11819

3 Hours / 100 Marks Seat No. | | | | | | | | |

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.
(5) Use of Non-programmable Electronic Pocket Calculator is permissible.
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any THREE of the following : **12**

(a) State the meaning of energy conservation and its need in present scenario.

(b) Define the following term :

(i) Luminous flux

(ii) Illumination

(iii) Luminous Efficacy

(iv) Lux

(c) Describe the need of energy conservation in Induction motor.

(d) State any two opportunities for energy conservation techniques in transformer.

(B) Attempt any ONE of the following : **6**

(a) Describe the procedure for assessing existing lighting system in a facility.

(b) Describe the following energy conservation methods of electrical motors :

(i) Matching motor

(ii) By operating in star mode

2. Attempt any FOUR of the following : **16**

(a) State the criteria for lamp replacement with energy efficient lamps and use of light control gear as a energy conservation technique.

(b) Draw and explain power flow diagram of Induction motor.

(c) State the need of energy conservation in transformer and material used to improve the design & performance of transformer.

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

(e) State any four objectives of tariff system.

(f) State the term co-generation and explain its significance.

3. Attempt any FOUR of the following : **16**

(a) State the advantages of Installing high frequency electronic ballasts in place of conventional ballast in case of lighting system.

(b) State the factors governing the selection of Induction motor.

(c) State the various commercial losses in transmission & distribution system. Also state energy conservation techniques adopted for reducing the losses takes place in transmission and distribution system.

(d) Describe maximum demand tariff and power factor tariff.

(e) Explain the classification of co-generation system on the basis of sequence of energy use and on the basis of technology.

4. (A) Attempt any THREE of the following : **12**

(a) Explain amorphous core transformer and epoxy resin cast (dry type transformer) w.r.t. energy conservation.

(b) Explain the following energy conservation techniques in transmission and distribution system :

(i) By reducing I^2R losses

(ii) By compensating reactive power flow

(c) State the factors to be considered for selection of co-generation techniques.

(d) What is energy conservation equipment and list out energy conservation equipments related to lighting system and induction motor.

(B) Attempt any ONE of the following : **6**

(a) A consumer has a maximum demand of 100 kW, p.f. 0.8 lagging and load factor is 60%. The tariff used is ₹ 75/kVA of maximum demand +15 paise/kWh consumed. Calculate annual bill of consumer. (Considering 365 days/46)

(b) An industrial plant has an incandescent lighting load of comprising 100 nos. of 60 W, and 140 Nos. of 100 W. Calculate the energy savings and simple pay back period if each incandescent load is replaced by 1 × 40 W fluorescent lighting load. Lighting is required for 4000 hrs/yr and cost of electricity is ₹ 6.00/kWh. Replacement cost is ₹ 150/unit. Consider ballast consumption as 15 Watt.

Given data : 100 W incandescent lamp = 2200 lumens

60 W incandescent lamp = 1320 lumens

40W fluorescent lamp = 2400 lumens

5. Attempt any FOUR of the following : **16**

(a) What is phase balancing system ? Explain how it is used to conserve energy in distribution system.

(b) State incentives and penalty related with power factor.

(c) State advantages of co-generation system and give the names of co-generation industries takes place in Maharashtra.

(d) Describe the working of soft starter and state its advantages over conventional starter.

(e) State the use of variable frequency drive with its advantages.

(f) Define :

(i) Energy audit

(ii) Simple pay back period

(iii) Return of investment

(iv) ABC Analysis

6. Attempt any FOUR of the following : **16**

(a) State the features of energy efficient motors as compared to conventional induction motors.

(b) Explain time off day and peak off day tariff.

(c) State the working principle and operation of APFC and MD controller used in transmission and distribution system.

(d) State various energy audit instrument with their use for auditing.

(e) State the difference between “Walk through Audit” & “Detailed Audit”.

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