Code No: **RT42033D** **R13** **Set No. 1**

IV B.Tech II Semester Regular Examinations, April/May - 2017

POWER PLANT ENGINEERING

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) What is the function of cooling tower? [4]
   b) Draw the layout of diesel power plant? [4]
   c) List out the drainage area characteristics? [4]
   d) State the advantages of fast breeder reactors? [3]
   e) List out the advantages and disadvantages of nuclear plants over conventional thermal plants. [4]
   f) What are fixed and operating costs? [3]

PART–B *(3x16 = 48 Marks)*

2. a) Enumerate and explain the steps involved in coal handling. [8]
   b) Explain the general layout of ash handling and dust collection systems. [8]

3. a) Draw and explain the layout of modern diesel power plant showing the following systems.
   (i) Fuel supply system
   (ii) Lubrication system [8]
   b) Discuss the advantages of combined cycle power generation. Explain the working of GT-ST combined cycle plant. [8]

4. a) What is a spillway? Why are spillways required? What are the different types of spillways? [8]
   b) Explain with a neat sketch a pumped storage hydro plant, state its advantages [8]

5. a) Enumerate and explain the essential components of a nuclear reactor. [8]
   b) Explain about sodium-graphite reactor with a neat sketch [8]

6. a) Explain the working principle of hydroelectric and gas turbine station. [8]
   b) With a neat sketch explain the working of photo cell type smoke meter. [8]

7. a) Define peak load, demand factor, load factor and plant use factor. [8]
   b) Explain briefly various methods of pollution. [8]

Code No: **RT42033D** **R13** **Set No. 2**

IV B.Tech II Semester Regular Examinations, April/May - 2017

POWER PLANT ENGINEERING

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) What are the methods used for handling of coal? [3]
   b) What are the components of gas turbine power plants? [4]
   c) Explain about hydrograph. [4]
   d) Explain the function of nuclear reactor? [4]
   e) State the advantages of combined power plants. [3]
   f) What is the significance of load curves? [4]

PART–B *(3x16 = 48 Marks)*

2. a) How does a cooling tower operate? Mention its merits and demerits. [8]
   b) Explain the various draught systems with a neat sketch [8]

3. a) Draw a neat line diagram of a diesel power plant showing all the systems and explain the working [8]
   b) Mention the advantages and disadvantages of diesel power plant over a gas turbine power plant? [8]

4. a) State the functions of a dam. How are dams classified? Briefly describe a few important types of dams. How would you select the site and the type of the dam? [10]
   b) How hydro electric power plants are classified? [6]

5. a) Explain with a line diagram, the working of homogeneous reactor. [6]
   b) Sketch and explain gas cooled reactor and also its advantages [10]

6. a) Explain the working of run-of-river plant in combination with steam plant. [8]
   b) Explain with a neat line diagram the circuit to analyse the gas for nuclear radiation. [8]

7. A power station has to supply load as follows:

Time(hrs)	0-6	6-12	12-14	14-18	18-24
Load(MW)	30	90	60	100	50

(i) Draw the load curve
(ii) Draw the load-duration curve
(iii) Give a scheme of suitable generating units to supply the level
(iv) Calculate load factor, capacity of the plant and plant capacity factor [16]

Code No: **RT42033D** **R13** **Set No. 3**

IV B.Tech II Semester Regular Examinations, April/May - 2017

POWER PLANT ENGINEERING

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

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PART–A ***(22 Marks)***

1. a) What are the uses of ash? [3]
   b) What are the components of diesel power plants? [3]
   c) Classify different types of dams. [4]
   d) Mention the various types of fast breeders. [4]
   e) List out the techniques for measuring water purity. [4]
   f) How the load duration curve is is constructed. [4]

PART–B ***(3x16 = 48 Marks)***

2. a) Explain the working of spreader stoker with neat sketch. [8]
   b) What are the different types of cooling towers ?Explain with a neat sketch [8]

3. a) Give the classification of gas turbine power plant? [8]
   b) Supercharging-explain with advantages and disadvantages [8]

4. The turn off data of a river at a particular site is tabulated below.

Month	*Mean discharge (millions of cu.m.)*	*Month*	*Mean discharge (millions of cu.m.)*
January	30	July	80
February	25	August	100
March	20	September	110
April	0	October	65
May	10	November	45
June	50	December	30

(i)Draw the hydrograph and find the mean flow.
(ii)Draw the flow duration curve.
(iii)Find the power developed if the head available is 90m and the overall efficiency of generation is 86 percent. Assume each month of 30 days. [16]

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5. a) Explain the construction and working of nuclear power plant with a layout [8]
   b) Describe with the help of a neat sketch the construction working of a pressurized water reactor. What are the advantages and disadvantages? [8]

6. a) Draw the electric line diagram to measure CO_2 in the flue gases and explain the working [8]
   b) Explain the working of pump storage type plant in combination with steam plant. [8]

7. a) What do you understand by load factor and capacity factor? When are they numerically equal? [8]
   b) What are the various costs involved in power plant? Discuss briefly. [8]

Code No: **RT42033D** **R13** **Set No. 4**

IV B.Tech II Semester Regular Examinations, April/May - 2017

POWER PLANT ENGINEERING

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) What is the function of a coal crusher [4]
   b) What are the different types of engines used in diesel power plants? [3]
   c) Define Spill way? Classify different types of spill ways. [4]
   d) How the nuclear reactors are classified? [4]
   e) Explain the importance of measurement in power plant [4]
   f) What do you mean by diversity factor? [3]

PART–B *(3x16 = 48 Marks)*

2. a) Explain the working principle of cyclone furnace with neat diagram. [8]
   b) Classify the pulverised fuel burners and list the requirements of them. [8]

3. a) List the essential components of gas turbine power plant and explain them briefly [8]
   b) Explain how engines are selected for diesel power plants [8]

4. a) What you mean by storage and pondage. Why are they required? [8]
   b) What do you understand by pumped storage plant? [8]

5. a) Explain the working of a typical fast breeder nuclear power plant with neat diagram. [8]
   b) Explain briefly about radiation hazards and scheduling? [8]

6. a) Explain the magnetic wind method for the measurement of O_2 in the flue gases. [8]
   b) Explain the working of run-off-river plant in combination with steam plant. [8]

7. a) Define pollution and pollutants. [8]
   b) Estimate the generating cost per unit supplied from a power plant having the following data
   Plant capacity = 120 MW.
   Capital cost = Rs.600 × 106
   Annual load factor = 40 %
   Annual cost of fuel, taxation, oil and salaries = Rs.500000
   Interest and depreciation = 12 % [8]