## Scheme - I

## Sample Question Paper

**Program Name** : **Electrical Engineering Program Group**
**Program Code** : **EE/EP/EU**
**Semester** : **Fifth**
**Course Title** : **Energy Conservation and Audit**
**Max. Marks** : **70** **Time: 3 Hrs.**

**22525**

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**Instructions:**
(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Sub-questions in a main question carry equal marks.
(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

**Q.1) Attempt any Five of the following.** **10 Marks**

a) List any two functions of BEE related to energy conservation.
b) Define power quality relating to energy conservation in motors.
c) Interpret losses in secondary distribution system.
d) List co-generation systems based on sequence of energy used.
e) Define time off day tariff.
f) List four relevant instruments to carry out energy audit in electrical laboratory.
g) Recall the steps followed in walk through energy audit.

**Q.2) Attempt any Three of the following.** **12 Marks**

a) Distinguish between Energy conservation and Energy audit based on activities.
b) Illustrate Energy conservation in motor by load matching and operating in star mode.
c) Demonstrate the Energy Conservation Technique adopted in Lighting System by using energy efficient luminaries and using light controlled gears.
d) Summarize the factors considered while selecting the co-generation system.

**Q.3) Attempt any Three of the following.** **12 Marks**

a) Identify energy conservation opportunities in transformer based on material technology.
b) Differentiate between technical and commercial losses.
c) Choose any four tariff schedule to reduce electricity bill of commercial consumer.
d) Illustrate significance of Sankey diagram to identify the area for energy conservation in thermal system.

**Q.4) Attempt any Three of the following.** **12 Marks**

a) Differentiate the star labeled electrical equipment from non-labeled electrical equipment based on running charges, initial investment, design aspect and life span.
b) Illustrate with neat sketch the working of automatic power factor corrector as a energy conservation device.

c) Identify and list the technical losses in electrical installation, suggest techniques to reduce them.
d) Make use of load factor and maximum demand tariff to minimize electrical consumption of electrical installation.
e) Outline questionaires to carry out energy audit of electrical workshop.

**Q.5) Attempt any Two of the following. 12 Marks**

a) i) List significant features of soft starter. [2]
ii)Describe with sketch the working of Variable frequency drive as a energy conservation device. [4]
b) An industrial consumer charged with the scheduled tariff of Rs.250 /kVA per month for maximum demand and 150paisa per unit consumed for 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.
c) Identify the benefits and applications of availability-based tariff and power factor tariff.

**Q.6) Attempt any Two of the following. 12 Marks**

a) Outline the step wise activities to be carried out to assess the performance of existing lighting system of electrical installation.
b) 30 number, 100W incandescent lamps are used for exterior lighting and it is being recommended to replace with 25 number 20 W CFL or 15 number 20 W fluorescent Tube light. Determine the payback period for each of the two recommended, by using following information.
i) Cost of one incandescent lamp Rs.10/- ii) Cost of one CFL Rs.80/- andiii) Cost of one fluorescent tube Rs.140/-.Assume cost per unit is Rs 4/- and working hours 10 per day.
c) Describe with flow chart, the detailed energy audit procedure.

## Scheme - I

## Sample Test Paper - I

**Program Name** : **Electrical Engineering Program Group**

**Program Code** : **EE/EP/EU**

**Semester** : **Fifth**

**22525**

**Course Title** : **Energy Conservation and Audit**

**Max. Marks** : **20** **Time: 1 Hour.**

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**Instructions:**

(1) All questions are compulsory.
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(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

**Q.1 Attempt any FOUR.** **08 Marks**

a. List out two benefits of energy conservation.

b. Outline any two features of energy efficient transformer.

c. State any four energy conservation techniques in Induction motor.

d. Summarise the technical losses taking place in primary transmission system.

e. Describe voltage optimisation techniques to reduce technical loss.

f. List the benefits of maximum demand controller as energy conserving device.

**Q.2 Attempt any THREE.** **12 Marks**

a. Explain the role of MEDA and BEE to promote energy conservation programme.

b. Discuss the energy conservation opportunities in induction motor and its need.

c. Illustrate the load sharing and isolating technique in transformer to predict energy efficiency.

d. List any four commercial losses and suggest remedy to overcome it.

e. Describe the energy conservation technique in power system by using reactive power compensator with their benefits and limitations.

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## Scheme - I

## Sample Test Paper - II

**Program Name** : **Electrical Engineering Program Group**

**Program Code** : **EE/EP/EU**

**Semester** : **Fifth**

**22525**

**Course Title** : **Energy Conservation and Audit**

**Max. Marks** : **20** **Time: 1 Hour.**

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**Instructions:**

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Sub-questions in a main question carry equal marks.
(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

**Q.1 Attempt any FOUR.** **08 Marks**

a. State two benefits of combined heat power generation.
b. State any two feature of topping cycle co-generation.
c. State the components of availability-based tariff.
d. State the definition of energy audit as per energy conservation act.
e. Draw neat labelled sketch of gas turbine co-generation.
f. List any four instruments used in energy audit with their application.

**Q.2 Attempt any THREE.** **12 Marks**

a. Describe the operation of servo stabilizer and lighting transformer with regards to energy conservation in lighting.
b. Explain the penalty clause of poor power factor while preparing energy bill.
c. Illustrate the benefits of time off day and peak off day tariff relevant to energy cost along with its impact on energy bill.
d. Prepare the general audit report format of electrical installation of concert hall/ theatre.
e. Explain: Payback period and detailed audit in relevance to energy efficiency.

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