

Nuclear Power Plants

- 3.1. The efficiency of a nuclear power plant in comparison to a conventional thermal power plant is
 (a) same (b) more
 (c) less
 (d) may be less or more depending on size
 (e) unpredictable.
- 3.2. Isotopes of same elements have
 (a) same atomic number and different masses
 (b) same chemical properties but different atomic numbers
 (c) different masses and different atomic numbers
 (d) different chemical properties and same atomic numbers
 (e) same chemical properties and same atomic numbers.
- 3.3. Atomic number of an element in the periodic table represents the numbers of
 (a) protons in the nucleus
 (b) electrons in the nucleus
 (c) neutrons in the nucleus
 (d) electrons in the atom
 (e) neutrons in the atom.
- 3.4. The mass number of a substance represents the sum of total number of
 (a) protons and neutrons in an atom
 (b) protons and electrons in an atom
 (c) neutrons and electrons in an atom
 (d) protons and neutrons in a nucleus
 (e) protons and electrons in a nucleus.
- 3.5. Which is not identical for an atom and an isotope
 (a) mass number (b) atomic number
 (c) chemical properties
 (d) position in periodic table
 (e) all of the above.
- 3.6. Amongst the following, the fissionable materials are
 (a) U^{233} and Pu^{239} (b) U^{233} and Pu^{233}
 (c) U^{235} and Pu^{235} (d) U^{238} and Pu^{239}
 (e) U^{243} and Pu^{235}
- 3.7. The mass of electron as compared to that of neutron is
 (a) same (b) $\frac{1}{2}$
 (c) $\frac{1}{100}$ (d) $\frac{1}{1839}$
 (e) $\frac{1}{1837}$
- 3.8. A nuclear unit becoming critical means
 (a) it is generating power to rated capacity
 (b) it is capable of generating much more than rated capacity
 (c) there is danger of nuclear spread
 (d) chain reaction that causes automatic splitting of the fuel nuclei has been established
 (e) it generates no heat.
- 3.9. Moderator in nuclear plants is used to
 (a) reduce temperature
 (b) extract heat from nuclear reaction
 (c) control the reaction
 (d) cause collision with the fast moving neutrons to reduce their speed
 (e) moderate the radioactive pollution.
- 3.10. The most commonly used moderator in nuclear plants is

- (a) heavy water
(b) concrete and bricks
(c) graphite and concrete
(d) deuterium (e) graphite.
- 3.11. The nuclear energy is measured as
(a) MeV (b) curie
(c) farads (d) MW
(e) kWhr.
- 3.12. The total energy released in fission of U^{235} is
(a) 5 MeV (b) 10 MeV
(c) 199 MeV (d) 168 MeV
(e) 11 MeV.
- 3.13. Breeder reactor has a conversion ratio of
(a) unity (b) more than unity
(c) less than unity (d) zero
(e) infinity.
- 3.14. Boiling water reactor employs
(a) boiler
(b) direct cycle of coolant system
(c) double circuit system of coolant cycle
(d) multi pass system
(e) single circuit system.
- 3.15. Fast breeder reactor uses
(a) boiler
(b) direct cycle of coolant system
(c) double circuit system of coolant cycle
(d) multi pass system
(e) single circuit system.
- 3.16. One gram of uranium will produce energy equivalent to approximately
(a) 1 tonne of high grade coal
(b) 4.5 tonnes of high grade coal
(c) 10 tonnes of high grade coal
(d) 100 tonnes of high grade coal
(e) 1000 tonnes of high grade coal.
- 3.17. Which of the following nuclear reactor does not need a heat exchanger for generation of steam
(a) gas cooled (b) liquid metal cooled
(c) pressurised water
(d) boiling water (e) none of the above.
- 3.18. The most usable isotope of uranium is
(a) U^{233} (b) U^{235}
(c) U^{238} (d) U^{240}
(e) U^{243}
- 3.19. The number of isotopes of hydrogen are
(a) 1 (b) 2
(c) 3 (d) 4
(e) 0.
- 3.20. The commonly used material for shielding is
(a) lead or concrete
(b) lead and tin
(c) graphite or cadmium
(d) thick galvanised sheets
(e) black carbon papers.
- 3.21. The main interest of shielding in nuclear reactor is protection against
(a) X-rays (b) infra-red rays
(c) α , β , and γ rays
(d) neutrons and gamma rays
(e) electrons.
- 3.22. Reflector in nuclear plants is used to
(a) return the neutrons back into the core
(b) shield the radioactivity completely
(c) check pollution
(d) conserve energy
(e) is not used.
- 3.23. The energy required to be applied to a radioactive nucleus for the emission of a neutron is
(a) 1 MeV (b) 2.4 MeV
(c) 4.3 MeV (d) 7.8 MeV
(e) 20 MeV.
- 3.24. Which of the following are fertile materials
(a) U^{233} and Pu^{239} (b) U^{238} and Th^{232}
(c) U^{238} and Pu^{239} (d) U^{238} and Th^{239}
(e) none of the above
- 3.25. Fertile material is
(a) the most fissionable material
(b) the basic fuel for nuclear plants
(c) basic raw material for nuclear plants
(d) the material which absorbs neutrons and undergoes spontaneous changes leading to the formation of fissionable material
(e) none of the above.
- 3.26. Enriched uranium is one in which
(a) %age of U^{235} has been artificially increased
(b) %age of U^{238} has been artificially increased
(c) %age of U^{234} has been artificially increased
(d) extra energy is pumped from outside
(e) all impurities have been removed.

