

**QUESTION BANK**  
**SUBJECT : ME8793 POWER PLANT ENGINEERING**  
**SEM / YEAR: V/III**

**UNIT I - COAL BASED THERMAL POWER PLANTS**

**PART – A**

1. Describe the processes of Rankine Cycle.
2. Define boiler draught. (Dec2016, May2016 May2013,)
3. List out the accessories of boilers.(May13, May2017)
4. What are once through boilers? .(May2017, May2012)
5. Illustrate the function boiler and turbine.
6. What is stoker? Classify it. (May2017 May2010)
7. Describe super critical boilers. (DEC2012,MAY2016)
8. Define the merits of pulverized fuel firing system. (DEC2012)
9. Define FBC
10. List the advantages of high pressure boilers. (Dec2012,Dec13)
11. Compare the various modern ash handling systems.
12. List the methods used for handling of coal.
13. Summarize the function of cooling tower.( May2011,May2013)
14. Discuss the requirements of a modern surface condenser.
15. Evaluate the processes of Binary cycle.
16. Define steam rate and heat rate. .(May12,13, DEC2016)
17. Express the factors affecting cooling of water in cooling tower.
18. Show the P-V, H-S and T-S diagram for Rankine Cycle. (May2010)
19. Demonstrate a neat sketch of basic principle of FBC.
20. Point out the Cogeneration systems.

**PART-B**

**(11a questions)**

1. Explain with a neat sketch the working of a thermal electric power plant station and discuss the function of major components in it. (MAY2017,DEC2016)
2. Illustrate the principle involved in preparation of coal and what are the methods of preparation? (MAY2015)
3. Write the shorts notes on:
  - i) Ash handling system. (MAY2017)
  - ii) Different draught systems. (May2008, DEC2016, MAY2017)

4. Discuss the different types of cooling towers? Explain with a neat sketch. (MAY2017,2008)
5. Explain the construction and working of any one High pressure boiler with a neat sketch. (Dec2016)

**(11b questions)**

6. i) Describe the working of FBC boiler with a neat diagram. (MAY2015, May2016)
- ii) Summarize the arrangement and operation of a surface condenser. ( May2016)
7. i) Discuss the functions of air heater types. (May2016)
- ii) Describe with a sketch the working of a mercury-water binary cycle. (May2016)
8. Examine the reheat system and regeneration system of a thermal power plant. (MAY2014)
9. Compare the conventional and non-conventional energy sources.
10. Demonstrate the power plant performance and its efficiency and explain about pulverized coal system. (May/ DEC2008)
11. (a) Examine a chart showing operations and devices used in coal handling plant. (MAY2014, MAY2017)
- (b) Describe any one type of cogeneration power plant.( DEC2016)

**PART – C**

1. Sketch and Explain the construction and operation of super critical boiler.
2. Draw a line diagram of fluidized bed combustion system where the steam turbine is used as a prime mover and explain its working.
3. Why is coal pulverized? Explain any one type of pulverized systems used now a days.
4. Explain with a neat sketch the principle of a commercial FBC system.

**UNIT-II**

**DIESEL, GAS TURBINE AND COMBINED CYCLE POWER PLANTS**

**PART-A**

1. Name the essential components in diesel engine power plant? (MAY2015 and 2017)
2. What are the applications of diesel engine power plant? (MAY2015, MAY2017)
3. What are the different types of engines used in diesel power plant?
4. Why is power generation by gas turbines attractive these days? (DEC2015)

5. What is the duty of the air intake system in a diesel engine power plant?
6. Draw a P-V and T-S diagram for Joule's cycle? (MAY2017)
7. What is cycle? What is the difference between an ideal and actual cycle?
8. Draw a P-V and T-S diagram for Otto cycle? (MAY2015)
9. Draw the layout of Diesel power plant?
10. Show that the efficiency of the Otto cycle depends only on the compression ratio?
11. Name the various gas power cycles. (MAY2017 )
12. What is reheating and regeneration in gas turbine ? (MAY2016)
13. Why is the maximum cycle temperature of gas turbine plant much lower than that of diesel power plant?
14. Classify the types of combined cycle plants. (MAY2016)
15. What are the advantages of combined cycles?
16. What are the applications of gas turbine? (MAY2014)
17. Enlist the advantages and disadvantages of diesel engine power plants?
18. What is the environmental impact of a combined cycle plant?
19. What is integrated gasification combined cycle?
20. Explain the term repowering?

