

MCQ Question Bank
Subject: Energy Conservation and Management
Subject Code: 2181916

1. Which of the following terms does not refer to specific energy consumption
 - a) kWh/ton
 - b) kCal/ton
 - c) kJ/kg
 - d) **kg/kCal**

2. Which of the following GHGs has the longest atmospheric life time
 - a) CO₂
 - b) Sulfur Hexafluoride (SF₆)
 - c) CFC
 - d) **Per FluoroCarbon (PFC)**

3. Which of the following comes under mandatory labeling programme
 - a) diesel Generators
 - b) induction motors
 - c) **tubular Fluorescent Lamps**
 - d) LED lamps

4. To improve the boiler efficiency, which of the following needs to be done
 - a) maximize O₂ in flue gas
 - b) **maximize CO₂ in flue gas**
 - c) minimize CO₂ in flue gas
 - d) maximize CO in flue gas

5. The quantity of heat required to raise the temperature of 1 kg of water by 1^oC is termed as
 - a) latent heat
 - b) one kilojoule
 - c) **one kilo calorie**
 - d) none of the above

6. The major share of energy loss in a thermal power plant is in the
 - a) generator
 - b) boiler
 - c) **condenser**
 - d) turbine

7. In India power sectors consumes about _____% of the coal produced
- a) 75%
 - b) 50%
 - c) 25%
 - d) 90%
8. How much power generation potential is available in a run of river mini hydropower plant for a flow of 40 liters/second with a head of 24 metres. Assume system efficiency of 60%
- a) 5.6 kW
 - b) 9.4 kW
 - c) 4.0 kW
 - d) 2.8 kW
9. For expressing the primary energy content of a fuel in tonnes of oil equivalent (toe) which of the following conversion factors is appropriate
- a) $\text{toe} = 1 \times 10^6 \text{ kcal}$
 - b) $\text{toe} = 116300 \text{ kwh}$
 - c) $\text{toe} = 41.870 \text{ GJ}$
 - d) all the above
10. For calculating plant energy performance which of the following data is not required
- a) current year's production
 - b) reference year's production
 - c) reference year energy use
 - d) capacity utilization
11. As per primary commercial energy consumption mix in India, the fuel dominating the energy production mix in India is
- a) natural gas
 - b) oil
 - c) coal
 - d) nuclear energy
12. An oil-fired boiler operates at an excess air of 6%. If the stoichiometric air fuel ratio is 14 then for an oil consumption of 100 kg per hour, the flue gas liberated in kg/hr would be
- a) 1484
 - b) 1584
 - c) 106
 - d) 114

13. Among which of the following fuels, the difference between the GCV and NCV is maximum
- a) coal
 - b) furnace Oil
 - c) natural gas
 - d) rice husk
14. A waste heat recovery system costs Rs. 54 lakhs and Rs. 2 lakhs per year to operate and maintain. If the annual savings is Rs. 20 lakhs, the payback period will be
- a) 8 years
 - b) 2.7 years
 - c) 3 years
 - d) 10 years
15. A process requires 10 Kg of fuel with a calorific value of 5000 kcal/kg. The system efficiency is 80% and the losses will be
- a) 10000 kcal
 - b) 45000 kcal
 - c) 500 kcal
 - d) 2000 kcal
16. A 400W lamp was switched on for 10 hours per day. The supply volt is 230V (current= 2 amps & PF= 0.8). What is the energy consumption per day
- a) 3.68 kWh
 - b) 6.37 kWh
 - c) 0.37 kWh
 - d) 4.0 kWh
17. 100 tons of coal with a GCV of 4200 kcal/kg can be expressed in 'tonnes of oil equivalent' as
- a) 42
 - b) 50
 - c) 420
 - d) 125
18. Which of the following may not be a suitable energy security option for India ?
- a) improving Energy Efficiency
 - b) increasing Jatropha Cultivation
 - c) increasing Renewable Energy use
 - d) increasing oil fired thermal power stations