- 3.27. Which of the following particles is the lightest
 (a) nucleus (b) electron
 (c) proton (d) meson
 (e) neutron.
- 3.28. Which of the following is the heaviest
 (a) neutron (b) proton
 (c) atom (d) electron
 (e) nucleus.
- 3.29. In fast breeder reactors
 (a) any type of moderator can be used
 (b) graphite is used as the moderator
 (c) heavy water is used as the moderator
 (d) moderator may or may not be used
 (e) moderator is dispensed with.
- 3.30. In nuclear fission each neutron that causes fission releases
 (a) no new neutron
 (b) at least one new neutron
 (c) one new neutron
 (d) more than one new neutrons
 (e) many-fold neutrons.
- 3.31. The breeding gain in case of thermal breeder reactor as compared to fast breeder reactor is
 (a) same (b) lower
 (c) higher (d) unity
 (e) higher/lower depending on the size of reactor.
- 3.32. Gas cooled reactor uses following materials as moderator, and coolant
 (a) graphite, CO₂ (b) graphite, air
 (c) heavy water, CO₂
 (d) lead, H₂ (e) concrete, N₂.
- 3.33. The most abundant isotope of uranium on earth is
 (a) U²³³ (b) U²³⁴
 (c) U²³⁵ (d) U²³⁸
 (e) U²⁴³.
- 3.34. A nuclear fission produces energy of following order in MeV
 (a) 20 (b) 200
 (c) 2000 (d) 20,000
 (e) 2×10^5 .
- 3.35. The process by which a heavy nucleus is splitted into two light nuclei is known as
 (a) splitting (b) fission
 (c) fusion (d) disintegration
 (e) chain reaction.
- 3.36. A nuclear fission is initiated when the critical energy as compared to neutron binding energy of the atoms is
 (a) same (b) more
 (c) less
 (d) there is no such criterion
 (e) none of the above.
- 3.37. The fast breeder reactor uses the following moderator
 (a) demineralised water
 (b) carbon dioxide
 (c) heavy water
 (d) graphite
 (e) no moderator is used.
- 3.38. The first nuclear power plant in India is located at
 (a) Kota (b) Kalapakkam
 (c) Tarapur (d) Baracilly
 (e) Kerala.
- 3.39. The nuclear power plant at Tarapur has the following reactor
 (a) fast breeder
 (b) pressurised water
 (c) boiling water
 (d) sodium graphite
 (e) none of the above.
- 3.40. Boiling water reactor uses the following as moderator, coolant and working fluid
 (a) ordinary fluid (b) heavy water
 (c) molten lead (d) hydrogen gas
 (e) none of the above.
- 3.41. Ideally the neutron flux in reactor should be
 (a) maximum in centre and zero at side
 (b) maximum at side and zero in centre
 (c) uniform throughout
 (d) zero throughout
 (e) none of the above.
- 3.42. Enriched uranium may contain fissionable contents of the order of
 (a) 1-99% (b) 1-25%
 (c) 1-50% (d) 1-75%
 (e) 1-90%.
- 3.43. U²³⁵ will undergo fission by
 (a) high energy (fast) neutrons alone
 (b) low energy (slow) neutrons alone
 (c) either fast or slow neutrons
 (d) medium energy neutrons
 (e) none of the above.

- 3.44. U^{238} will undergo fission by
 (a) high energy (fast) neutrons alone
 (b) low energy (slow) neutrons alone
 (c) either fast or slow neutrons
 (d) medium energy neutrons
 (e) none of the above.
- 3.45. A reactor capable of converting a fertile material into fissile isotopes is called
 (a) regenerative reactor
 (b) fast breeder reactor
 (c) breeder reactor
 (d) boiling water reactor
 (e) fertile reactor.
- 3.46. Hydrogen is preferred as better coolant in comparison to CO_2 because former
 (a) is lighter (b) is inert
 (c) has high specific heat
 (d) is a good conductor
 (e) all of the above.
- 3.47. Natural uranium is made up of
 (a) 99.282% U^{238} , 0.712% U^{235} , 0.006% U^{234}
 (b) 99.282% U^{235} , 0.712% U^{238} , 0.06% U^{234}
 (c) 99.282% U^{234} , 0.712% U^{238} , 0.006% U^{235}
 (d) 99.282% U^{235} , 0.712% U^{234} , 0.006% U^{238}
 (e) none of the above.
- 3.48. The risk of radioactive hazard is greatest in the turbine with following reactor
 (a) pressurised water
 (b) boiling water
 (c) gas cooled
 (d) liquid metal cooled
 (e) all of the above.
- 3.49. Plutonium is produced
 (a) as basic raw material
 (b) by neutron irradiation of U^{238}
 (c) by neutron irradiation of thorium
 (d) artificially
 (e) in high capacity furnace.
- 3.50. Electron-volt is the unit of
 (a) atomic power
 (b) energy
 (c) voltage
 (d) radio activity
 (e) there is no such unit.
- 3.51. Pick up the wrong statement

- (a) In a heterogeneous or solid-fuel reactor, the fuel is mixed in a regular pattern within moderator.
 (b) Slow or thermal neutrons have energy of the order of 0.025 eV
 (c) Fast neutrons have energies above 1000 eV
 (d) Fast reactor uses moderator
 (e) Most serious drawback in using water as coolant in nuclear plants is its high vapour pressure.
- 3.52. The unit of radio-activity is
 (a) electron-volt (b) electron-ampere
 (c) curie (d) MeV
 (e) AMU.
- 3.53. Pick up the wrong statement
 Fast breeder reactors
 (a) operate at extremely high power densities.
 (b) are liquid-metal cooled
 (c) produce more fuel than they consume
 (d) are unmoderated
 (e) use water as coolant.
- 3.54. Uranium-233 is produced
 (a) as basic raw material
 (b) by neutron irradiation of U^{238}
 (c) by neutron irradiation of thorium
 (d) artificially
 (e) in high capacity furnaces.
- 3.55. Plutonium-239 is produced
 (a) as basic raw material
 (b) by neutron irradiation of U^{238}
 (c) by neutron irradiation of thorium
 (d) artificially
 (e) in high capacity furnaces.
- 3.56. Which of the following type of pump is used in liquid metal cooled reactor for circulation of liquid metal
 (a) centrifugal (b) axial
 (c) reciprocation (d) electromagnetic
 (e) diaphragm.
- 3.57. Which of the following is the primary fuel
 (a) U^{233} (b) U^{235}
 (c) U^{238} (d) Pu^{239}
 (e) Pu^{235}
- 3.58. Control rods are made of
 (a) U^{235}
 (b) graphite or barium