## **PART-B**

**(12A questions)**

1. Explain in detail about Otto cycle and processes with p-V and T-s diagrams.
2. (a) Explain in detail about diesel cycle.(8)

- (b) Explain in detail about dual cycle. (8)
3. (a) Explain in detail about Brayton cycle.(8)(MAY2016)
- (b) Why is the Brayton cycle most suitable for gas turbine power? (8)
4. Draw and explain the layout of a modern diesel power plant showing the following systems. a. Air Intake system b. Cooling system c. Fuel supply system d. Lubrication system and e. Exhaust system. (MAY2016,17)
5. (a) Mention the advantages and disadvantages of a diesel power plant over a gas turbine power plant. (8)
- b) Give a maintenance schedule for Diesel engine power plant. (8)

**(12B questions)**

6. Explain the Gas turbine power plant with neat sketch. Discuss the advantages of gas turbine power plant. (MAY2016,17)
7. With p-v & t-s diagram explain the effect of intercooling, reheating& regeneration in a gas turbine plant (MAY2016,17)
8. (a) Give the classification of gas turbine power plants. (8) (MAY2016,17)
- (b) Give the advantages and disadvantages of open cycle gas turbine power plant.
9. Draw and explain the layout of a Combined Cycle Power Plant. (DEC16)
10. Draw and explain the layout of an Integrated Gasifier based Combined Cycle Power Plant. (MAY2016)

**PART – C**

1. Identify p-v & t-s diagram explain the effect of intercooling, reheating& regeneration in a gas turbine plant
2. Show that the efficiency of the Diesel cycle is always lower than the efficiency of Otto cycle for the same compression ratio
3. Draw the theoretical and actual p-V diagram of a fourstroke Otto cycle engine and Explain the reason for derivations.

4. State the purpose of heating, regeneration and intercooling in gas turbine powerplants.

**UNIT-3**  
**NUCLEAR POWER PLANTS**

**PART-A**

1. What are isotopes? (MAY2012,13)
2. Name the three moderators used in nuclear power plants. (MAY2012)
3. Explain the function of nuclear reactor. (May2008, 2009)
4. List the function of control rods. (MAY2017)
5. Discuss is nuclear fission. (MAY2012/May11/DEC2011)
6. Generalize the fuels used in nuclear power plants.
7. what is critical mass of nuclear fuel?(Dec16)
8. what is chain reaction? (MAY2004/May10)
9. what is the function of pressurizer in PWR? (MAY2017).
10. Define is a 'CANDU' reactor. (MAY2016)
11. Explain the requirements of fission process. (MAY2017)
12. Examine "half life" of nuclear fuels? (MAY2008)
13. Explain the functions of moderators. (MAY2007)
14. Distinguish between PHWR and LMFBR.
15. Define the term "Breeding".(May2005)
16. Name the components of pressurized water reactor nuclear power plant.(May2005).
17. Classify the nuclear reactors. (MAY2004/May11)
18. Integrate to provide for safety of nuclear power plant. (MAY2014)
19. Illustrate the various types of fast breeders.
20. Define fast nuclear reactor. (MAY2016)

**UNIT-3**  
**NUCLEAR POWER PLANTS**

**PART-A**

1. What are isotopes? (MAY2012,13)
2. Name the three moderators used in nuclear power plants. (MAY2012)
3. Explain the function of nuclear reactor. (May2008, 2009)
4. List the function of control rods. (MAY2017)
5. Discuss is nuclear fission. (MAY2012/May11/DEC2011)
6. Generalize the fuels used in nuclear power plants.
7. what is critical mass of nuclear fuel?(Dec16)
8. what is chain reaction? (MAY2004/May10)

9. what is the function of pressurizer in PWR? (MAY2017).
10. Define is a 'CANDU' reactor. (MAY2016)
11. Explain the requirements of fission process. (MAY2017)
12. Examine "half life" of nuclear fuels? (MAY2008)
13. Explain the functions of moderators. (MAY2007)
14. Distinguish between PHWR and LMFBR.
15. Define the term "Breeding". (May2005)
16. Name the components of pressurized water reactor nuclear power plant. (May2005).
17. Classify the nuclear reactors. (MAY2004/May11)
18. Integrate to provide for safety of nuclear power plant. (MAY2014)
19. Illustrate the various types of fast breeders.
20. Define fast nuclear reactor. (MAY2016)

