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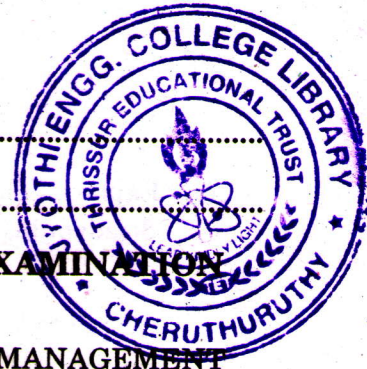
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EIGHTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION APRIL 2017

EE/PTEE 09 803 L09—ENERGY AUDITING, CONSERVATION AND MANAGEMENT

(2009 Admissions)

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all **five** *questions.*
2 marks each.

1. Define solar constant.

2. What are the disadvantages of renewable energy ?

3. Explain *two* part tariff.

4. What are the drawbacks of simple payback period ?

5. Define energy management.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
5 marks each.

6. Explain Components of a small hydro plant.

7. Discuss how TOD metering help in peak load reduction.

8. Explain the principle of life cycle costing.

9. Explain energy conservation opportunities in air conditioning system.

10. Discuss the advantages of PF (power factor) improvement.

11. Explain specific energy consumption.

(4 × 5 = 20 marks)

Part C

Answer all questions.
10 marks each.

12. (a) Explain V-I chara of solar cell and Define fill factor.

(5 marks)

(b) Determine the efficiency and fill factor of a solar cell, if Isc is 10 mA, Voc is 0.6 V and insolation is 0.9 mW/sq.cm. If I max is 50 % of Isc and Vmax is 0.045 V.

(5 marks)

Or

Turn over

(c) Explain two/three blade HAWT (horizontal axis wind turbine). Mention advantages and disadvantages.

(10 marks)

13. (a) Calculate the capacitance required to improve the power factor from 0.70 lag for a chemical industry of 1160kVA load to 0.89 lag ? Draw the phasor diagrams showing power factor angles before and after improvement.

Or

(b) Calculate the annual energy cost savings on replacing an existing standard motor (efficiency of 88.3 %) with energy efficient motor (efficiency of 93.5 %) with data as, Power= 15 kW, hours of working = 8000 Hrs, Energy price = Rs. 4/ kwh.

14. (a) Calculate the discounted payback period of solar water heating system, which costs Rs. 20,000 to purchase and install. If the geyser is used to heat 100 litres of water from 15 deg to 70 deg and operate for 160 days per year. Its efficiency is 90 % and cost of electricity is Rs. 3 per kWh. Use discount rate of 9 %.

Or

(b) A small wind mill for water pumping costs Rs. 10,000 to purchase and install. If Rs. 800 is the annual savings after replacing diesel engine, calculate the NPV of the investment, if life of wind mill is 15 years and interest rate is 12 %.

15. (a) Explain the eight steps of energy management.

Or

(b) Explain the three phases of detailed energy audit.

(4 × 10 = 40 marks)