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Total Number of Pages : 02

Course: B.Tech  
Sub\_Code: REL5D002

6<sup>th</sup> Semester Regular / Back Examination: 2022-23  
SUBJECT: Electrical Energy Conservation and Auditing

BRANCH(S): MECH

Time : 3 Hour

Max Marks : 100

Q.Code : M131

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right-hand margin indicate marks.

**Part-I**

**Q1 Answer the following questions:**

**(2 x 10)**

- What is Candela power?
- What is 3<sup>rd</sup> harmonics and explain it?
- Define power quality relating to energy conservation in motors.
- Define luminous intensity.
- Define time off day tariff.
- Define luminous flux.
- List co-generation systems based on the sequence of energy used.
- Recall the steps followed in the walk-through energy audit.
- List four relevant instruments to carry out an energy audit in the electrical laboratory.
- What is plant energy performance?

**Part-II**

**Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)**

- Describe the energy management approach that one should adopt.
- Describe with a sketch the working of Variable frequency drives as an energy conservation device.
- Describe the Lamberts law or  $\cos^3 \theta$  law.
- An industrial consumer is charged with the scheduled tariff of Rs.250 /kVA per month for maximum demand and 150paise per unit consumed for a load factor of 60% and 80%. Find overall cost per unit at i) unity P.F. ii) 0.9 P.F. Consider maximum demand of 50 kVA.
- Distinguish between Energy conservation and Energy audit based on activities.
- Make use of load factor and maximum demand tariff to minimize electrical consumption of the electrical installation.
- What do you understand by energy management? Elaborate on the various elements of Energy Management Program (EMP).

- h) Identify the benefits and applications of availability-based tariffs and power factor tariff.
- i) Differentiate between technical and commercial losses.
- j) List the various duties of an Energy Manager.
- k) Demonstrate the Energy Conservation Technique adopted in Lighting System by using energy-efficient luminaries and using light-controlled gears.
- l) Explain one method to improve the power factor of the system.

### Part-III

#### Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3 What is an energy audit? Explain its need. Give a brief about the various energy auditing instruments. (16)
- Q4 Describe with a flow chart, the detailed energy audit procedure. (16)
- Q5 Outline the step-wise activities to be carried out to assess the performance of the existing lighting system of electrical installation. (16)
- Q6 Illustrate the benefits of time off day and peak off day tariff relevant to energy cost along with its impact on the energy bill. (16)