**BVCTE,ANJANERI ,NASHIK**

**Course Name : Electrical Engineering**

**Course Code : EE Semester : Fifth**

**Subject Title : Energy Conservation & Audit(17506)**

1. State the meaning and need of Energy Conservation.

2. Define the following terms :

1) Illuminance

2) Lux

3) Luminous Efficacy

4) Colour Rendering Index

3. State any four benefits of Variable Frequency Drives (VFDs).

4. List any four factors to be considered while selecting motor for any particular application.

**5.** How energy efficiency improvement is achieved in Energy Efficiency Motor for

following power loss area: i) Iron ii) Stator and Rotor I2R iii) Friction and Windage?

**6** A 10 HP electric motor is being used 10 hrs. per week to grind feed. A new replacement

motor is estimated to save 5 kwh of energy during each hrs. of operation. If replacement

cost for 10 HP motor is Rs. 45000/- calculate simple pay back period. Assume

electricity cost of Rs. 4.50 per kwh.**s**

**6.**Describe the procedure for assessing existing lighting system in a facility.

7.Describe energy conservation technique using light controlled gear in lighting system.

**8.** Compare conventional core transformer with amorphous core transformer on the basis

of i) Construction ii) Material used iii) Losses and iv) Cost.

**9.** How parameters of transmission line effects the performance of transmission line?

**10.** Estimate the number and wattage of lamps which would be required to illuminate a

workshop space 60m x 15m by means of lamps mounted 5m above the working plane.

The average illumination required is about 100 lux, coefficient of utilization is 0.4,

luminous efficiency 16 lumens per watt. Assume a space-height ratio of unity and a

candle power depreciation of 20%.

**11.** A 50 kw induction motor with 86% full load efficiency is being considered for

replacement by a 89% efficiency motor. What will be the saving in energy if motor

works for 6000 hrs. per year and cost of energy is Rs. 4.50 per kwh?

**12.** Write stepwise procedure to calculate Installed Load Efficacy and Installed Load

Efficacy Ratio of an interior general lighting installation.

**13.** State the opportunities for energy conservation techniques in transformer.

**14.** Describe the following energy conservation methods of electrical motor:

i) Matching motor rating with required load

ii) Improving Power Quality

**15.** Describe the use of Epoxy Resin Cast / Encapsulated Dry Type Transformer from

energy conservation point of view.

**16.** How energy conservation is done in transmission and distribution system by i) Reducing

I2R losses and ii) Compensating reactive power flow?

17. State any four objectives of Tariff System.

18.State classification of Cogeneration System on the basis of i) Sequence of energy use and ii)

Technology.

19. What is the effect of following on energy conservation?

1) Power Factor (P.F.) 2) Load Factor (L.F.)

20. What are the various costs which have to be taken into account in fixation of Tariff?

**21.** How system voltage optimization and phase current balancing helps in energy conservation

in transmission and distribution system?

**22.** An industry has an annual energy consumption of 200000 kwh at a load factor of 0.35. The

tariff is Rs. 4000/- + Rs. 1200/- per kw of maximum demand + Rs. 2.20/- per kwh i) Find its

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annual bill ii) What is the bill if total energy consumption is the same but load factor

improved to 0.55? iii) What is the bill if energy consumption is reduced by 25% and load

factor remains at the same initial value of 0.35?

**23.** State the technical and commercial losses in transmission and distribution system.

**24.** List any four energy conservation equipments each related to i) Lighting System and ii)

Electrical Motors.

**25.**Describe layout diagram of Gas Turbine Cogeneration System.

**26.** Describe the working principle of Automatic Power Factor Controller.

**27.** Describe the working of Soft Starter and state its advantages over conventional starters.

**28.** Describe the working principle and operation of Maximum Demand Controller.

**29.** Describe an energy flow diagram for industrial plant with the help of sketch.

**30.** What is ABC analysis? State its advantages referred to energy audit projects.

**31.** The steam and electricity requirement of an industry is 75000 kg of steam and 5000 kwh of

electricity per month. 1 kg of coal produces about 5 kg of steam. If cogeneration is used

additional coal requirement to produce electricity is about 10%. If coal is used only for

power generation the coal consumption is about 0.6 kg / kwh. Find saving in coal if

cogeneration is used. Assume 20% losses in auxiliary, transmission and distribution.

**32.** States whether the following statement is true or false also justify your answer. “When

electricity produced by an industry through a cogeneration system, is sold to utility the price

of electricity should be neither too low nor too high”

**33.** “Measurements are an essential part of energy audit”. Justify the statement