

1. In a waterfall, potential energy is converted into ...energy
 1). Light 2). Sound 3). Chemical 4). Kinetic
 Ans: 4

2. Metal tea pots have wooden handles because -
 1). Wood is a bad conductor of heat 2). It prevents electric shock
 3). It gives beauty to the pots 4). It is hygienic
 Ans: 1

3. The motion of planets in the solar system is an example of the conservation of -
 1) Mass 2). Linear momentum
 3). Angular momentum 4). Energy
 Ans: 3

4. In the field/track, rails are welded by -
 1). Gas Welding 2). Arc Welding 3). TIG Welding 4). Thermit
 Welding
 Ans: 4

5. A soap bubble is formed due to the phenomenon of.....
 1). Capillary rise 2). Archimedes principle
 2). Surface tension 4). Cohesion
 Ans: 2

6. Who derived the famous science formula $E=MC^2$?
 1) Edison 2) Einstein 3). CV. Ramen 4) New
 Ans: 2. (Mass energy eqn for particles)

7. The unit of energy in the SI system is
 1). Joule 2). Metre 3). Watt 4). Newton
 Ans: 1

8. Any number of forces acting at a particular point are called as
 1). Co-planar 2). Concurrent 3). Parallel 4). Perpendicular
 Ans: 2

9. Which of the following functions is performed by the sleepers?

- 1). Hold the rails to proper gauge
- 2). Support the rails firmly
- 3). Distribute the load transmitted through rails over large area of ballast
- 4). All the these

Ans: 4

10. Which of the following are equal in an atom?

- 1) Atomic number and the number of neutrons
- 2) Number of electrons and protons
- 3). The number of neutrons and that of electrons
- 4). None

Ans: 2

11. Which of these is a conductor of electricity?

- 1). Rock
- 2). Wood
- 3). Water
- 4). Plastic

Ans: 2

12. The unit for angular acceleration is –

- 1). Radians
- 2). Radians per second
- 3). Radians per second per second
- 4). None of these

Ans: 3

13. Wear due to rubbing action of particles over each other is called:

- 1). Corrosion.
- 2). Skidding.
- 3). Tearing
- 4). Abrasion.

Ans: 4

14. The mass defect Δm equal to

1. Real mass - $(Zm_p + Nm_n)$
2. $\Delta m = (Zm_p + Nm_n) - \text{real mass}$
3. $(Zm_p + Nm_n) + \text{real mass}$
4. Zero

Ans: 2

Mass Defect and Binding Energy

Careful measurements have shown that the mass of a particular atom is always slightly less than the sum of the masses of the individual neutrons, protons, and electrons of which the atom consists. The difference between the mass of the atom and the sum of the masses of its parts is called the **mass defect** (Δm). The mass defect can be calculated using equation $\Delta m = [Z(m_p + m_e) + (A - Z)m_n] - m_{\text{atom}}$, where: Δm = mass defect [atomic mass unit (amu)]; m_p = mass of a proton (1.007277 amu); m_n = mass of a neutron (1.008665 amu); m_e = mass of an electron (0.000548597 amu); m_{atom} = mass of nuclide ${}^A_Z\text{X}$ (amu); Z = atomic number (number of protons); and A = mass number (number of nucleons).

Nuclear Fission, Balasubramanian Viswanathan, in Energy Sources, 2017.
<https://www.sciencedirect.com/topics/engineering/mass-defect>.

15. If a material has identical properties in all directions it is said to be
 1). Homogeneous 2) **Isotropic** 3). Elastic 4). Orthotropic
Ans: 2
16. The maximum and minimum value of $\sin^2 x$ are respectively
 1). (0, 1) 2). **(1, 0)** 3). (-1, 0) 4). (0,-1)
Ans: 2
17. Sheep is to bullock as Mutton is to...
 1). Venison 2). Chicken 3) **Beef** 4). Omelet
Ans: 3
18. Based on the relationship of the two given words, find out the correct pair of the word.
 Bird is to sky as Fish is to:
 1). Sea 2). Bowl 3). **Water** 4). Ocean
Ans: 3
19. The glycerin used in day to day life is –
 1). Alcohol 2). Fat 3). Carbohydrate 4). **Soap**
Ans: 4

Glycerol, sometimes referred to as glycerin, is a sugar alcohol widely used in a variety of personal care products, including toothpaste, hair conditioner, cosmetics, and moisturizers. In products such as moisturizer creams, glycerol helps to bring moisture to the surface of the skin, to help skin smooth. It is also added to hair conditioner, shaving creams and eye drops for the same purpose. In over-the-counter skin care products, such as moisturizers, glycerol is added to help protect the skin from irritants.