- (c) boron or cadmium
(d) lead
(e) none of the above.
- 3.59. Which of the following is secondary fuel
(a) Th^{232} and U^{238} (b) U^{238} and Pu^{235}
(c) U^{233} and Pu^{239} (d) U^{235} and Pu^{238}
(e) U^{233} and Pu^{238}
- 3.60. A pressurised water reactor employs pressuriser for the following application
(a) to maintain constant pressure in primary circuit under varying load
(b) to supply high pressure steam
(c) to increase pressure of water in primary circuit
(d) to provide subcooled water at high pressure
(e) all of the above.
- 3.61. Which of the following can be used as a coolant in nuclear plant
(a) light or heavy water
(b) molten lead (c) carbon dioxide
(d) freon (e) carbon tetrachloride.
- 3.62. Reactors for propulsion applications use
(a) natural uranium
(b) molten lead (c) any form of uranium
(d) thorium (e) plutonium.
- 3.63. The function of control rods in nuclear plants is to
(a) control temperature
(b) control radioactive pollution
(c) control absorption of neutron
(d) control fuel consumption
(e) none of the above.
- 3.64. Breeder reactors employ liquid metal coolant because it
(a) acts as good moderator
(b) produces maximum steam
(c) transfers heat from core at a fast rate
(d) breeds neutrons
(e) increases rate of reaction in core.
- 3.65. In triggering fission, which type of neutrons are more effective
(a) fast (b) slow
(c) in bulk (d) static
(e) activated.
- 3.66. For economical operation of a nuclear plant
(a) used fuel should be reprocessed
(b) moderator should be used
(c) coolant should be employed
(d) control rods should be used
(e) reflector should be used.
- 3.67. The size of the reactor is said to be critical when
(a) chain reaction can be initiated
(b) it becomes uncontrollable
(c) it explodes
(d) it produces no power
(e) it produces tremendous power.
- 3.68. When a reactor becomes critical, then the production of neutrons is
(a) infinite (b) zero
(c) exactly balanced by the loss of neutrons through leakage
(d) initiated (e) stopped.
- 3.69. In the breeder reactors the generation of new fissionable atom is
(a) at the lower rate than the consumption
(b) at a higher rate than the consumption
(c) at an equal rate of the consumption
(d) depends on other considerations
(e) unpredictable.
- 3.70. The energy produced by a thermal reactor of same size as a breeder reactor is
(a) almost same (b) slightly more
(c) slightly less (d) much less
(e) much more.
- 3.71. Reactors designed for propulsion applications are designed for
(a) natural uranium
(b) enriched uranium
(c) pure uranium
(d) any type of uranium
(e) none of the above.
- 3.72. Superheated steam is generated in following reactor
(a) boiling water (b) gas cooled
(c) pressurised water
(d) all of the above
(e) none of the above.
- 3.73. Solid fuel for nuclear reactions may be fabricated into various small shapes such as
(a) plates (b) pallets
(c) pins
(d) any one of the above
(e) none of the above.
- 3.74. Which of the following is more appropriate for a moderator. One which

- (a) does not absorb neutrons
 (b) absorbs neutrons
 (c) accelerates neutrons
 (d) eats up neutrons
 (e) regenerates neutrons.
- 3.75. A fission chain reaction in uranium can be developed by
 (a) slowing down fast neutrons so that U^{235} fission continues by slow motion neutrons
 (b) accelerating fast neutrons
 (c) absorbing all neutrons
 (d) using moderator
 (e) enriching U^{235} .
- 3.76. In triggering fission, the following types of neutrons are desirable
 (a) fast moving (b) slow moving
 (c) critical neutrons
 (d) neutrons at rest
 (e) none of the above.
- 3.77. Effective moderators are those materials which contain
 (a) light weight atoms
 (b) heavy weight atoms
 (c) critical atoms
 (d) zero weight atoms
 (e) there is no such criterion.
- 3.78. In a fission process, maximum %age of energy is released as
 (a) kinetic energy of neutrons
 (b) kinetic energy of fission products
 (c) instantaneous release of gamma rays
 (d) gradual radioactive decay of fission products
 (e) none of the above.
- 3.79. The following present serious difficulty in designing reactor shield
 (a) alpha particles
 (b) beta particles
 (c) thermal neutrons
 (d) fast neutrons and gamma rays
 (e) none of the above.
- 3.80. In nuclear fission
 (a) the original elements change into completely different elements
 (b) the electrons of the element change
 (c) the molecules rearrange themselves to form other molecules
 (e) none of the above.
- 3.81. In order to have constant chain reaction to produce a constant rate of heat output, the value of ratio of the number of neutrons in one generation to the number of neutrons in the immediately preceding generation must be
 (a) greater than 1.0
 (b) less than 1.0
 (c) equal to zero
 (d) equal to 1.0
 (e) equal to infinity.
- 3.82. Each fission of U^{235} produces following number of fast neutrons per fission
 (a) 1 neutron (b) $1\frac{1}{2}$ neutrons
 (c) 2 neutrons (d) $2\frac{1}{2}$ neutrons
 (e) infinite.
- 3.83. A fast breeder reactor uses following as fuel
 (a) enriched uranium
 (b) plutonium (c) thorium
 (d) U^{235} (e) natural uranium.
- 3.84. A boiling water reactor uses following as fuel
 (a) enriched uranium
 (b) plutonium (c) thorium
 (d) U^{235} (e) natural uranium.
- 3.85. A fast breeder reactor
 (a) uses graphite rods as moderator
 (b) has powerful moderator
 (c) has no moderator
 (d) uses ferrite material as moderator
 (e) uses pressurised water as moderator.
- 3.86. Artificial radioactive isotopes find application in
 (a) power generation
 (b) nucleonic devices
 (c) nuclear fission (d) nuclear fusion
 (e) medical field.
- 3.87. A fast breeder reactor uses
 (a) 90% U-235 (b) U-238
 (c) U-235 (d) Pu-239
 (e) U-239.
- 3.88. Half life of a radioactive isotope corresponds to the time required for half of the following to decay
 (a) electrons (b) protons
 (c) neutrons (d) nucleus
 (e) atom.