### **PART-B**

#### **(13A questions)**

1. Explain the construction and working of Nuclear power plant with a layout. (DEC2016, DEC13)
2. Demonstrate the difference between a pressurized water reactor nuclear power plant and boiling water reactor nuclear power plant. (MAY2012)
3. Discuss the following terms:
  - (i) Fission of nuclear fuel (MAY2017)
  - (ii) Distribution of fission energy
  - (iii) Chain reaction. (MAY2017)
4. i) Discuss the advantages and disadvantages of breeder reactor. (MAY2009, 2011)  
 ii) Summarize fission of nuclear fuel. (MAY2011)  
 iii) Discuss radiation hazards and shielding.
5. With the help of a sketch show all the important part of nuclear reactor. Describe briefly the functions of each part. (MAY 13, MAY2017)

#### **(13B questions)**

6. i) Explain with neat sketch and brief the characteristics features of a BWR. (MAY2017, MAY2016)  
 ii) Describe the India's three stage nuclear power programme. (DEC2016)
7. i) Explain the difference between controlled and uncontrolled nuclear chain reaction.  
 ii) Explain the necessity of pressurizer in a PWR power plant. (MAY2016)  
 iii) Examine the Safety measures for Nuclear Power plants. (DEC2016)
8. i) Explain the LMFBR. (MAY2012)  
 ii) Explain the functions of reflectors and cladding
9. Explain CANDU reactor with neat sketch. Give its advantages and disadvantages. (MAY13, DEC2016)  
 iii) Examine the Safety measures for Nuclear Power plants. (DEC2016)

10. Generalize in detailed notes on following:

(i) Boiling water reactor (MAY2013)

(ii) Gas cooled reactor.(May2006)

### **PART – C**

1.i) Explain the Gas Cooled and Liquid Metal Cooled Reactors.

ii) Explain the CANADA Deuterium- Uranium reactor (CANDU).

2. (i) Explain the function of reflectors and cladding.

(ii) Write a note on India's three stage nuclear power programme.

3. Draw the diagram of PWR and BWR and explain the advantages and disadvantages. What are the conditions which prefer PWR and BWR and viceversa.

4. Write about principles of nuclear energy. List out the various power plants station in India. With neat sketch explain any one.

### **UNIT -4 POWER FROMRENEWABLE ENERGY**

#### **PART-A**

1. What is the purpose of draft tube?(May11,12).

2. Discuss the binding energy.

3. Illustrate the advantages and disadvantages of hydropower plants.

4. Define the function of surge tank in hydro plants. (MAY2016)

5. Give the merits of hydroelectric power plants.

6. Classify the hydro electric turbines with respect to high medium and low head.

7. Why is a tall tower essential for mounting a horizontal axis wind turbine? (MAY2016).

8. Define hydrograph. (MAY2013,14).

9. Demonstrate the function of spear & nozzle.

10. Describe the water hammer.

11. Discuss the function of spillway. (MAY2017)

12. Name the basis of classification of turbines.

13. Explain solar cell. (MAY2017)

14. Compose the Francis AND Kaplan turbine. (DEC2016)

15. Tell the components of Tidal power plants.

16. Explain the fuel cell. (MAY2017)

17. Summarize the geothermal energy. (MAY2014).

18. What is biogas? Give the advantages. (DEC2016)

19. Generalize the important criteria while selecting the geothermal energy.

20. Identify the different types of geothermal fluid and give its temperature range.

**PART-B**  
**(14A questions)**

1. i) Draw a schematic diagram of a hydro plant and explain the operation. (Dec2011,2008,MAY2017, Dec16).  
ii) write short note on Bio energy.
2. (i) Compare Kaplan turbine and Francis turbine.  
(ii) Explain pumped storage power plant with its merits & demerits.(MAY16)
3. Discuss the working of the biogas power plant. (MAY2017).
4. Describe the detail about surge tank used in hydro electric power plant. Also explain about the classification and selection of dams.
5. Examine the factors to be considered while selecting the site of a hydro power plant. (MAY16)

**(14B questions)**

6. i) Describe the functions of a solar PV electric plant. (MAY2017).  
ii) Explain the construction and working of fuel cell also state the advantages and disadvantages (MAY16)
7. Generalize the construction and working of Geo thermal power plant. (Dec2011)
8. (i) Explain the different types of Tidal power plants.(Dec2012)  
(ii) Describe the Solar thermal central receiver system. (May/Dec2008)
9. Discuss the different types of ocean thermal energy conversion system. (Dec2011, 2008)
10. Describe the advantages and limitations of Wind energy system.(DEC16)
11. (i) Explain with a neat diagram of wind electric generating power plant.  
(ii) Explain in detail about the various types of Wind energy system.

