



17559

15162

3 Hours / 100 Marks

Seat No.

--	--	--	--	--	--	--	--

- Instructions :** (1) *All questions are compulsory.*
(2) *Figures to the **right** indicate **full** marks.*
(3) *Assume suitable data, if **necessary**.*
(4) *Use of Non-programmable Electronic Pocket Calculator is **permissible**.*

Marks

1. A) Attempt any three.

12

- a) Classify energy sources with any two suitable examples.
- b) Explain the concept of fuel cell.
- c) List out the objectives of energy management.
- d) Draw the diagram of biogas plant.

B) Attempt any one.

6

- a) State three modes of heat transfer with examples.
- b) Define power factor. How it is calculated in electrical system ? Calculate the power factor of three phase induction 75 kW motor operates at 50 kW. The measured voltage is 415 V, current is 80 Amp.

2. Attempt any four.

16

- a) Explain any four energy audit instruments.
- b) What are the factors to be considered for energy security ?
- c) Define the following terms :
 - i) Heat
 - ii) Sensible heat
 - iii) Calorific value
 - iv) Wet bulb temp.
- d) List any four energy conservation opportunities in pumping system.
- e) How energy conservation cell will catalyse energy conservation activities in industry ?

P.T.O.



- 3. Attempt any four.** **16**
- a) State advantages and disadvantages of tidal energy.
 - b) How throttle valve pumping system can be replaced by any other four types of energy efficient pumping system ?
 - c) Explain energy monitoring and targetting and list the benefits of effective monitoring and targetting.
 - d) List components of windmill with their uses.
 - e) Differentiate between energy conservation and energy efficiency.
- 4. A) Attempt any three.** **12**
- a) List out (any eight) energy saving opportunities in cooling tower.
 - b) Compare renewable and non-renewable energy sources.
 - c) Explain three T's of combustion.
 - d) How energy is generated from tide and ocean ?
- B) Attempt any one.** **6**
- a) Define latent heat and specific heat. 20 kg of steam of 100°C with latent heat of condensation of 200 kJ/kg is condensed and cooled to 80°C. If specific heat of water is 4.187 kJ/kg°C. Find the quantity of heat given out.
 - b) What is benchmarking ? Write any eight benchmarking parameters used in industry.
- 5. Attempt any two.** **16**
- a) How will you determine the pump efficiency ? Estimate the reduction in power consumption of condensate transfer pump by reducing speed of the pump by 20% to the rated speed.
 $Q = 38 \text{ m}^3/\text{h}$, $H = 65 \text{ m}$, $P = 12.5 \text{ kW}$.
 - b) What are the types of energy audit ? Write down the points which should be included in energy audit report. What is the purpose of knowing energy cost in energy audit ?
 - c) Explain with diagram any one type of cooling tower. List the factors affecting cooling tower performance.
- 6. Attempt any two.** **16**
- a) Explain different parts of a centrifugal pump with a neat sketch.
 - b) How the wood gasifier is used for power generation ? Explain with diagram.
 - c) Explain the methodology of heat exchanger performance assessment.
-