- 3.89. Pressurised water reactor is designed
- (a) for boiling of water in the core
 - (b) to use liquid sodium metal as coolant
 - (c) to use intermediate coolant
 - (d) to prevent the water coolant from boiling in the core
 - (e) to eliminate the coolant loop of the pressurised water.
- 3.90. The coolant used in boiling water reactor is
- (a) CO₂
 - (b) pressurised water
 - (c) mixture of water and steam
 - (d) liquid metal
 - (e) mercury.
- 3.91. In boiling water reactor, moderator is
- (a) coolant itself
 - (b) ferrite rod
 - (c) graphite rod
 - (d) liquid sodium metal
 - (e) blanket of thorium.
- 3.92. The most practical fuel for a thermo-nuclear reactor, both from economical and nuclear consideration is
- (a) plutonium
 - (b) uranium
 - (c) deuterium
 - (d) thorium
 - (e) lithium.
- 3.93. The efficiency of a nuclear power plant in comparison to conventional and nuclear consideration is
- (a) higher cost of nuclear fuel
 - (b) high initial cost
 - (c) high heat rejection in condenser
 - (d) lower temperature and pressure conditions
 - (e) nuclear hazard risk.
- 3.94. The presence of reflector in nuclear power plants results in
- (a) increased production of neutrons
 - (b) complete absorption of neutrons
 - (c) controlled production of neutrons
 - (d) decreased leakage of neutrons
 - (e) decrease of speed of neutrons.
- 3.95. The fuel needed, with reflector in nuclear power plant, in order to generate sufficient neutrons to sustain a chain reaction, would be
- (a) more
 - (b) less
 - (c) same
 - (d) zero
 - (e) negative, *i.e.* fuel would be generated.

Steam Boilers, Engines, Nozzles and Turbines

- 4.1. For water, at pressures below atmospheric,
 (a) melting point rises slightly and boiling point drops markedly
 (b) melting point rises markedly and boiling point drops markedly
 (c) melting point drops slightly and boiling point drops markedly
 (d) melting point drops slightly and boiling point drops slightly
 (e) none of the above.
- 4.2. At very low temperature, the melting and boiling temperatures become equal. This temperature is
 (a) 373°K (b) 273.16°K
 (c) 303°K (d) 0°K.
 (e) 300°K.
- 4.3. The critical pressure at which latent heat of vaporisation is zero is
 (a) 225.65 kgf/cm²
 (b) 273 kgf/cm² (c) 100 kgf/cm²
 (d) 1 kgf/cm² (e) - 1 kgf/cm².
- 4.4. The latent heat of steam at pressures greater than atmospheric in comparison to latent heat at atmospheric pressure is
 (a) less (b) more
 (c) equal
 (d) may be less or more depending on temperature
 (e) unpredictable.
- 4.5. The saturation temperature of steam with increase in pressure increases
 (a) linearly
 (b) rapidly first and then slowly
 (c) slowly first and then rapidly
 (d) inversely
 (e) none of the above.
- 4.6. Carbonisation of coal is the process of
 (a) pulverising coal in inert atmosphere
 (b) heating wood in a limited supply of air at temperatures below 300°C
 (c) strongly heating coal continuously for about 48 hours in the absence of air in a closed vessel
 (d) binding the pulverised coal into brick-ettes
 (e) enriching carbon in the coal.
- 4.7. Coke is produced by
 (a) pulverising coal in inert atmosphere
 (b) heating wood in a limited supply of air at temperatures below 300°C
 (c) strongly heating coal continuously for about 48 hours in the absence of air in a closed vessel
 (d) binding the pulverised coal into brick-ettes
 (e) enriching carbon in the coal.
- 4.8. Heating of dry steam above saturation temperature is known as
 (a) enthalpy (b) superheating
 (c) supersaturation (d) latent heat
 (e) super tempering.
- 4.9. Superheating of steam is done at
 (a) constant volume
 (b) constant temperature
 (c) constant pressure
 (d) constant entropy
 (e) constant enthalpy.
- 4.10. 1 kg.m is equal to
 (a) 9.81 Joules (b) 421 Joules

- (c) 427 Joules (d) 102 Joules
(e) 539 Joules.
- 4.11. If partial pressure of air and steam be p_a and p_s respectively in a condenser, then according to Dalton's law, the pressure in condenser is equal to
(a) $p_s - p_a$ (b) $p_a - p_s$
(c) $p_a + p_s$ (d) $\frac{p_a + p_s}{2}$
(e) $\sqrt{p_a \times p_s}$.
- 4.12. Equivalent evaporation is the amount of water evaporated in a boiler from and at
(a) 0°C (b) 100°C
(c) saturation temperature at given pressure
(d) room temperature
(e) 20°C.
- 4.13. The specific volume of steam with increase in pressure decreases
(a) linearly
(b) slowly first and then rapidly
(c) rapidly first and then slowly
(d) inversely
(e) none of the above.
- 4.14. The equivalent evaporation of a boiler is a measure to compare
(a) the given boiler with the model
(b) the two different boilers of the same make
(c) two different makes of boilers operating under the same operating conditions
(d) two boilers of same make but operating under different conditions
(e) any type of boilers operating under any conditions.
- 4.15. The coal requirement per kW hour generation in the thermal power plant is of the order of
(a) 0.1 to 0.2 kg (b) 0.2 to 0.4 kg
(c) 0.6 to 0.8 kg (d) 1.0 to 1.5 kg
(e) 1.5 to 2 kg.
- 4.16. Sublimation region is the region where
(a) solid and vapour phases are in equilibrium
(b) solid and liquid phases are in equilibrium
(c) liquid and vapour phases are in equilibrium
(d) solid, liquid and vapour phases are in equilibrium
(e) none of the above.
- 4.17. Stoichiometric quantity of air is the
(a) air present in atmosphere at NTP conditions
(b) air required for complete combustion of fuel with no excess air
(c) air required for optimum combustion so as to have reasonable excess air
(d) air required to convert CO into CO₂
(e) air required to form an explosive mixture.
- 4.18. One kg of steam sample contains 0.8 kg dry steam; its dryness fraction is
(a) 0.2 (b) 0.8
(c) 1.0 (d) 0.6
(e) 0.5.
- 4.19. If a steam sample is nearly in dry condition, then its dryness fraction can be most accurately determined by
(a) throttling calorimeter
(b) separating calorimeter
(c) combined separating and throttling calorimeter
(d) bucket calorimeter
(e) none of the above.
- 4.20. If x_1 and x_2 be the dryness fractions obtained in separating calorimeter and throttling calorimeter respectively, then the actual dryness fraction of steam will be
(a) $x_1 x_2$ (b) $x_1 + x_2$
(c) $\frac{x_1 + x_2}{2}$ (d) $\frac{1}{\frac{1}{x_1} + \frac{1}{x_2}}$
(e) $x_2 - x_1$.
- 4.21. The specific heat of superheated steam in kcal/kg is generally of the order of
(a) 0.1 (b) 0.3
(c) 0.5 (d) 0.8
(e) 1.0.
- 4.22. On Mollier chart, flow through turbine is represented by
(a) horizontal straight line
(b) vertical straight line
(c) straight inclined line
(d) curved line
(e) none of the above.

