B. Tech.

(SEM. VIII) EXAMINATION. 2006-07

POWER PLANT ENGINEERING

Time : 3 Hours] [Total Marks : 100

Note : (1) Attempt all questions.
(2) All questions carry equal marks.

1  Attempt any four of the following :  5×4=20
   a) What do you mean by the term depreciation? Discuss various methods of its determination in brief.
   b) Discuss the effect of variable loads on the power plant.
   c) How can the cost of power generation be reduced? Discuss about the fixed costs.
   d) Define the following (i) connected load (ii) maximum demand (iii) diversity factor (iv) plant use factor
   e) What is a chemical fuel? How does it differ from a nuclear fuel?
   f) A power station is to be built to meet the following electrical load requirements :

<table>
<thead>
<tr>
<th>Time (hrs)</th>
<th>0-6</th>
<th>6-12</th>
<th>12-14</th>
<th>14-18</th>
<th>18-20</th>
<th>20-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load (MW)</td>
<td>120</td>
<td>360</td>
<td>240</td>
<td>400</td>
<td>200</td>
<td>150</td>
</tr>
</tbody>
</table>

V-4057] 1 [Contd...
Work out the following:
(i) Draw the load curve
(ii) Calculate the load factor
(iii) Calculate plant capacity factor.

2 Attempt any **four** parts of the following:  
5×4=20

a) Discuss the working principle of fluidized bed boilers.
b) Explain the working of an ash handling system
c) Discuss the basic process of water softening
d) What do you understand by pulverization of coal?
e) What is the purpose of governing of steam turbines? How it is done?
f) With the help of neat sketch, explain a general layout of a steam power plant.

3 Attempt any **two** parts:  
10×2=20

a) Why is super charging necessary in diesel power plant? What methods are used for supercharging the diesel engines?
b) Explain with the help of T-S and line diagram the working of a gas turbine plant. How can the performance of the plant be improved?
c) A gas turbine has a pressure ratio of 6 and maximum cycle temperature of 800°C. The isentropic efficiencies of compressor and turbine are 0.82 and 0.85 respectively. Calculate the power output and thermal efficiency when air enters compressor at 15°C and 1 bar.

V-4057] 2 [Contd..
4 Attempt any two parts : \[ 10 \times 2 = 20 \]
   a) With the help of neat diagrams, explain the working of a boiling water reactor. (BWR)
   b) What is the function of surge tanks in hydro-plants. Construct the various types of surge tanks.
   c) What are different non-conventional energy sources? Explain the working of a geothermal power plant.

5 Attempt any two parts : \[ 10 \times 2 = 20 \]
   a) Why hydrogen cooling is universally used in modern power plants? List out its advantages over air cooling system.
   b) Draw an electric line diagram to measure \( \text{CO}_2 \) in the flue gases and explain its working.
   c) What do you understand by noise pollution? Explain the methods adopted to reduce the noise pollution.