<https://www.chemicalsafetyfacts.org/glycerol/>

This medication is used as a moisturizer to treat or prevent dry, rough, scaly, itchy skin and minor skin irritations (e.g., diaper rash, skin burns from radiation therapy). Emollients are substances that soften and moisturize the skin and decrease itching and flaking.

20. A geostationary satellite completes one orbit at a height of (36,000 Km) in –
 1). One hour 2). 5 hours 3) 24 hours 4). 28 days
Ans: 3
21. Who among the following invented the X-ray?
 1). Hopins 2). Roentgen 3). Marconi 4). Morse.
Ans: 2
22. Which of the following is NOT a grade of file used by fitters?
 1). Rough 2). Bastard 3). Dead Smooth 4). Hard
Ans: 4
23. Which is the biggest known planet in the solar system?
 1). Pluto 2). Earth 3). Jupiter 4). Saturn
Ans: 3
24. Soda water is a solution of ~
 1). Liquid in gas 2). Gas (CO₂) in liquid 3). Solid in solid 4). Solid in water
Ans: 2
25. Which is the cheapest sheet metal?
 1). Galvanized iron 2). Black iron
 3). Tinned Sheet 4). Aluminum
Ans: 1
26. Based on the relationship of the two given words, find out the core
 Madness is to 'Brain' as 'Paralysis' is to
 1). Face 2). Arm 3). Body 4). Nerves
Ans: 4
27. A 'Celsius' is a unit
 1). Of electric potential difference 2). Of heat potential difference
 3). Of trigonometric angle 4). Equivalent to degree centigrade
Ans: 4
28. A laser beam is used for carrying out surgery because it
 1). Is highly monochromatic 2). Is high coherent
 3). Is highly directional 4). Can be sharply focused
Ans: 4
29. The chemical name of 'Caustic Soda' is
 1). Potassium Hydroxide 2). Aluminum Oxide
 3). Sodium Hydroxide 4) None of these

Ans: 3

30. For welding dissimilar metals, the following property of both the metals should have wide variations.

- | | |
|-----------------------|----------------------|
| 1). Ductility | 2). Tensile strength |
| 3). Thermal expansion | 4). Wear resistance |

Ans: 3

31. The main purpose of the fan of a liquid cooling system for an engines is to

- 1). Disperse engine fumes
- 2). Cool the external surface of the engine
- 3). Pump hot air over the cold cooling water
- 4). Drive air flow when the vehicle

Ans: 2

32. Based on the relationship of the two given words, find out the correct pair of the word.

Broom is to Sweep as Rubber is to:

- | | | | |
|----------|------------|-----------|-----------|
| 1). Copy | 2). Pencil | 3). Erase | 4). Depth |
|----------|------------|-----------|-----------|

Ans: 3

33. Which one of the following is the correct sequence of planets in order of increasing distance from sun?

- | | |
|----------------------------------|------------------------------------|
| 1). Venus, Mars, Uranus, Mercury | 2). Mercury, Venus, Earth, Mars |
| 3). Mercury, Venus, Earth, Mars | 4). Jupiter, Mercury, Venus, Earth |

Ans: 2

34. At O K temperature, a p-type semiconductor –

- 1). does not have any charges carriers
- 2). has few holes but no free electrons
- 3). has few holes and few free electrons
- 4). has equal number of holes and electrons

Ans: 1

35. The noble gasses are nonreactive because they

- | | |
|-----------------------------------|--|
| 1). Have same number of electrons | 2). Have an atomicity of one |
| 3). Are gasses with low densities | 4). Have stable electronic configuration |

Ans: 4. (outer most orbits are filled)

