



# 17559

**16172**

**3 Hours / 100 Marks**

Seat No.

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- Instructions :**
- (1) *All questions are compulsory.*
  - (2) *Illustrate your answers with neat sketches wherever necessary.*
  - (3) *Figures to the right indicate full marks.*
  - (4) *Assume suitable data, if necessary.*

**Marks**

1. A) Attempt **any three** of the following : **12**
- a) Define primary and secondary sources of energy and list them.
  - b) How energy is generated using tides and ocean ?
  - c) List any four equipments used for energy audits.
  - d) Explain the concept of fuel cell.
- B) Attempt **any one** of the following : **6**
- a) What is power factor ? A three phase motor operates at 55 kW draws 80 A current. Line voltage is 415 V. Calculate power factor.
  - b) State three modes of heat transfer. Give the examples of each.
2. Attempt **any four** of the following : **16**
- a) Distinguish between preliminary and detailed energy audit (any four point).
  - b) State various forms of energy with example.
  - c) What is the meaning of AC and DC current ?
  - d) List any eight energy saving opportunities in cooling tower.
  - e) What is energy security ? Explain.
3. Attempt **any four** of the following : **16**
- a) Describe the operation of typical Bio-gas plant with sketch.
  - b) What is NPSH ? Why it is important in pumping operation ?
  - c) What are the contents of energy audit report ?
  - d) Give different applications of solar energy.
  - e) State salient features of PAT scheme.

**P.T.O.**



4. A) Attempt **any three** of the following : 12
- a) State the salient features of fire tube and water tube boiler.
  - b) Define the following :
    - 1) Day light opening
    - 2) Cycle time injection molding.
  - c) Differentiate between sensible heat and latent heat (any two points).
  - d) Explain the term conventional and non-conventional energy sources with example.
- B) Attempt **any one** of the following : 6
- a) How variation of speed and impeller diameter affect energy consumption ? A pump is running at speed of 1750 rpm consuming 75 kW power. If speed is doubled, how much power will it consume ?
  - b) State eight energy bench marking parameters.
5. Attempt **any two** of the following : 16
- a) Give the objectives of performance test on pumps. What is system resistance ?
  - b) Discuss the important features of energy conservation act 2001 and new amendments in the same.
  - c) Calculate stoichiometric (kg) amount of air required for complete combustion of liquid fuel using following data. GCV of fuel is 10880 kcal/kg.
    - i) C-85.9%, H<sub>2</sub>-12%, O<sub>2</sub>-0.7%, N<sub>2</sub>-0.5%, S-0.5%, H<sub>2</sub>O-0.35%, ash-0.05%.
    - ii) C-88.4%, H<sub>2</sub>-9.4%, O<sub>2</sub>-2%, S-0.2%.
6. Attempt **any two** of the following : 16
- a) What is cooling tower ? Draw a diagram any one of the cooling tower and explain its working. What do you mean by cooling tower effectiveness ?
  - b) How solar energy can be used ? Explain it with six examples of applications.
  - c) List the steps to check performance assessment of heat exchanger.
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