- 4.23. A wet vapour can be completely specified by
 (a) pressure only
 (b) temperature only
 (c) dryness fraction only
 (d) specific volume only
 (e) pressure and dryness fraction.
- 4.24. On Millier chart, the constant pressure lines
 (a) diverge from left to right
 (b) diverge from right to left
 (c) are equally spaced throughout
 (d) first rise up and then fall
 (e) none of the above.
- 4.25. On Mollier chart, free expansion, or throttling process from high pressure to atmosphere is represented by
 (a) horizontal straight line
 (b) vertical straight line
 (c) straight inclined line
 (d) curved line
 (e) none of the above.
- 4.26. The bituminous coal is non-caking if its carbon content is
 (a) 78-81% (b) 81-85%
 (c) 85-90% (d) 90-95%
 (e) 95-100%.
- 4.27. The dry saturated steam at very low pressure, ($5-10 \text{ kg/cm}^2$) when throttled to atmosphere will become
 (a) wet (b) superheated
 (c) remain dry saturated
 (d) dry (e) none of the above.
- 4.28. Water at pressure of 4 kg/cm^2 and 160°C temperature when exposed to atmosphere will
 (a) boil
 (b) flash *i.e.* get converted into steam
 (c) remain as it was
 (d) cool down
 (e) none of the above.
- 4.29. The dry saturated steam at very high pressure ($150-200 \text{ kg/cm}^2$) when throttled to atmosphere will become
 (a) wet (b) superheated
 (c) remain dry saturated
 (d) dry (e) none of the above.
- 4.30. In a throttling process
 (a) steam temperature remain constant
 (b) steam pressure remains constant
 (c) steam enthalpy remains constant
 (d) steam entropy remains constant
 (e) steam volume remains constant.
- 4.31. In a throttling process
 (a) heat transfer takes place
 (b) work is done by the expanding steam
 (c) internal energy of steam changes
 (d) all of the above
 (e) none of the above.
- 4.32. The pressure at which latent heat of vaporisation of water is zero, is
 (a) below atmospheric pressure
 (b) 1 kg/cm^2 (c) 100 kg/cm^2
 (d) 170 kg/cm^2 (e) 225.6 kg/cm^2 .
- 4.33. Latent heat of dry steam at atmospheric pressure is equal to
 (a) 539 kcal/kg (b) 539 BTU/lb
 (c) 427 kcal/kg (d) 100 kcal/kg
 (e) 471 kcal/kg.
- 4.34. The latent heat of steam with increase of pressure
 (a) remains same (b) increases
 (c) decreases
 (d) behaves unpredictably
 (e) none of the above.
- 4.35. At critical point, *i.e.* $p=225.65 \text{ kg/cm}^2$, the latent enthalpy of vaporisation is
 (a) maximum (b) minimum
 (c) zero
 (d) depends on temperature also
 (e) none of the above.
- 4.36. At which pressure the properties of water and steam become identical
 (a) 0.1 kg/cm^2 (b) 1 kg/cm^2
 (c) 100 kg/cm^2 (d) 225.6 kg/cm^2
 (e) it is never possible.
- 4.37. In an experiment to determine dryness fraction of steam, the mass of water separated was 1.2 kg in 15 mts and the mass of steam passed out in same time was 4.8 kg. Dryness fraction is
 (a) 40% (b) 25%
 (c) 50% (d) 80%
 (e) 90%.
- 4.38. While steam expands in turbines, theoretically the entropy
 (a) remains constant
 (b) increases
 (c) decreases