36. Under thermal and electrical system analogy, temperature is considered analogous to

- | | | | |
|-------------|-------------|------------|----------------|
| 1). Current | 2). Voltage | 3). Charge | 4) Capacitance |
|-------------|-------------|------------|----------------|

Ans: 2

37. To study X-ray diffraction is used,

- | | |
|---|---------------------|
| 1). ordinary light transmission grating | 2). crystal lattice |
| 3). single slit | 4). None of these |

Ans: 2

38. Laser beam does not

- | | | | |
|-------------|-------------|--------------|-------------------|
| 1). Reflect | 2). Diverge | 3). Converge | 4). None of these |
|-------------|-------------|--------------|-------------------|

Ans: 2

39. The principle of Fleming’s left hand rule is applied in the working of a
 1). Motor 2). Dynamo 3). Transformer 4). Microphone

Ans: 1

40. A polished calorimeter should be placed in an insulated wooden box to reduce heat loss due to –
 1). Conduction 2). Convection
 3). Radiation and conduction 4). Radiation

Ans: 4

41. When water freezes, its volume
 1). Increases 2). Decreases 3). Remains same 4). None of these

Ans: 1

42. Clean water will appear less deep due to
 1). Total Internal Reflection 2). Refraction
 3). Mirage 4). Dispersion

Ans: 2

43. The headquarters of North-Eastern railway is situated at
 1). Secundrabad. 2). Gorakhpur. 3). New Delhi 4). Mumbai

Ans: 2

44. Why is the electric power distribution from one place to another carried out on high AC Voltage?
 1) To check the pilferage of electric wires
 2). The current passes in a very short time
 3). To enhance the brightness in lighting system by.
 4). To minimise transmission losses

Ans: 4

45. In general the solubility of a solid in a liquid can be increased by increasing the - 1).
 Particle size 2). Pressure 3). Rate of stirring 4). Temperature

Ans: 4

46. In steam power plant, exhaust steam from turbine goes to
 1). Cooling tower 2). Economizer 3). Condenser 4). Air preheater

Ans: 3

47. Mechanical advantage of a simple machine is –
 1). Load/Effort 2). Load× Effort 3). Effort/load 4). Load + Effort

Ans: 1

48. The most abundant gas in the atmosphere is –
 1). nitrogen 2). Carbon dioxide 3). Oxygen 4). Helium

Ans: 1

49. The substance made of only carbon is,
 1). Graphite 2). Sugar 3). Methane 4). Acetic acid

Ans: 1

50. Who invented the Safety razor?
 1). M Moore 2). Galileo 3). King C. Gillette 4). Marconi

Ans: 3

51. Which of the following is NOT a type of welding?
 1). Arc welding 2). Resistance welding
 3) Thermit welding 4). Soldering

Ans: 4

52. Four words are given below. One of them differs from the rest Find out the word
 1). Uncle 2). Aunt 3). Mother 4) Baby

Ans: 4

53. Lignite is –
 1). Pure carbon 2). High calorific value coal
 3). Low calorific value coal 4). A vegetable origin liquid

Ans: 3

54. Which of the following terms is not associated with computers?
 1). Doping 2). Database
 3). Binary numbers 4). Windows

Ans: 1

55. Which of the following is not a computer language?
 1) I.B.M 2). Fortran 3). Pascal 4). Cobol

Ans: 1

56. A blotting paper works on the principle of
 1). Cohesion 2). Adhesion 3) Capillary Rise 4). Centrifugal force

Ans: 3

57. Which of the following spoils the surface of metals?
 1). Corrosion 2). Anodising 3). Galvanising 4). None of these

Ans: 1

58. Based on the relationship of the two given words, find out the correct pair of the word.

Clock is to Time as Altimeter is to:

- 1). Distance 2). Density 3). Height 4). Depth

Ans: 3

59. Which kings were responsible for the sculptures at Mamallapuram?
 1). Pallavas 2). Cholas 3). Pandyas 4). Chalukyas

Ans: 1

60. When water freezes its density
 1) Increases 2) Decreases

3). Remains constant 4). Becomes zero
Ans: 2 (volume increases)

