Note: Attempt all questions. The question paper contains 70 MCQ type questions. Each question carries equal marks. Select the answer and fill the bubble corresponding to that question in the attached OMR sheet.

1. 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
2. Role of energy manger is
   (A) Energy auditor and in charge of the finance department of the plant
   (B) Intermediate player between top management, energy and cost centers of the plant
   (C) In charge of the captive power plant and mediator between plant and Electricity boards
   (D) As well as called production manger and project manager
3. The ratio of current year's production to the reference year's production is called as.
   (A) Demand factor
   (B) Production factor
   (C) Utilization factor
   (D) Load factor
4. The cost of a new heat exchanger is Rs. 1.0 lakh. The simple payback period in years considering annual savings of Rs 60,000 and annual operating cost of Rs. 10,000 is
   (A) 0.50
   (B) 1.66
   (C) 2.00
   (D) 6.00
5. One unit of electricity is equivalent to _____ kcal heat units.
   (A) 800
   (B) 860
   (C) 400
   (D) 680
6. The benchmarking parameter for air conditioning equipment is
   (A) kW/Ton of Refrigeration
   (B) kW/ kg of refrigerant handled
   (C) kcal/m3 of chilled water
   (D) Differential temperature across chiller
7. In project management work breakdown structure defines
   (A) temporary endeavour undertaken to create unique product or service
   (B) the activities to be completed in the projects
   (C) how realistic were the assumptions underlying the project
   (D) none of the above

8. Which instrument is used to monitor O_2, CO in flue gas?
   (A) Combustion analyzer
   (B) Power analyzer
   (C) Pyrometer
   (D) Fyrite

9. Lux meter is used to measure……
   (A) Illumination level
   (B) Sound intensity and illumination level
   (C) Harmonics
   (D) Speed

10. For a cement plant the parameter, "kWh/MT of clinker "indicates
   (A) Energy Index parameter
   (B) Utility factor
   (C) Production factor
   (D) Load factor

11. Energy manger 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

12. 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

13. Non contact speed measurements can be carried out by
   (A) Tachometer
   (B) Stroboscope
   (C) Oscilloscope
   (D) Speedometer

14. 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

15. Infrared thermometer is used to measure
   (A) Surface temperature
   (B) Flame temperature
   (C) Flue gas temperature
   (D) Hot water temperature

16. Find out the 'odd' among the following choices for fuel substitution for industrial sector of India.
   (A) LDO with LSHS
   (B) Coal with rice husk
   (C) Natural gas for fertilizer plant
   (D) LPG for soft coke

17. Air velocity in ducts can be measured by using ___ and manometer
   (A) Orifice meter
   (B) Borden gauge
   (C) Pitot tube

(D) Anemometer

18. Having an energy policy
    (A) Shows commitment
    (B) Satisfies regulations
    (C) Indicates energy audit skills
    (D) adds to the list of number other policies

19. An energy audit requires
    (A) Quantification of energy use
    (B) Qualification of source
    (C) Converting all energy use to one single unit
    (D) Quantum reduction in power consumption

20. Which of the following requires detailed trials/experiments?
    (A) Preliminary energy audit
    (B) Detailed energy audit
    (C) Energy policy
    (D) Energy information system

21. An energy audit team is finalized during
    (A) Pre-audit phase
    (B) Audit phase
    (C) Post audit phase
    (D) The time of the study

22. Matching energy use to requirement means providing
    (A) Just theoretical energy needed
    (B) Just the designers' needs
    (C) Energy with minimum losses
    (D) less than what is needed

23. A motor with 10 kW rating in its name plate, will draw Input power of_____
    (A) 10 kW at full load
    (B) more than 10 kW at full load
    (C) less than 10 kW at full load
    (D) 10 kW at 110% of full load

24. The objective of energy management is
    (A) To minimize energy costs
    (B) To minimize environmental effects
    (C) a & b
    (D) None of the above

25. For calculating plant energy performance which of the following data is not required
    (A) Current year's production
    (B) Reference year production
    (C) Reference year energy use
    (D) Capacity utilization

26. Which of the following is most accurate instrument for surface temperature measurement of the hot pipe line
    (A) Thermocouples
    (B) Infrared Thermometer
    (C) Leaf type contact thermometer
    (D) All of the above

27. Which one of the following is not considered for external benchmarking?
    (A) Scale of Operation

(B) Vintage of Technology

(C) Energy Price

(D) Quality of Raw Material and Products

28. For industrial process heating, the best quality of steam is:

(A) Dry saturated steam

(B) Superheated steam

(C) Wet steam

(D) High pressure steam

29. Which type of insulation is more economic or energy efficient for steam pipelines carrying saturated steam?

(A) Glass wool

(B) Ceramic fibre

(C) Calcium silicate

(D) Fiber bricks

30. Energy is released from fossil fuels when they are_____

(A) Pumped

(B) Cooled

(C) Burned

(D) Pressurized

31. Oil release sulfur dioxide gas when they burn.

(A) True

(B) False

(C) Ambiguous statement

(D) None of the above

32. The most nuclear fuel used in the world is_____

(A) Thorium – 232

(B) Uranium – 238

(C) Uranium – 235

(D) Plutonium – 239

33. The blades in wind turbines are connected to_____

(A) Nacelle

(B) Tower

(C) Foundations

(D) String

34. In the production of wave energy which form of energy is used?

(A) Potential energy

(B) Kinetic energy

(C) Solar energy

(D) Wind energy

35. A tidal barrage is a barrier built over a_____

(A) River bed

(B) River estuary

(C) River end

(D) River starting

36. In hydroelectricity power_____

(A) Kinetic energy is transferred to potential

(B) Potential energy is transferred to kinetic

(C) Solar energy is transferred to wind energy

(D) Wind energy is transferred to solar energy

37. Solar panels generate electricity.

(A) True

(B) False

(C) Ambiguous statement

(D) None of the above

38. In order to produce solar energy during sunlight, where the energy is stored in the batteries?
(A) Nickel Sulfur
(B) Zinc Cadmium
(C) Nickel Cadmium
(D) Nickel Zinc

