22525

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3 Hours / 70 Marks Seat No. | | | | | | | | |

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) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

(a) List any two functions of MEDA.

(b) List any two energy conservation techniques in lighting systems.

(c) Interpret the losses in Induction motor.

(d) Write any two advantages of cogeneration.

(e) Illustrate any two applications of use of electronic ballast in a fluorescent electric discharge lamp.

(f) Define energy audit.

(g) Draw typical energy flow diagram (Sankey diagram).

2. Attempt any THREE of the following : **12**

(a) Suggest any two techniques for each one of the following electrical home appliances related to energy conservation :

(i) Domestic Refrigerator

(ii) Room Air Conditioner

(b) Illustrate any four factors affecting energy efficiency and minimising losses in operation of induction motor.

(c) Illustrate any four techniques to improve energy conservation in fan.

(d) Illustrate with neat block diagram bottoming cycle cogeneration system.

3. Attempt any THREE of the following : **12**

(a) List any four advantages of the use of energy efficient motors related to energy conservation.

(b) Compare on the basis of any four points the commercial and technical losses in the distribution system.

(c) State and elaborate the application of following tariff structure to reduce energy bill :

(i) Time of Day

(ii) Block Rate

(d) Describe walk through energy audit.

4. Attempt any THREE of the following : **12**

(a) List any four salient features of energy conservation Act, 2001.

(b) Draw and explain the load versus efficiency and power factor curves of induction motor related to energy conservation.

(c) Illustrate the effect of I^2R loss in the transmission and distribution lines related to energy conservation.

(d) Describe the term variable load on power stations and its effect on them related to energy conservation.

(e) State minimum one application of the following energy audit equipments :

(i) Lux meter

(ii) Energy meter

(iii) Voltmeter

(iv) Power analyser

5. Attempt any TWO of the following : **12**

(a) List any six advantages of energy efficient transformer.

(b) A consumer is offered electricity at the tariff of ₹ 150.00 per kVA of his Maximum Demand (MD) plus 25 paise per unit consumed. The consumer has a total load of 400 kW at a power factor 0.8 lagging. Calculate the annual bill for the consumer at a load factor 1. (100%)

(c) Illustrate any three factors governing selection of cogeneration system.

6. Attempt any TWO of the following : **12**

(a) Write any two advantages of each of the following energy conservation devices used :

(i) Maximum Demand Controller

(ii) Automic Power Factor Controller

(iii) kVA Controller

(b) A 10 hp motor is used for 20 hrs per week to pump water. A new motor has to be replaced to save 5 kWh of energy during each hour. If cost of new motor is ₹ 45,000, calculate payback period with electricity cost of ₹ 4.20 per kWh.

(c) List any six needs of energy audit.