61. A stick in water appears to be bent due do
 1). **Refraction of light** 2). Reflection
 3). Total Internal Reflection 4). None of these
Ans: 1

62. A chemical reaction that takes place with the evolution of heat is called a/an
 1). Reversible reaction 2). Endothermic reaction
 3). Thermal reaction 4). **Exothermic reaction**
Ans: 4 (Endothermic reaction absorbs heat)

62. A reading of 77°F when converted to Centigrade scale is equal to –
 1). 100° C 2). 75°C 3). 50°C 4). **25°C**
Ans: 4

63. One of the pairs differs from the other three. Find the odd one out.
 1). Nectar - Poison 2). Early - Late
 3). **True - Real** 4). Life – Death
Ans: 3

64. What is most necessary in a match?
 1). Referee 2). Fight 3). **Teams** 4). Spectators
Ans: 3

65. The process by which energy is generated in the sun is –
 1). **Fusion of hydrogen** 2). Fission of uranium
 3). None of the above 4). Fusion of helium
Ans: 1

66. The resistivity of electrical conductors is most affected by –
 1). Temperature 2). Pressure
 3). **Composition** 4). Temperature and pressure
Ans: 3

67. The mechanical equivalent of heat is equal to
 1). 17.6,148 J/cal. 2). 8.614 J/cal. 3). **4.186 J/cal.** 4). 1.648 J/cal.
Ans: 3

68. In the Centigrade scale of temperature measurement, the boiling point of water is
 1). 0° 2). 32° 3). **100°** 4). 212°
Ans: 3

69. 'Psychology' is to 'Mind' as 'Trigonometry' is to:
 1). **Mathematics** 2). Heart 3). Signs 4). Triangle
Ans: 1

70. Which of the following is not true regarding stratosphere?

- 1). It is the lowest layer of atmosphere covering the earth
- 2). It contains thick layer of Ozone
- 3). It absorbs Ultra-violet radiation from sun
- 4). All

Ans: 1(lowest layer of atmosphere is troposphere)

71. The source of butyric acid is

- 1). Red ant
- 2). Butter
- 3). Laurel oil
- 4). Vinegar

Ans: 2

72. The earth moves round the sun in an elliptical path and not in circular one. So the distance between the two is not fixed but keeps on varying as the earth goes around the sun. The speed of the earth in its orbital path around the sun–

- 1). is variable
- 2) Decreases when the distance between them increases and vice versa
- 3). increases when the distance between them increases and
- 4) None of these

Ans: 2

73. From which place the first railway line was started?

- 1). Madras (Chennai)
- 2). Calcutta (Kolkata)
- 3). Delhi
- 4). Bombay (Boribundar)

Ans: 4

74. IC Chips' for computers are usually made of –

- 1). Silicon
- 2). Leaf
- 3). Gold
- 4). Chromium

Ans: 1

75. The inertia of the rotating parts of the clutch should be

- 1). Minimum.
- 2) Maximum.
- 3). Zero.
- 4). None of the above.

Ans: 2

76. When does a biogas plant work to its maximum capacity?

- 1). At 45°C in aerobic conditions
- 2). When there is constant sewage supply in aerobic conditions
- 3). When there is constant sewage supply in anaerobic condition of 45°C
- 4). None of these

Ans: 3

In small-scale biogas plants, the bacteria that produce biogas work most effectively when the temperature of the slurry is 20-45°C. Within this range, biogas production will vary, so the size of a biogas plant is usually designed to ensure that daily gas production is maximised.

IRENA (2016), Measuring small-scale biogas capacity and production, International Renewable Energy Agency (IRENA), Abu Dhabi.

