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3 Hours / 100 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) Assume suitable data, if necessary.

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

Marks

1. (A) Attempt any THREE : **12**

(a) List out the energy conservation techniques to be adopted to reduce losses in the induction motor.

(b) List out the factors to be considered to select electrical drives for an application.

(c) Why energy conservation techniques should be adopted in transformers even though its efficiency is 90% ?

(d) Epoxy resin transformers are more suitable in hazardous areas. Give reason.

(B) Attempt any ONE : **06**

(a) List out any six significant features of Indian Electricity Act, 2003.

(b) State the stepwise procedure to assess the performance of existing lighting system in a fascility.

2. Attempt any FOUR : **16**

(a) State the significant features of Energy Efficient Motor.

(b) Suggest the energy conservation techniques in following cases :

(i) Motor is running with 70% loaded condition.

(ii) Motor is continuously loaded at 50%.

(iii) Motor runs with 30% loaded condition but sometimes rises to 50% loading condition.

(iv) Motor runs continuously under no-load condition.

(c) State how 'parallel operation of transformers' helps in energy conservation.

(d) List out the different technical losses that takes place in Transmission and Distribution system.

(e) Define the following tariff :

- Time-off-day tariff.
- Peak-off-day tariff.

Give one example for each.

(f) State and explain "power factor tariff".

3. Attempt any FOUR : **16**

(a) With example explain how the replacement of lamps in lighting system contributes for energy conservation ?

(b) List out the energy conservation techniques in Fans.

(c) State the various commercial losses in Transmission & Distribution systems. Also state energy conservation techniques adopted for reducing the losses.

(d) Explain the following energy conservation techniques :

(i) By reducing I^2R losses in Trans. system

(ii) By optimising distribution voltage.

(e) State the incentives and penalty related to following tariff structure :

(i) Max. demand tariff

(ii) Load factor tariff

(f) How the application of tariff system helps to reduce energy bill ?

4. (A) Attempt any THREE : **12**

(a) State advantages of electronic ballast compare to electrical ballast.

(b) State the scenario of power transmission losses at state level, national level, in developed countries and global level.

(c) State the need of cogeneration in present scenario.

(d) State the classification of cogeneration system based on sequence of energy use.

(B) Attempt any ONE : **06**

(a) A 50 kW motor with 86% efficiency is considered to replacemeant by 89% efficiency motor. What will be the energy saving, if operational hours per year is 6000 hr ?

(b) State and explain the desirable characteristics of a Tariff.

5. Attempt any FOUR : **16**

(a) Draw and label steam turbine cogeneration system.

(b) State the advantages of adoption of cogeneration system in an industry.

(c) List out the energy conservation equipments related to

- Lighting system
- Induction motor

(d) State the comparison between soft starter and conventional DOL starter.

P.T.O.

(e) Name the energy audit instruments used for measuring following parameters :

- All elect. parameters (V, I, P, Q, P.J)
- Lamp output
- Combustion of fuel
- Liquid flow
- Process temperature
- Presence of harmonics
- Fuel efficiency
- Gas leak
- Speed of rotating device

(f) What is 'energy flow diagram' ? State its significance.

6. Attempt any FOUR : **16**

(a) Explain, how technical losses can be reduced by use of energy efficient transformer in Transmission and Distribution system.

(b) State and explain the factors that governs the selection of cogeneration system for an industry.

(c) State the working principle and operation of Automatic power factor controller used in Transmission and Distribution system.

(d) Define :

(i) Energy Audit

(ii) Simple payback period

(iii) Return on Investment

(iv) Energy Audit Instruments

(e) State the difference between "Walk Through Audit" & "Detailed Audit".

(f) State the use of "Variable Frequency Drive". State its advantages.