19. India's proven oil reserves is about ___% of total world reserves
- a) 0.1
 - b) 2
 - c) 0.4
 - d) 4
20. Matching energy usage to requirement means providing
- a) just theoretical energy needed
 - b) just the design needs
 - c) energy with minimum losses
 - d) less than what is needed
21. An oil fired boiler operates at an excess air of 20%. If the stoichiometric air to fuel ratio is 14 and oil consumption is 200 kg per hour then the mass of flue gas leaving the boiler chimney in kg/ hour would be
- a) 3560
 - b) 3360
 - c) 3460
 - d) 3660
22. A sensitivity analysis is an assessment of
- a) cash flows
 - b) risks due to assumptions
 - c) capital investment
 - d) best financing source
23. For an investment which has a fluctuating savings over its project life which of these analysis would be the best option
- a) Payback
 - b) NPV
 - c) ROI
 - d) IRR
24. In a heat exchanger, inlet and outlet temperatures of cooling water are 28°C & 33°C. The cooling water circulation is 200 litres /hr. The process fluid enters the heat exchangers at 60 °C and leaves at 45 °C. Find out the flow rate of the process fluid? (C_p of process fluid = 0.95)
- a) 70
 - b) 631
 - c) 63
 - d) 570

25. In a cumulative sum chart, if the graph is horizontal, then
- nothing can be said
 - energy consumption is reduced
 - specific energy consumption is increasing
 - actual and calculated energy consumption are the same
26. Assume project A has an IRR of 85% and NPV of Rs 15,000 and project B has an IRR of 25% and NPV of 200,000. Which project would you implement first if financing is available and project technical life is the same?
- B
 - A
 - cannot be decided
 - question does not make sense
27. In CDM terminology CER means
- Carbon Emission Reduction
 - Clean Environment Rating
 - Certified Emission Reduction
 - Carbon Emission Rating
28. How much carbon emission will be reduced per year by replacing 60 Watt incandescent lamp with 15 Watt CFL Lamp, if emission per unit is 1 kg CO₂ per kWh and annual burning is 3000 hours?
- 45 ton
 - 3 ton
 - 0.135 ton
 - 183 ton
29. An energy audit as defined in the Energy Conservation Act 2001 does not include
- action plan to reduce energy consumption
 - verification, monitoring and analysis of use of energy
 - submission of technical report with recommendations
 - implementation of all the recommendations of energy audit
30. In the first two months the cumulative sum is 4 and 12 respectively. In each of the next two months $E_{\text{calculated}}$ is more than E_{actual} by 3. The energy savings at end of the fourth month would be
- 6
 - 0
 - 6
 - none of the above

31. Which among the following can be best implemented through an ESCO (Energy Service Company) route:
- a) coal procurement contract for captive power plant
 - b) energy efficient design of a municipal lighting system
 - c) large Waste Heat Recovery System in a large process plant, where external financing is sought
 - d) energy and mass balance study of a Steel Plant
32. Statement not applicable to TOD (Time of the Day) in electricity tariff structure?
- a) higher energy charges during peak period
 - b) it is an incentive to maximize off- peak consumption
 - c) it is an incentive to minimize peak time power draw from the grid by consumers
 - d) it is a disincentive for Distribution Company
33. The process by which Annex 1 countries can invest in the GHG mitigation projects in developing countries is called:
- a) green trading
 - b) clean development mechanism
 - c) conference of parties
 - d) certified emission reduction
34. Which one is not an energy consumption benchmark parameter?
- a) kCal/kWh of electricity generated
 - b) kg/ deg C.
 - c) kW/ton of refrigeration
 - d) kWh/kg of yarn
35. The four pillars of successful energy management are technical ability, monitoring system, top management support and _____
- a) strategy plan
 - b) energy audit plan
 - c) quality plan
 - d) financial plan
36. Identify the wrong statement
- a) fuel switching may improve energy efficiency
 - b) fuel switching may reduce energy efficiency
 - c) fuel switching may reduce energy costs
 - d) fuel switching always reduces energy consumption