77. In which city is Auroville located?

- 1). Trichy
- 2). Chennai
- 3) Pondicherry(now Pudhucherry)
- 4). Madurai

Ans: 3

78. _____ rays/waves are used in burglar alarms.
 1). Infrared 2). UV 3). Gamma 4). X- Rays
 Ans: 1

79. The substance commonly employed as a refrigerant in refrigerators is
 1). liquid ammonia 2). Nitrogen
 3). Helium 4). None of these
 Ans: 4

TYPES OF REFRIGERANT

Halocarbons 1. Azeotropic Refrigerants

2. Zeotropic Refrigerants

3. Inorganic Refrigerants

4. Hydrocarbon Refrigerants

• Halocarbon Refrigerants are the Freon family of refrigerants. EXAMPLES: CFC's : R11, R12, R113, R114, R115 • HCFC's : R22, R123

• HFC's : R134a, R404a, R407C, R410a

• Inorganic refrigeration - Carbon Dioxide, Water, Ammonia, Air and Sulphur dioxide

<http://health.gov.vc/health/images/PDF/SAICM/refrigerants.pdf>

80. _____ waves are used in the treatment of bone diseases and tumors.
 1). Infrared 2). Ultra violet 3). Gamma 4). None of these
 Ans: 3

81. Light is the best described as a form of?
 1). Work 2). EM waves 3). Waves 4). Force
 Ans: 2

82. If $2 \times 8 = 4$, $3 \times 15 = 5$, $4 \times 24 = 6$ then $5 \times 40 = ?$
 1). 10 2). 8 3). 6 4). 120
 Ans: 2

83. Why do vegetables take less time to cook in a pressure cooker?
 1). Boiling point is maintained constant
 2). Boiling point of water is raised as pressure increases in a pressure cooker
 3). Boiling point is lowered
 4). None of these
 Ans: 2

84. Pascal's law states that, 'any pressure applied to a gas in a closed space will be transmitted equally in all direction'. This law is most important in the function of a
 1). Hair dryer 2). Exhaust pipe 3). Electric fan 4). Hydraulic brake
 Ans: 4

85. 'Stethoscope' was invented by –
 1). Bessemer 2) **Laennec** 3). Becqueral 4). None of these
Ans: 2
86. Pearlite is
 1). A low ash containing coal 2). Same as lignite
 3). An insulation material, 4). **None of the above**
Ans: 4 (It is one of the phases of iron – carbon steel)
87. With which of the following is the tape of a tape-recorder coated?
 1). Copper sulphate 2). **Ferromagnetic powder**
 3). Mercury 4). Zinc oxide
Ans: 2
88. Which of the following has as its main function the elimination of excess heat
 1). Arteries 2). Kidneys
 3). **Sweat glands** 4). Urinary bladder
Ans: 3
89. Which of the following is a non-renewable resource?
 1). Coal 2). Iron 3). Forests 4). **All of the above**
Ans: 4
90. Highest amount of protein is found in –
 1). Egg 2). **Soya bean** 3). Pulses 4). Cereals
Ans: 4
91. 'Photometer' is used to determine –
 1). Capacity of atomic reactor
 2). Capacity of thermal plant
 3). **Illuminating power of a source of light**
 4). None of these
Ans: 3
92. Molecular weight = 2 × vapour density. It is true –
 1). **For gases only** 2). For liquids only
 3). For solids only 4). Liquids and solids
Ans: 1
93. The enzyme found in the saliva is –
 1). **Ptylin** 2). Pepsin 3). Maltose 4). Lipase
Ans: 1

94. What is the name of the longest bone of our body located in the thigh?
 1). Vistula 2). **Femur** 3). Fibula 4). Humerous
Ans: 2

94. Water loss from the leaves through the stomata is called –
 1). Perspiration 2) **Transpiration** 3). Suspiration 4). Expiration
Ans: 2

95. Doctors prescribeto a patient suffering from allergy.
 1). Histamine 2). **Antihistamine** 3). Pyrotoxin 4). Analgesic
Ans: 2

96. Acupuncture is a / an
 1). **Ancient Chinese system of medicine**
 2). modern method of digging deep wells
 3). ancient Greek system of medicine
 4). method of curing cancer
Ans: 1

97. The brittle form of steel is –
 1). tempered steel 2). Mild steel 3). **Hardened steel** 4). Mediums
Ans: 3

98. When ants bite, they inject –
 1). Glacial acetic acid 2). Methanol
 3). **Formic acid** 4). Stearic acid
Ans: 3

99. Potato is a
 1). Bud 2). Fruit 3) **Stem** 4). Root
Ans: 3

100. 'Ptyalin' is an enzyme found in the –
 1). **Saliva** 2). Bile 3). Blood 4). None of these
Ans: 1