- (d) behaves unpredictably
(e) none of the above.
- 4.39. Heating wet steam at constant temperature is heating it at constant
(a) volume (b) pressure
(c) entropy (d) enthalpy
(e) none of the above.
- 4.40. Adiabatic process is
(a) essentially an isentropic process
(b) non-heat transfer process
(c) reversible process
(d) constant temperature process
(e) constant enthalpy process.
- 4.41. The state of vapour under saturation condition is described by
(a) pressure alone
(b) temperature alone
(c) pressure and temperature
(d) pressure and dryness fraction
(e) dryness fraction alone.
- 4.42. Pick up the wrong statement about critical condition of steam
(a) latent heat is zero
(b) liquid directly becomes steam
(c) specific volume of steam and liquid is same
(d) this is the maximum pressure limit
(e) all properties of liquid and steam are same.
- 4.43. Water boils when its vapour pressure
(a) equals that of the surroundings
(b) equals 760 mm of mercury
(c) equals to atmospheric pressure
(d) equals the pressure of water in the container
(e) boiling has nothing to do with vapour pressure.
- 4.44. If x is the weight of dry steam and y is the weight of water in suspension, then dryness fraction is equal to
(a) $\frac{x}{x+y}$ (b) $\frac{y}{x+y}$
(c) $\frac{x}{x-y}$ (d) $\frac{y}{x-y}$
(e) $\frac{x-y}{x}$.
- 4.45. Mechanical equivalent of heat for 1 kcal or Joule's equivalent is equal to
(a) 427 kgm (b) 421 kgm
(c) 539 kgm (d) 102 kgm
(e) 75 kgm.
- 4.46. Equivalent evaporation of water is the evaporation for a feed water supply at 100°C
(a) and its corresponding conversion into dry saturated steam at 100°C and 1.033 kg/cm^2
(b) and its corresponding conversion into dry steam at desired boiler pressure
(c) conversion into steam at atmospheric condition
(d) conversion into steam at the same pressure at which feed water is supplied
(e) none of the above.
- 4.47. The evaporation of 15.653 kg of water per hour from and at 100°C is called
(a) evaporative capacity
(b) factor of evaporation
(c) equivalent evaporation
(d) one boiler h.p.
(e) boiler efficiency.
- 4.48. If H is the total heat of steam in kcal/kg and h is the sensible heat of feed water in kcal/kg, then factor of evaporation is
(a) $\frac{H-h}{539}$ (b) $\frac{H-h}{427}$
(c) $\frac{H-h}{102}$ (d) $\frac{H-h}{75}$
(e) $\frac{H-h}{735}$
- 4.49. The increase in pressure
(a) lowers the boiling point of a liquid
(b) raises the boiling point of a liquid
(c) does not affect the boiling point of a liquid
(d) reduces its volume
(e) none of the above.
- 4.50. During polytropic process
(a) heat transfer takes place across cylinder walls
(b) work is done
(c) steam may be wet, dry or superheated after expansion
(d) all of the above
(e) none of the above.
- 4.51. Hygrometry deals with the
(a) Hygroscopic substances
(b) water vapour in air

- (c) temperature of air
(d) pressure of air
(e) density measurement.
- 4.52. Orsat meter is used for
(a) gravimetric analysis of the flue gases
(b) volumetric analysis of the flue gases
(c) mass flow of the flue gases
(d) measuring smoke density of flue gases
(e) none of the above.
- 4.53. Alkaline pyrogallate is used in Orsat's apparatus for absorption of
(a) CO₂ (b) CO
(c) O₂ (d) N₂
(e) none of the above.
- 4.54. An ideal regenerative cycle is
(a) equal to carnot cycle
(b) less than carnot cycle
(c) more than carnot cycle
(d) could be anything
(e) none of the above.
- 4.55. Efficiency of rankine cycle can be increased by
(a) decreasing initial steam pressure and temperature
(b) increasing exhaust pressure
(c) decreasing exhaust pressure
(d) increasing the expansion ratio
(e) increasing number of regenerative heaters.
- 4.56. Cochran boiler is a
(a) horizontal fire-tube boiler
(b) horizontal water-tube boiler
(c) vertical water-tube boiler
(d) vertical fire tube boiler
(e) forced circulating boiler.
- 4.57. Lancashire boiler is a
(a) stationary fire tube boiler
(b) stationary water tube boiler
(c) water tube boiler with natural/forced circulation
(d) mobile fire tube boiler
(e) none of the above.
- 4.58. Efficiency of a thermal cycle increases by
(a) regeneration
(b) reheating of steam
(c) both (a) and (b)
(d) cooling of steam
(e) none of the above.
- 4.59. One kilowatt-hour energy is equivalent to
(a) 1000 J (b) 360 kJ
(c) 3600 kJ (d) 3600 kW/sec
(e) 1000 kJ.
- 4.60. Which of the following gases has the highest calorific value
(a) producer gas (b) coal gas.
(c) water gas (d) blast furnace gas
(e) coke oven gas.
- 4.61. 100% efficiency of a thermal cycle cannot be achieved because of
(a) frictional losses
(b) it is not possible to achieve 0°K temperature
(c) leakage
(d) non-availability of ideal substance
(e) none of the above.
- 4.62. For burning 1 kg of carbon to CO as per chemically correct combustion, amount of air required is
(a) 1 kg (b) 4/3kg
(c) 8/3kg (d) 2 kg
(e) 16/3 kg.
- 4.63. The diameter of Cornish boiler is of the order of
(a) 1-2 m (b) 1.5-2.5 m
(c) 2-3 m (d) 2.5-3.5 m
(e) 0.5 to 1 m.
- 4.64. The length of Cornish boiler is of the order of
(a) 2-4 m (b) 3-5 m
(c) 5-7.5 m (d) 7-9 m
(e) 9-11 m.
- 4.65. The diameter of fire tube of Cornish boiler compared to its shell is
(a) one half (b) one third
(c) one-fifth (d) two-fifth
(e) three-fifth.
- 4.66. Steam engine operates on
(a) carnot cycle (b) joule cycle
(c) stirling cycle (d) brayton cycle
(e) none of the above.
- 4.67. The change in internal energy in steam engines equals to
(a) work done during the rankine cycle
(b) work done during compression
(c) work done during adiabatic expansion
(d) change in enthalpy
(e) none of the above.

