



**ELECTIVE - I**  
**Energy Conservation & Management (New)**  
**(1251)**

**P. Pages : 3**

**Time : Three Hours**

**Max. Marks : 100**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any two** bits from a,b,c.
5. Black figures to the right indicate full marks.
6. Assume suitable additional data, if required, giving proper justification.

**UNIT – I**

1. a) What do you mean by energy management. State the steps in energy management to be established in a manufacturing company. **10**
- b) Give the need and importance of energy conservation with energy efficiency. **10**
- c) i) Following data is obtained from analysis of a boiler performance. Draw Sankey Diagram. Heat losses through flue gases (After last heat exchanger) = 11%  
Heat recovery by economiser = 3%  
Heat recovery by air preheater = 3%  
Heat losses due to moisture present in fuel = 2%  
Heat losses due to moisture present in air = 1%  
Heat losses due to water evaporation due to H<sub>2</sub> in fuel = 5%  
Losses due to radiation and heat unaccounted for = 2% **5**
- ii) What is Reserves to production ratio? Explain its importance with example. **5**

**UNIT – II**

2. a) i) Compare and recommended on the basis of life cycle cost. **5**

	ABC Compressor	PQR Compressor
Power Consumption	147 kw	150 kw
Life of Compressor	15 years	12 years
Cost of Compressor	15 lakhs	12 lakhs
Power cost	Rs. 5 / per kwh	Rs. 5/- per kwh
Operating hours	3000 hrs per year	3000 per year

- ii) List the strategies for better energy security of the nation. **5**
- b) What do you mean by energy audit. Explain its types in detail. **10**
- c) Explain energy audit methodology. **10**

**UNIT – III**

3. a) Calculate motor efficiency and power factor at full load with following data : **10**

Rated Power = 50 kw  
 Voltage 415 V  
 Current 88 A  
 Speed 1445 rpm.  
 Connection Delta  
 No load test data  
 Voltage 415 V  
 Current 21 A  
 Frequency 50Hz  
 Stator phase resistance at 30°C 0.27 ohms  
 No load power 2350 watt  
 Temp. at full load of motor 120°C.

- b) i) What are VFDS? Explain operation of VFD with example. **5**
- ii) Explain benefits of power factor improvement with example. **5**
- c) i) Initial oxygen level in the furnace exhaust is 10.5%. After energy conservation measures the level was brought down to 7%. Find out the percentage reduction in excess air supplied. **5**
- ii) Describe crycid parameters while selecting lighting system. What type of lamps you will select for street lights, why? **5**

**UNIT – IV**

4. a) What do you mean by co-generation. What are the factors influencing co-generation. **10**
- b) i) Explain effect of speed variation and impeller diameter on head, discharge and power consumption of a pump. **5**
- ii) Explain five major energy conservation measures in industrial fans. **5**
- c) Explain in details five most important energy conservation measures in refrigeration and air conditioning system. **10**

**UNIT – V**

5. a) What are the requirements for energy action planning. Explain in brief. **10**
- b) What are responsibilities and duties of energy manager under EC Act 2001. **10**
- c) Write short notes on : **10**
- a) Energy Policy
- b) Motivation of employees.

\*\*\*\*\*