37. Doppler effect principle is used in which of the following instrument
- lux meter
 - ultrasonic flow meter
 - infrared thermometer
 - flue gas analyzer
38. In a cogeneration system, with extraction condensing turbine, the highest heat rate is recorded when;
- maximum power output and maximum extraction to process
 - maximum power output and normal extraction to process
 - maximum power output and minimum extraction to process
 - none of the above
39. A bottoming cycle is one in which fuel is used for producing
- power primarily followed by byproduct heat output
 - heat primarily followed by byproduct power output
 - power, heat and refrigeration simultaneously
 - none of the above
40. Heat transfer in a furnace is effected by
- radiation from flame
 - radiation from furnace walls
 - convection due to movement of hot gases over the stock
 - all of the above
41. A paper plant needs steam at 3.5 bar and 10.5 bar in addition to electric power. The most suitable choice among the following will be
- condensing turbine
 - bottoming cycle
 - back pressure turbine
 - extraction cum back pressure turbine
42. A power utility distributed 1 million 15 Watt CFLs for Rs 15 million, replacing 60 Watt incandescent lamps under Bachat Lamp Yojna. What will be the drop in power in the evening on the demand side, if 80% of the lights are on at that time, assuming similar numbers of incandescent lamps were switched on during the same period?
- 360 kW
 - 12 MW
 - 36 MW
 - 60MW

43. Which of the following with respect to fossil fuels is true?
- a) Reserve / Production (R/P) ratio is a constant once established
 - b) R/P ratio varies every year with only changes in production
 - c) R/P ratio varies every year with only changes in reserves
 - d) R/P ratio varies every year with changes in both production and reserves
44. Consider two competitive projects A and B each entailing investment of Rs.85,000/- . Project A returns Rs.50,000 at the end of each year, but Project B returns Rs.115,000 at the end of Year 2. Which project is superior?
- a) project A since it starts earning by end of first year itself and recovers cost before end of two years
 - b) project B since it offers higher return before end of two years
 - c) both projects are equal in rank
 - d) insufficient information to assess the superiority
45. Power is to be generated from a cement kiln exhaust gas. The applicable type of cogeneration is called
- a) topping cycle
 - b) trigeneration
 - c) bottoming cycle
 - d) none of the above
46. _____ is a statistical technique which determines and quantifies the relationship between variables and enables standard equations to be established for energy consumption.
- a) linear regression analysis
 - b) time-dependent energy analysis
 - c) moving annual total
 - d) CUSUM
47. Which property of ceramic coating influences energy savings in furnaces?
- a) emissivity
 - b) coating thickness
 - c) conductivity
 - d) convective heat transfer coefficient
48. The internal rate of return is the discount rate for which the NPV is
- a) positive
 - b) zero
 - c) negative
 - d) less than 1

49. Which of the following instrument is used for assessing combustion efficiency ?
- a) lux Meter
 - b) pitot tube & manometer
 - c) ultrasonic flow meter
 - d) fyrite
50. The benchmarking parameter for a vapour compression refrigeration system is
- a) kW / kg of refrigerant used
 - b) kcal / m³ of chilled water
 - c) BTU / Ton of Refrigeration
 - d) kW / Ton of Refrigeration
51. A building intended to be used for commercial purpose will be required to follow Energy conservation building code under Energy Conservation Act, 2001 provided its
- a) connected load is 120 kW and above
 - b) contract demand is 100 kVA and above
 - c) connected load is 100 kW and above or contract demand is 120 kVA and above
 - d) connected load is 500 kW and contract demand is 600 kVA
52. Energy Intensity is the ratio of
- a) Fuel Consumption / GDP
 - b) GDP/Fuel Consumption
 - c) GDP/ Energy Consumption
 - d) Energy Consumption / GDP
53. Which of the following is an energy security measure?
- a) fully exploiting domestic energy resources
 - b) diversifying energy supply source
 - c) substitution of imported fuels for domestic fuels to the extent possible
 - d) all of the above
54. In project financing ,sensitivity analysis is applied because
- a) almost all the cash flow methods involve uncertainty
 - b) of the need to assess how sensitive the project to changes in input parameters
 - c) what if one or more factors are different from what is predicted
 - d) all the above situation