- 4.68. Water tube boilers are those in which
 (a) flue gases pass through tubes and water around it
 (b) water passes through the tubes and flue gases around it
 (c) work is done during adiabatic expansion
 (d) change in enthalpy
 (e) none of the above.
- 4.69. Locomotive type boiler is
 (a) horizontal multitubular water tube boiler
 (b) water wall enclosed furnace type
 (c) vertical tubular fire tube type
 (d) horizontal multi-tubular fire tube type
 (e) none of the above types.
- 4.70. Lancashire boiler is of
 (a) stationary fire tube-type
 (b) horizontal type
 (c) natural circulation type
 (d) internally fired type
 (e) all of the above.
- 4.71. Fire tube boilers are those in which
 (a) flue gases pass through tubes and water around it
 (b) water passes through the tubes and flue gases around it
 (c) forced circulation takes place
 (d) tubes are laid vertically
 (e) none of the above.
- 4.72. Which of the following substance will have same percentage in both proximate and ultimate analysis
 (a) ash (b) volatile matter
 (c) moisture (d) hydrogen
 (e) none of the above.
- 4.73. The number of flue tubes in Lancashire boiler is
 (a) zero (b) one
 (c) two (d) four
 (e) many.
- 4.74. Which of the following is a fire tube boiler
 (a) locomotive boiler
 (b) Babcock and Wilcox boiler
 (c) Stirling boiler
 (d) all of the above
 (e) none of the above.
- 4.75. Which of the following is a water tube boiler
 (a) locomotive boiler
 (b) Cochran boiler
 (c) Cornish boiler
 (d) Babcock and Wilcox boiler
 (e) Lancashire boiler.
- 4.76. The diameter of cylindrical shell of the Lancashire boiler is of the order of
 (a) 1 to 1.25 m (b) 1 to 1.75 m
 (c) 2 to 4 m (d) 1.75 to 2.75 m
 (e) 2.25 to 4.5 m.
- 4.77. A packaged boiler is one in which various parts like firing equipment, fans, feed pumps and automatic controls are
 (a) supplied by same manufacturer loose and assembled at site
 (b) supplied mounted on a single base
 (c) purchased from several parties and packed together at site
 (d) packaged boiler does not exist
 (e) none of the above.
- 4.78. The biggest size of thermal power unit operating in India is
 (a) 30 MW (b) 60 MW
 (c) 100 MW (d) 210 MW
 (e) 500 MW.
- 4.79. Which of the following coals has the highest calorific value
 (a) anthracite coal (b) bituminous coal
 (c) lignite (d) peat
 (e) wood.
- 4.80. The high pressure boiler is one producing steam at a pressure more than
 (a) atmospheric pressure
 (b) 5 kg/cm^2 (c) 10 kg/cm^2
 (d) 40 kg/cm^2 (e) $75\text{-}80 \text{ kg/cm}^2$.
- 4.81. The crown of the fire box is made hemispherical in order to
 (a) give maximum space
 (b) give maximum strength
 (c) withstand pressure inside boiler
 (d) resist intense heat in fire box
 (e) enable easy manufacture.
- 4.82. Which of the following is steam coal
 (a) non-coking bituminous coal
 (b) brown coal
 (c) pulverised coal
 (d) coking bituminous coal
 (e) none of the above.

- 4.83. The fire tubes in a Cochran and Scottish marine boiler are
 (a) horizontal (b) vertical
 (c) inclined
 (d) both horizontal and vertical
 (e) horizontal and inclined.
- 4.84. The diameter of internal flue tubes in a Lancashire boiler compared to its shell is
 (a) one-half (b) one-third
 (c) one-fourth (d) one-fifth
 (e) two-fifth.
- 4.85. The basic purpose of drum in boiler is to
 (a) serve as storage of steam
 (b) serve as storage of feed water for water wall
 (c) remove salts from water
 (d) separate steam from water
 (e) control level.
- 4.86. Duplex feed pumps are used in small steam boilers. These operate on the principle of
 (a) centrifugal pump
 (b) axial flow pump
 (c) gear pump
 (d) ejector pump
 (e) reciprocating pump.
- 4.87. The best suited coal for chain or travelling grate stoker boiler is
 (a) coking coal
 (b) non coking or free burning coal
 (c) pulverised coal
 (d) high sulphur coal
 (e) least ash content coal.
- 4.88. In natural circulation type boiler,
 (a) heating takes place at bottom and the water supplied at bottom gets converted into the mixture of steam bubbles and hot water which rise to drum
 (b) water is supplied in drum and through down-comers located in atmospheric condition it passes to the water wall and rises to drum in the form of mixture of water and steam
 (c) feed pump is employed to supplement natural circulation in water wall type furnace
 (d) water is converted into steam in one pass without any recirculation
 (e) water is fed at atmospheric pressure.
- 4.89. One kg steam sample contains 0.4 kg water vapour. Its dryness fraction is
 (a) 0.4 (b) 0.6
 (c) $\frac{0.4}{1.4}$ (d) 0.4×0.6
 (e) $\frac{0.4}{0.6}$.
- 4.90. Hard coke is produced by carborisation of coal at
 (a) atmospheric temperature
 (b) 500–600°C (c) 700–850°C
 (d) 950–1100°C (e) 1200–1500°C.
- 4.91. Hard coke is used in
 (a) cement industry
 (b) thermal power plant
 (c) blast furnace
 (d) domestic use
 (e) locomotives
- 4.92. Pick up the correct statement as regards Cornish boiler and Lancashire boiler
 (a) cornish is fire tube and lancashire is water tube
 (b) cornish is water tube and lancashire is fire tube
 (c) cornish has two fire tubes and lancashire has one
 (d) lancashire has two fire tubes and cornish has one
 (e) both have two fire tubes.
- 4.93. In locomotive boiler, maximum steam pressure is limited to
 (a) 1 kg/cm² (b) 5 kg/cm²
 (c) 10 kg/cm² (d) 18 kg/cm²
 (e) 31 kg/cm².
- 4.94. Locomotive boiler is of the following type
 (a) multitubular (b) horizontal
 (c) internally fired
 (d) mobile (e) all of the above.
- 4.95. The shell diameter and length of locomotive boiler are
 (a) 1.5 m, 4 m (b) 1.5 m, 6 m
 (c) 1 m, 4 m (d) 2 m, 4 m
 (e) 1.5 m, 8 m.
- 4.96. The diameters of fire tubes and superheater tubes in locomotive boiler are
 (a) 47.5 mm, 130 mm
 (b) 32.5 mm, 180 mm
 (c) 65.5 mm, 210 mm
 (d) 24.5 mm, 65 mm

