

3 hours

80 Marks

N. B. :

1. Question number 1 is compulsory
2. Attempt any **THREE** from question number 2 to 6
3. Use illustrative diagrams wherever required

Q1) Attempt any **FOUR** questions

- a) Differentiate between energy conservation and energy efficiency? **05**
- b) Write any five types of energy audit. **05**
- c) Enlist types of utilities required in chemical industry. **05**
- d) Explain why, indirect efficiency of boiler is calculated? **05**
- e) Enlist any five types of lamps and write their features. **05**

- Q2)**
- a) What is energy management? Write the principles of energy management. **10**
 - b) Explain how energy and environment are related to each other. What is the role of renewable energy to balance the equilibrium of environment? **10**

- Q3)**
- a) Define energy audit? Explain the need of energy auditing in the industries? **10**
 - b) Draw the flow chart showing the methodology of detailed energy audit. **10**

- Q4)**
- a) List **ENCON** measures possible in boiler system. **10**
 - b) List **ENCON** measures possible in HVAC system? **10**

- Q5)**
- a) How energy efficient motor differ from ordinary motor? Write significant parameters that influence the motor selection. **10**
 - b) Explain the method to calculate efficacy of lighting system. **10**

- Q6)**
- a) How the quality and quantity of waste heat is measured? Name any five waste heat recovery devices. **10**
 - b) What is the meaning of cogeneration? Write the advantages and applications of the process of cogeneration. **10**