6TH SEM./MECH./DIP IN MECH./MECH.(MAINT)/ MECH.(PROD.)/ MECH(SAND.) / MECH(IND. INT.)/ 2024(S)

Th-3 POWER STATION ENGINEERING

Full Marks: 80 **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

USE OF STEAM TABLE AND MOLLIER DIAGRAM ALLOWED

1. Answer **All** questions 2 x 10
   a. Define work ratio and specific steam consumption in a Rankine cycle.
   b. State any four sources of energy.
   c. Define mountings of boiler with examples.
   d. What do you mean by fission reaction? Give an example.
   e. Define and classify steam turbine.
   f. What is the function of air extraction pump?
   g. Name the major components of hydel power plant.
   h. Differentiate between captive power plant and central power plant.
   i. Name four nuclear fuels.
   j. Write any two advantages of using a condenser in a steam power plant.

2. Answer **Any Six** Questions 6 x 5
   a. Enumerate and explain essential components of a nuclear reactor.
   b. Define and explain accessories of boiler? Describe economiser in a steam power plant.
   c. Differentiate between jet condenser and surface condenser.
   d. State the advantages and disadvantages of hydroelectric power plant.
   e. Explain the disposal of nuclear waste.
   f. Mention different captive power plant located in Odisha and for what purpose these are used.
   g An ideal engine works on Carnot cycle between the temperature limits of 327^0c and 77^0c. If 550KJ of heat is supplied to the working medium during a cycle of operation.
   Then find
   (i) Thermal efficiency of the cycle. (ii) Quantity of heat rejected

3. Explain working of nuclear power plants with block diagram. 10
4. For a diesel power station discuss briefly about lubricating system. 10
5. A steam power plant is supplied with dry saturated steam at a pressure of 12bar and exhausts into a condenser at 0.1bar. 10
   Calculate the Rankine efficiency by using (a) steam table and (b) Mollier chat.
6. Classify and explain the general arrangement of storage type of hydroelectric project and explain its operation. 10
7. Derive the expression for thermal efficiency of Rankine cycle with the help of P-V, T-S, and H-S diagram. 10