a) the annual energy production, (b) the reserve capacity over and above the peak load, and (c) the hours during which the plant is not in service per year.	Remember	14
4	Calculate the cost of generation per kWh for a power station having the following data: Installed capacity of the plant = 200MW Capital cost = Rs 400 Crores Rate of interest and depreciation = 12% Annual cost of fuel, salaries and taxation = Rs 5 crores Load factor = 50% Also estimate the saving in cost per kWh if the annual load factor is raised to 60%.	Understand	14
5	A 300 MW thermal power station is to supply power to a system having maximum and minimum demand of 240 MW and 180 MW respectively in a year. Assuming the load duration curve to be a straight line, estimate the (a) load factor, (b) capacity factor.	Remember	14
6	The maximum load on a thermal power plant of 60 MW capacity is 50MW at an annual load factor of 60%. The coal consumption is 1 kg per unit of energy generated and the cost of coal is Rs 600 per tonne of coal. Find (a) the annual revenue earned if the energy is sold at Rs 2 per kWh and (b) the capacity of the plant.	Understand	14
7	A thermal power plant consists of two 60 MW units, each running for 8000hrs, and one 30 MW unit running for 2000hrs per year. The energy	Remember	14

	produced by the plant is 876×10^6 kWh per year. Determine the plant load factor and plant use factor. Consider the maximum load as equal to the plant capacity.		
8	A power station is said to have a use factor of 47% and capacity factor of 40%. For how many hours in a year was the power station not in service	Understand	14
9	A consumer has following connected load: 10 lamps of 60 W each 2 heaters of 1000 W each, Max. demand = 1500 W. On the average he uses 8 lamps, for 5 hrs a day and each heater for 3 hrs a day. Find his average demand, load factor and monthly energy consumption.	Remember	14
10	The output of a generating station is 525×10^6 kWh per year. And the average load factor is 60%. If the annual fixed charges are Rs. 100 per kW of installed capacity and the annual running charges are 5 paise per kWh, What is the cost per kWh of energy at bus bars?	Understand	14

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