



17559

16117

3 Hours / 100 Marks

Seat No.

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- Instructions :** (1) *All questions are compulsory.*
(2) *Answer each next main Question on a new page.*
(3) *Illustrate your answers with neat sketches wherever necessary.*
(4) *Figures to the right indicate full marks.*
(5) *Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.*

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| 1. A) Attempt any three of the following : | 12 |
| a) State the salient features of EC (Energy Conservation) Act, 2001. | |
| b) Write construction and working of Biogas plant. | |
| c) Explain need of energy audit. | |
| d) Explain concept of wave and tidal energy. | |
| B) Attempt any one of the following : | 6 |
| a) Explain power factor. A three phase motor with rated voltage 440 V and power 1.6 KW draws current of 2.6A. Calculate power factor. | |
| b) Describe types of fuels based on Physical state. Explain concept of gross and net calorific value. | |
| 2. Attempt any four of the following : | 16 |
| a) List any four instruments used for energy audit. Which parameters are measured by these instruments ? State importance of these parameters in energy audit. | |
| b) Classify energy sources with suitable examples. | |
| c) Draw and explain power triangle with the terms associated with it. | |
| d) Explain types of heat exchangers based on construction. | |
| e) Explain energy conservation and state its importance. | |
| 3. Attempt any four of the following : | 16 |
| a) Explain concept of fuel cell. | |
| b) State advantages and disadvantages of direct method for boiler efficiency calculation. | |
| c) Explain the steps involved in detailed energy audit. | |
| d) Derive expression for power in wind. | |
| e) Write down the features of Perform, Achieve and Trade (PAT) Scheme. | |

P.T.O.



4. A) Attempt **any three** of the following : 12
- a) Explain construction and working of centrifugal pump.
 - b) Explain construction and working of solar cell.
 - c) Explain 3T's of combustion.
 - d) State advantages and disadvantages of renewable energy sources.
- B) Attempt **any one** of the following : 6
- a) Define specific heat and latent heat. Steam is condensed at 100°C and cooled upto 60°C. Calculate heat given out in KJ.
Latent heat of steam = 540 KCal/kg.
Specific heat = 1 KCal/kg.
Mass of steam = 2 kg.
 - b) Explain in detail, structure of energy audit report. What is the importance of executive summery ?
5. Attempt **any two** of the following : 16
- a) Explain method for performance assessment of cooling tower.
 - b) What is simple payback period ? State its importance in energy conservation projects. An investment of Rs. 2,50,000/- gives saving of Rs. 30,000/- per year. Maintenance cost is Rs. 8,000/- per year. Calculate payback period.
 - c) Why throttling valve should be avoided in pumping system ? A pump consumes 8 kW power. Its impeller is trimmed by 10% of original diameter, calculate saving in power.
6. Attempt **any two** of the following : 16
- a) State energy conservation measures (4 each) in boiler and pumps.
 - b) Explain concept of solar cooker. How solar energy can be converted into electricity ?
 - c) Explain efficiency calculation of boiler by direct method.
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