Code No: M0328/R07 **Set No. 1**

**IV B.Tech I Semester Supplementary Examinations, Feb/Mar 2011**
**POWER PLANT ENGINEERING**
**( Mechanical Engineering )**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) When the wet type of mechanical dust collector is prefered and why?
   (b) Explain with the neat diagram the working of different types of wet type mechanical dust collectors. [6+10]
2. (a) What do you understand by FBC? Explain its working principle with a neat sketch.
   (b) What are the major advantages of FBC system over conventional one?[10+6]
3. (a) What are the advantages of diesel power plant?
   (b) Explain with necessary diagram different fuel injection systems used in diesel engine plant. [6+10]
4. What do you understand by a closed cycle gas turbine plant. List out its advantages over open cycle plant. What difficulties are encountered in the developement of closed plant. [16]
5. (a) Describe advantages and disadvantages of hydroelectric power plant.
   (b) What is spill way? Explain any two spill ways. [8+8]
6. What do you understand by MHD? Explain the working principle of MHD with neat sketch. [16]
7. Discuss the various factors to be considered while selecting the site for nuclear power stations. Discuss its advantages and disadvantages. [16]
8. (a) The peak load on a power station is 40MW. The loads having maximum demand s of 12MW,10MW,5MW and 9MW are connected to the power station. The capacity of the power station is 45MW and annual load factor is 50%. Find
      i. Average load on the power station
      ii. Energy supplied per year
      iii. Demand factor
      iv. Diversity factor.
   (b) Explain the pollution due to nuclear power plant. [10+6]

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Code No: M0328/R07 **Set No. 2**

**IV B.Tech I Semester Supplementary Examinations, Feb/Mar 2011**
**POWER PLANT ENGINEERING**
**( Mechanical Engineering )**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. What is the imporatnce of thermal power developement in the country? Describe its developement during the last six plans period. [16]

2. Explain different types of cooling towers used in steam power plant. Discuss their specific advantages. [16]

3. (a) How do you classify I.C engines?
   (b) Describe the various methods used for starting diesel engine. Describe the correct sequence of steps for starting and stoping procedure. [6+10]

4. A regenrative 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 maximum temperacture of the cycle is limited to $590^0$C. The regenerator receives 60% of the available energy from the exchaust gases. The compressor and turbine isentropic effiencies are 83% and 86% respectively. Find the efficiency and ratio of useful work to the turbine work. [16]

5. What are the factors considered in selecting a prime mover for a hydro electric power plant? [16]

6. (a) What is fuel cell?
   (b) Explain hydrogen-oxygen cell.

7. (a) What is a moderator in nuclear reaction? Explain the desirable properties of good moderator.
   (b) How are nuclear reactors classified? [8+8]

8. (a) Explain environmental pollution due to road transport.
   (b) Write short notes on stratospheric ozone depletion and acid fog. [8+8]

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Code No: M0328/R07 **Set No. 3**

**IV B.Tech I Semester Supplementary Examinations, Feb/Mar 2011**
**POWER PLANT ENGINEERING**
**( Mechanical Engineering )**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) Explain different types of equipments used for transferring coal.
   (b) List out their advantages and disadvantages. [8+8]

2. (a) Explain the role of PH value in corrosion.
   (b) Explain the process of internal boiler water treatment for scale prevention. [6+10]

3. (a) How do you classify I.C engines?
   (b) Describe the various methods used for starting diesel engine. Describe the correct sequence of steps for starting and stoping procedure. [6+10]

4. An open cycle gas turbine power plant, working on Brayton cycle. The maximum pressure and temperature of the cycle are limited to 5 ata and 900K. The pressure and temperacture of the gas entering into the compressor are 1 ata and $27^0$C. Reheating is used at a pressure of 2.5 ata, where the temperacture of the gases is increased to its original turbine inlet temperacture. The air flow rate is 10 kg/sec. Determine the thermal efficiency and plant capacity is MW. The exhaust pressure of the turbine is also 1 ata. Assume the compression and expansion are isentropic. Take $\gamma = 1.4$ for air and gas
   $C_P = 0.24$ k cal/ kg-k for air gas
   C.V of the fuel = 8000 k.cal/ kg. [16]

5. What are functions of surge tank and fore bay? Describe any two types of surge tank. [16]

6. (a) How are silicon cells fabricated?
   (b) Write the advantages and disadvantages of photo voltaic solar energy conversion. [8+8]

7. Explain the properties of moderator used in nuclear reactor. Explain the operation of a sodium graphite reactor with a sketch. [16]

8. (a) Briefly explain fossil fuel pollution.
   (b) What do understand by acid rains? What are the reasons of this? How are they controlled? [8+8]

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Code No: M0328/R07 **Set No. 4**

**IV B.Tech I Semester Supplementary Examinations, Feb/Mar 2011**
**POWER PLANT ENGINEERING**
**( Mechanical Engineering )**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) With the help of a sketch explain the working of electro static precipitator.
   (b) Discuss the factors affecting the performance of electro static precipitator. [10+6]

2. (a) What is the importance of high purity water in high pressure boilers?
   (b) Explain a method used for water purification when the make up water is required for high pressure boiler. [6+10]

3. Draw a neat diagram of a cooling system used for diesel power plant showing all the essential components. What are the advantages of double circuit over circuit. [16]

4. (a) Give the lay out of gas turbine power plant.
   (b) What methods are used to improve the efficiency of gas turbine power plant? [6+10]

5. What are the functions of surge tank and fore bay? Describe different types of surge tanks. [16]

6. What do you understand by MHD? Explain the working principle of MHD with neat sketch. [16]

7. (a) What is a moderator in nuclear reaction? Explain the desirable properties of good moderator.
   (b) How are nuclear reactors classified? [8+8]

8. (a) Briefly explain fossil fuel pollution.
   (b) What are the effects of SO2, NO2 and hydrocarbons on the human and crop lives? [8+8]

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