55. In a glass industry waste heat is used for power generation. This type of cogeneration is called
- a) topping cycle
 - b) bottoming cycle**
 - c) combined cycle
 - d) none of the above
56. Which among the following types of fans is predominantly used in cooling towers ?
- a) centrifugal fan
 - b) axial fan
 - c) radial fan
 - d) all the above
57. The T2, T5, T8 and T12 fluorescent tube light are categorized based on
- a) diameter of the tube**
 - b) length of the tube
 - c) both diameter and length of the tube
 - d) power consumption
58. What is shale Oil?
- a) Sedimentary rock containing solid bituminous materials**
 - b) Heavy black viscous oil combination of clay, sand, water and bitumen
 - c) A form of naturally compressed peat
 - d) combustible brownish-black sedimentary rock
59. ESCO stands for
- a) Energy supply company
 - b) Energy service company**
 - c) Energy standards company
 - d) Energy sourcing company
60. The essential elements of monitoring and targeting system is
- a) Recording
 - b) Reporting
 - c) Controlling
 - d) All the above**

61. The objective of energy management is
- a) To minimize energy costs
 - b) To minimize environmental effects
 - c) a & b**
 - d) None of the above
62. Capital costs are the costs associated with
- a) Design
 - b) Installation & Commissioning of project
 - c) a & b**
 - d) Savings from project
63. Which of the following is not an external source of fund
- a) Bank loans
 - b) Leasing arrangement
 - c) Revenue budget**
 - d) Private Finance
64. Percentage share of different energy consumption in an industry can be best shown by a
- a) Pie Chart**
 - b) Bar Chart
 - c) Line Diagram
 - d) None of the above
65. "The judicious and effective use of energy to maximise profits and enhance competitive positions". This can be the definition of:
- a) Energy conservation
 - b) Energy management**
 - c) Energy policy
 - d) Energy Audit
66. Energy manager should be well versed with
- a) Manufacturing and processing skills
 - b) Managerial and technical skills**
 - c) Technical and marketing skills
 - d) Managerial and commercial skills

67. An energy policy does not include
- a) Target energy consumption reduction
 - b) Time period for reduction
 - c) Declaration of top management commitment
 - d) Future production projection
68. The tool used for performance assessment and logical evaluation of avenues for improvement in Energy management and audit is
- a) Fuel substitution
 - b) Monitoring and verification
 - c) Energy pricing
 - d) Bench marking
69. The various types of the instruments, which requires during audit need to be
- a) easy to carry
 - b) easy to operate
 - c) inexpensive
 - d) all (a) to (c)
70. Energy monitoring and targeting is built on the principle of “ _____ ”.
- a) “production can be reduced to achieve reduced energy consumption”
 - b) “Consumption of energy is proportional to production rate”
 - c) “You cannot manage what you do not measure”
 - d) None of the above.
71. One of the following is not the element of energy monitoring & targeting system
- a) Recording the energy consumption
 - b) comparing the energy consumption
 - c) Controlling the energy consumption
 - d) Reducing the production
72. Data required to plot a moving annual total is _____.
- a) production
 - b) energy
 - c) both the above
 - d) none the above

73. The number of major green house gases covered for their reduction by the Kyoto protocol are
- a) 10
 - b) 2
 - c) 6
 - d) 1
74. The name of the world commission on Environment and development is _____
- a) Brundtland Commission
 - b) Zakaria Commission
 - c) Planning Commission
 - d) None of the above
75. Steam is preferred medium for heating applications because:
- a) high latent heat
 - b) temperature break down is easy
 - c) Easy to control and distribute
 - d) all the above
76. In a plant a boiler is generating a saturated steam of 2 tonnes/hour at a pressure of 7.0 kg/cm²g. The feed water temperature is 70 °C and furnace oil consumption is 138 kg/h. What is the efficiency of the boiler by using direct method of efficiency evaluation? (calorific value of FO is 10,000 kCal/kg, enthalpy of steam is 660 kCal/kg.)
- a) 65
 - b) 75
 - c) 85
 - d) 95
77. Approximate percentage reduction in power consumption with 1 °C rise in evaporator temperature in refrigerating systems is _____.
- a) 2%
 - b) 3%
 - c) 1%
 - d) 4%

