

**CERTIFICATE IN ENERGY TECHNOLOGY
AND MANAGEMENT (CETM)**

Term-End Examination

December, 2015

**OEY-003 : ENERGY MANAGEMENT :
AUDIT AND CONSERVATION**

Time : 3 hours

Maximum Marks : 70

*Note : Attempt **five** questions in all. Question no. 1 is compulsory. All questions carry equal marks. Use of scientific calculator is permitted.*

1. Choose the correct answer from the given four alternatives. 7×2=14

(a) Which fossil fuel dominates the energy sector of India ?

- (i) Coal
- (ii) Gas
- (iii) Oil
- (iv) Biomass

- (b) The Energy Conservation Act, 2001 requires designated consumers to
- (i) appoint/designate certified energy manager
 - (ii) conduct an energy audit through an accredited energy auditor
 - (iii) comply with energy consumption norms and standards
 - (iv) All of the above
- (c) Acid rain is caused by
- (i) CO₂ emissions
 - (ii) Soot in the air
 - (iii) NO_x emissions
 - (iv) SO_x emissions
- (d) One thousand litres of fuel oil costs ₹ 16,000. How much does one kg of fuel oil cost, if the density is 950 kg/m³ ?
- (i) ₹ 15-20
 - (ii) ₹ 15-50
 - (iii) ₹ 17-20
 - (iv) ₹ 16-80
- (e) IRR stands for
- (i) Industrial Rate of Return
 - (ii) Interest Return Rate
 - (iii) Internal Rate of Return
 - (iv) Investment Return Rate

- (f) In an industry, the average electricity consumption is 2.3 lakh kWh for the period. The average production is 20,000 tons with a specific electricity consumption of 10 kWh/ton for the same period. The fixed electricity consumption for the plant is
- (i) 30,000 kWh
 - (ii) 23,000 kWh
 - (iii) 2,00,000 kWh
 - (iv) None of the above
- (g) Which of the following gases has the least impact on global warming ?
- (i) Carbon Dioxide (CO_2)
 - (ii) Carbon Monoxide (CO)
 - (iii) Methane (CH_4)
 - (iv) Nitrous Oxide (NO_x)
2. (a) What are the basic principles of classification of energy conservation measures ?
- (b) What do you understand by medium term energy conservation measures in a wire manufacturing industry ?

7+7

3. (a) Elaborate the basic concepts of integrated rural energy planning.
- (b) 100 numbers of fused 60 watt Incandescent Light Bulbs (ILB) are replaced by same numbers of 12 watt CFL instead of new ILB. Calculate the annual 'kWh' saved for 4000 hours of operation per year. 7+7
4. (a) How do you calculate the life cycle cost of solar PV power ?
- (b) Discuss waste heat recovery from flue gases. 7+7
5. (a) Explain in brief the energy audit of a pharmaceutical industry.
- (b) A house is fitted with 20 lamps rated 100 W each, 10 fans consuming 0.5 A each and an electric kettle of resistance 100 ohm. Electricity is supplied at 220 V and electrical energy is sold at ₹ 4 per kWh. Calculate the bill for running the appliances for 6 hours in a day for the month of May, 2015. 7+7
6. (a) Differentiate between energy consumption and specific energy consumption.
- (b) Explain blow-down losses in detail. 7+7

7. (a) Do you agree that the energy audit is important in our day-to-day life ? Justify your answer with suitable examples.
- (b) Name the various pressure, flow and speed measuring instruments and explain any one of them in brief. 7+7

8. Write short notes on any *four* of the following : $4 \times 3 \frac{1}{2} = 14$

- (a) Solar PV Power
 - (b) Conservation in AC units
 - (c) Animal Power
 - (d) Waste Heat Recovery
 - (e) Gasifier-based Engine Pumps
 - (f) Evaporative Cooling
 - (g) Mechanized Bullock Cart
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