**PART – C**

- 1 i) List out the essential elements of hydro Power plant and Explain with a neat sketch(10)  
ii) Describe the working of low head Hydro Plant with a neat diagram.
2. Draw a Schematic diagram of a solar power plant and explain the operation of it. Also mention its merits and demerits.
3. Explain with a neat sketch working of a Distributed (parabolic) through solar power plant.
4. i) Explain the various type of prime movers used in geo-thermal energy conversion system  
ii) Describe the principle of a fuel cell and discuss the choice of fuel required.



**UNIT-5**  
**ENERGY, ECONOMIC AND ENVIRONMENTAL ISSUES OF POWER PLANTS**  
**PART-A**

1. Define demand factor.
2. Define plant use factor .(DEC16)
3. Define load factor and capacity factor. (MAY2016)
4. Explain the load duration curve. (MAY2015)
5. Discuss the tariff. (DEC2016)
6. Calculate the cost of electricity.)
7. Express the two part tariff.
8. Extend to improve the power factor.
9. Tell the fixed costs in a power plant. (MAY2017,16)
10. Explain the financing cost.
11. Discuss the operating cost.
12. Describe depreciation.
13. Explain the various operating cost of coal fired steam power plant.
14. Integrate the potential options for CO<sub>2</sub> sequestration.
15. Explain the waste disposal options for Coal Power Plant.
16. List the components of fixed cost.
17. Describe the significance of two part tariff and three part tariff.
18. Explain the criteria for site selection of power plant.
19. Generalize the merits and demerits site selection of power plant.
20. Summarize the waste disposal options for Nuclear Power Plant. (MAY2017)

**PART-B**  
**(15A questions)**

1. Describe, what you understand by power plant economics? Explain the fixed costs and operating costs of a power station.
2. Summarize the elements which contribute to the cost of the electricity? And how can the cost power generation be reduced?
3. Discuss the cost of electrical generation? What are the various types of cost associated with power generation?
4. Define tariff? Discuss and compare various tariff used in practice. (MAY2011,2009,2017,2016)
5. i) Explain the term depreciation and discuss various methods of calculating the depreciation of an electrical plant.  
ii) Explain load curves and load duration curves? Discuss their utility in the economics of generation.
6. A generating stations as a maximum demand (MD) of 15 MW and the daily load

curve on the station is as follows, 10pm to 05 am 2500 KW 01pm to 04pm 10000KW 05am to 07 am 3000KW 04pm to 06pm 12000KW ,07pm to 11am 9000KW 06 pm to 08pm 15000KW 11am to 01pm 6000KW 08pm to 10pm 5000KW .Determine the size and the number of generator units, plant load factor, plant capacity factor, use factor and reserve capacity of plant. (MAY2012,16)

**(15B questions)**

7. Explain the pollution control technologies including waste disposal options for coal power plant. (MAY2016)
8. Explain the pollution control technologies including waste disposal options for nuclear power plant.(MAY2012)
9. i) Name and elaborate on the elements that contribute to the cost of electricity.  
ii) Brief: Base load, peak load and average load of a thermal power plant.  
iii) Indicate the likely % cost of capital and operating cost of a thermal power plant take the like of the power plant as 25 years. (MAY2016)
10. Discuss the pollution from thermal power plants. (DEC2016)
11. Explain the criteria for site selection of power plant. (DEC2016)

**PART – C**

1.The peak load on a thermal power plant is 75 MW. The loads having maximum demands of 35 MW, 20 MW, 15 MW and 18 MW are connected to the power plant. The capacity of the power plant is 90 MW and the annual load factor is 0.53. Calculate the:

- a) Average load on the power plant.
- b) Energy Supplied per year.
- c) Demand factor.
- d) Diversity factor.

15

2.List out the fixed and operating cost of steam power plant? How are they accounted for fixing cost of electricity

15

3.The following data pertain to a power plant. Installed capacity = 200 MW , Capital cost = Rs.350 x 10<sup>7</sup>, Annual cost of field, taxes and salaries = Rs.55 x 10<sup>7</sup> Rate of interest = 5% of the capital Rate of Depreciation = 6% of the capital Annual load factor = 0.65 Capacity Factor = 0.56 Energy used in running the plant auxiliaries = 4% of total units generated. Determine the (a) cost of power generation and (b) reserve capacity

15

4. Elucidate the objective and requirement to tariff and general from of tariff.