78. Replacement of steam based hot water generation by solar system is an example of
- a) matching energy usage to the requirement
 - b) maximising system efficiency
 - c) Energy substitution**
 - d) Performance improvement
79. The energy manager has to perform the function of ____.
- 1) Organizer 2) Planner 3) Decision Maker 4) Team leader
- a) 1,2 & 3
 - b) 1 & 2 only
 - c) 1,2 & 4
 - d) All the four above**
80. Providing information to BEE is the role of energy manager as per
- a) Energy Conservation Act 2003
 - b) Energy Conservation Act 2004
 - c) Energy Conservation Act 2002
 - d) Energy Conservation Act 2001**
81. To assess the existing situation of a plant, good energy saving strategy plan starts with...
- a) energy audit**
 - b) training
 - c) seminar
 - d) none of the above
82. The factor that reflects the risk of the project while evaluating the present value of the expected future cash flow is _____
- a) Life of the project
 - b) Discount rate**
 - c) Capital cost
 - d) All the above
83. Poor scattering on trend line of production Vs Energy consumption indicates ____.
- a) poor level of control**
 - b) good level of control
 - c) both the above
 - d) none of above.

84. Installing larger diameter pipe in pumping system results in reduction in-----
- a) static head
 - b) frictional head**
 - c) both a and b
 - d) neither a nor b
85. Cogeneration is the simultaneous generation of -----.
- a) heat and power**
 - b) steam and condensate
 - c) Mechanical Energy and power
 - d) All the above
86. Name the predominant loss component for furnace oil fed boiler.
- a) losses due to radiation and convection
 - b) loss due to hydrogen in fuel
 - c) loss due to dry flue gas**
 - d) loss due to moisture in fuel
87. The factors affecting Waste Heat Recovery from exhaust flue gases of DG set are:
- a) Temperature of exhaust flue gases after turbo charger
 - b) Back pressure on the DG set
 - c) DG set loading
 - d) all of the above**
88. The ISO standard for Energy Management System is
- a) ISO 9001
 - b) ISO 50001**
 - c) ISO 14001
 - d) none of the above
89. The Government of India levies Clean Energy Cess on which of the following
- a) electricity
 - b) coal**
 - c) Diesel
 - d) biodiesel

90. Which of the following parameters is not considered for external Benchmarking?

- a) scale of operation
- b) energy pricing**
- c) raw materials and product quality
- d) vintage of technology

91. Sankey diagram shows in graphics the _____

- a) Energy input
- b) Energy output
- c) Energy balance
- d) All of the above**

92. The Kyoto protocol came into force in _____

- a) 2005**
- b) 2006
- c) 2008
- d) 2010

93. Energy Audit provides us with tools to benchmark our consumption against

- a) Best figures
- b) Average figures
- c) National figures
- d) Both best figures and national figures**

94. Salient feature of Energy Conservation Act 2001 is _____

- a) Establishment of bureau of Energy efficiency**
- b) To prescribe energy conservation building codes for all buildings
- c) To specify energy consumption standard
- d) Both bureau of energy efficiency and energy conservation building codes.

95. Which of the following is not a conservation of energy?

- a) Reduction of wastage of energy
- b) Reduction of percentage of energy consumption
- c) Reduction of energy consumption
- d) Inter-fuel substitution**

- 96.Improvement of power factor helps in reduction of _____
- a) Reactive power
 - b) Apparent power
 - c) Active power
 - d) Both reactive power and apparent power
- 97.Which of these is non-price method of energy conservation?
- a) Direct quantity rationing
 - b) VAT
 - c) Fuel taxes
 - d) Energy audit
- 98.Which of these is the economic character of inter fuel substitution?
- a) Labour intensive
 - b) Capital intensive
 - c) Technology intensive
 - d) Service intensive
- 99.In a furnace, the lower the exhaust temperature the _____ is the furnace efficiency
- a) lower
 - b) moderate
 - c) higher
 - d) None of the above
100. Which of the following is termed as “time of day” scheme?
- a) Offering cheap power during a specific off-peak period
 - b) offering cheap power during peak load period
 - c) offering cheap power at night
 - d) offering cheap power at day