39. How many forms of fossil fuels are there_____
(A) One
(B) Two
(C) Three
(D) Four

40. According to WHO, how many premature deaths annually linked to air pollution causing by the burning of fossil fuels?
(A) One million
(B) Three million
(C) Five million
(D) Seven million

41. Energy in the form of heat and light is obtained by_____
(A) Biomass
(B) Fossil fuels
(C) Sun
(D) Wind

42. The demand side management can be achieved by the technique of
(A) Time of day pricing and metering
(B) Multi - utility power exchange model
(C) load management
(D) All of these

43. The efficiency of variable speed drives generally
(A) Decreases with speed
(B) Increases with speed
(C) Remains constant with change in speed
(D) none of these

44. The rotational speed of an AC induction motor depends on the
(A) Number of poles in stator
(B) Frequency of the applied AC power
(C) Both a and b
(D) none of these

45. In valley filling, the incremental costs during peak hours are
(A) Less than the average costs of electricity
(B) more than the average costs of electricity
(C) Equal to the average cost of electricity
(D) none of these

46. The reduction of utility load primarily during peak demand is known as
(A) Peak clipping
(B) Load shifting
(C) Valley filling
(D) MTP analysis

47. EPRI stands for
(A) European power research institute

(B) Electrical power Russian institute

(C) Electrical power research institute

(D) Electrical power research industries

48. The term Demand Side Management was coined during

(A) 1936 energy crisis

(B) 1972 energy crisis

(C) 1973 energy crisis

(D) 1986 energy crisis

49. The energy management function is generally vested in –

(A) Senior Management

(B) One energy manager or coordinator

(C) Distributed among number of middle manager

(D) (B) & (C) together

50. 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

51. The primary energy consumption of India is

(A) 1/29 of the world

(B) 1/16 of the world

(C) 1/7 of the world

(D) 1/20 of the world

52. Which fuel dominates the energy mix in Indian energy scenario?–

(A) Oil

(B) Natural gas

(C) Coal

(D) Nuclear

53. Indian per capita energy consumption is _ of the world average.

(A) 4%

(B) 20%

(C) 1%

(D) 10%

54. Energy consumption per unit of GDP is called as:

(A) Energy Ratio

(B) Energy intensity

(C) Per capita consumption

(D) None Name the Act,

55. Which is proposed to bring the qualitative transformation of the electricity sector?

(A) Regulatory Commission Act 1998

(B) Indian Electricity Act 1910

(C) Supply Act 1948

(D) Electricity Act 2003

56. Which of the following is highest contributor to the air pollution?

(A) Carbon Monoxide

(B) Hydro Carbons

(C) Sulphur Oxides

(D) none

57. The objective of energy management includes
(A) Minimising energy costs
(B) minimising waste
(C) Minimising environmental degradation
(D) all the above

58. The percentage of energy saved at the current rate of use, compared to the reference year rate of use, is called
(A) Energy Utilization
(B) Energy Performance
(C) Energy Efficiency
(D) None

59. Replacement of steam based hot water generation by solar system is an example of
(A) matching energy usage to the requirement
(B) maximizing system efficiency
(C) Energy substitution
(D) Performance improvement

60. Which of the variable does not contribute to energy consumption?
(A) Production
(B) Hours
(C) Climate
(D) None of the above

61. 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)

62. Assuming total conversion of electrical energy to heat energy, how much heat is produced by a 200 W heater in 5 minutes?
(A) 200 kJ
(B) 40 kJ
(C) 1000 kJ
(D) 60 kJ

63. Acid rain is caused by the release of the following components from combustion of fuels.
(A) SO_x and NO_x
(B) SO_x and CO_2
(C) CO_2 and NO_x
(D) H_2O

64. The ISO standard for Energy Management System is
(A) ISO 9001
(B) ISO 50001
(C) ISO 14001
(D) none of the above

65. World gas reserves are estimated to last over
(A) 45 years
(B) 65 years
(C) 200 years
(D) 75 years

66. In olden days voltmeters were _____
(A) made of transistors
(B) made of vaccum tubes
(C) made of transformers
(D) made of diodes

67. The energy used by any manufacturing process varies with

(A) Production volume

(B) Type of process

(C) Resource input

(D) All the above

68. What is the main cause of increase in air pollution in the 20th century?

(A) Development of the transport system

(B) Development of infrastructures

(C) Development of electricity

(D) Development of water resources

69. The best way of correlating production and energy data in any plant is.....

(A) Text format

(B) Graphical representation

(C) Oral communication

(D) None

70. What do you mean by "toe"

(A) Total oil equivalent

(B) Tons of effluent

(C) Tons of oil equivalent

(D) None of the above

*****