- (e) 94 mm, 260 mm.
- 4.97. The water tubes in a babcock and wilcox boiler are
 (a) horizontal (b) vertical
 (c) inclined
 (d) horizontal and inclined
 (e) vertical and inclined.
- 4.98. Which of the following varieties of coals is mostly used in steam boilers
 (a) non-coking bituminous coal
 (b) brown coal (c) peat
 (d) coking bituminous coal
 (e) none of the above.
- 4.99. The diameter of tubes for natural circulation boiler as compared to controlled circulation boilers is
 (a) more (b) less
 (c) same
 (d) could be more or less depending on other factors
 (e) none of the above.
- 4.100. A boiler in India should conform to safety regulations of
 (a) DIN (b) BS
 (c) ASTM (d) IBR
 (e) GOST.
- 4.101. The function of injector used in small steam plants is to
 (a) create vacuum in furnace
 (b) create vacuum at turbine exhaust
 (c) pump feed water
 (d) dose chemicals in feed water
 (e) control steam temperature by injecting water.
- 4.102. Which of the following boilers is best suited to meet fluctuating demands
 (a) babcock and wilcox
 (b) locomotive (c) lancashire
 (d) cochran (e) cornish.
- 4.103. The difference between cornish boiler and lancashire boiler is that
 (a) former is fire tube type and latter is water tube type boiler
 (b) former is water tube type and latter is fire tube type
 (c) former contains one fire tube and latter contains two fire tubes
 (e) none of the above.
- 4.104. In accelerated circulation type boiler
 (a) heating takes place at bottom and the water supplied at bottom gets converted into the mixture of steam bubbles and hot water which rise to drum
 (b) water is supplied in drum and through downcomers located in atmospheric condition it passes to the water wall and rises to drum in the form of mixture of water and steam
 (c) feed pump is employed to supplement natural circulation in water wall type furnace
 (e) water is converted into steam in one pass without any recirculation
 (e) water is fed under high pressure and high velocity.
- 4.105. Pick up the wrong statement about water tube boiler in comparison to fire tube boilers
 (a) former generates steam at high pressure
 (b) former occupies less space for same power
 (c) rate of steam flow is more in former case
 (d) former is used for high installed capacity
 (e) chances of explosion are less in former case.
- 4.106. The number of drums in Benson steam generator is
 (a) one (b) two
 (c) one steam drum and one water drum
 (d) no drum
 (e) none of the above.
- 4.107. A fusible plug is fitted in small boilers in order to
 (a) avoid excessive build up of pressure
 (b) avoid explosion
 (c) extinguish fire, if water level in the boiler falls below alarming limit
 (d) control steam dome
 (e) remove molten ash.
- 4.108. The fusible plug in small boilers is located
 (a) in the drum
 (b) in the fire tubes
 (c) above steam dome
 (d) over the combustion chamber
 (e) at the inlet of chimney.

- 4.109. Fusible plug for boilers is made of fusible metal containing tin, lead, and
 (a) bismuth (b) copper
 (c) aluminium (d) nickel
 (e) iron.
- 4.110. Boiler H.P. is defined as the
 (a) steam evaporation rate per kg of fuel fired
 (b) work done in evaporating 1 kg of steam per hour from and at 100°C into dry saturated steam
 (c) the evaporation of 15.65 kg of water per hour from and at 100°C into dry saturated steam
 (d) work done by 1 kg of steam at saturation condition
 (e) heat consumed in evaporating 1 kg water at 0°C to steam at 100°C and 1.033 kg/cm² pressure.
- 4.111. In forced recirculation type boiler,
 (a) heating takes place at bottom and the water supplied at bottom gets converted into the mixture of steam bubbles and hot water which rise to drum
 (b) water is supplied in drum and through down-comers located in atmospheric condition it passes to the water wall and rises to drum in the form of mixture of water and steam
 (c) feed pump is employed to supplement natural circulation in water wall type furnace
 (d) water is converted into steam in one pass without any recirculation
 (e) heating of water takes place in stages.
- 4.112. The ratio of heat utilised to produce steam and the heat liberated in furnace is known as
 (a) boiler effectiveness
 (b) boiler evaporative capacity
 (c) factor of evaporation
 (d) equivalent evaporation
 (e) boiler efficiency.
- 4.113. Steam in water tube boiler as compared to fire tube boiler
 (a) can be raised rapidly
 (b) is raised at slower rate
 (c) is raised at same rate
 (d) could be raised at fast/slow rate depending on design

- (e) none of the above is true.
- 4.114. Thermal efficiency of well maintained boiler will be of the order
 (a) 20% (b) 40%
 (c) 50% (d) 75%
 (e) 90%.
- 4.115. Thermal efficiency of a thermal power plant is of the order of
 (a) 15% (b) 20%
 (c) 30% (d) 45%
 (e) 60%.
- 4.116. It is required to produce large amount of steam at low pressure. Which boiler should be used ?
 (a) pulverised fuel fired boiler
 (b) cochran boiler
 (c) lancashire boiler
 (d) babcock and wilcox boiler
 (e) stoker fired boiler.
- 4.117. The overall efficiency of thermal power plant is
 (a) boiler efficiency, turbine efficiency, generator efficiency
 (b) all the three above plus gas cycle efficiency
 (c) carnot cycle efficiency
 (d) regenerative cycle efficiency
 (e) rankine cycle efficiency.
- 4.118. Which type of boiler can meet rapid changes of load
 (a) vertical fire tube type
 (b) horizontal fire tube type
 (c) horizontal water tube type
 (d) vertical water tube type
 (e) forced circulation type.
- 4.119. In forced circulation type boiler
 (a) heating takes place at bottom and the water supplied at bottom gets converted into the mixture of steam bubbles and hot water which rise to drum
 (b) water is supplied in drum and through down-comers located in atmospheric condition it passes to the water wall and rises to drum in the form of mixture of water and steam
 (c) feed pump is employed to supplement natural circulation in water wall type furnace

- (d) water is converted into steam in one pass without any recirculation
 (e) water is heated in a large number of tubes.
- 4.120.** Boiler stays are used to
 (a) prevent flat surfaces under pressure from tearing apart
 (b) take care of failure in shear
 (c) take care of failure in compression
 (d) provide support for boiler
 (e) provide foundation of boiler.
- 4.121.** The radius of a dished head is taken approximately as
 (a) one-fourth (b) half
 (c) one (d) two
 (e) three.
- 4.122.** Size of boiler tubes is specified by
 (a) mean diameter and thickness
 (b) inside diameter and thickness
 (c) outside diameter and thickness
 (d) outside diameter and inside diameter
 (e) outside diameter alone.
- 4.123.** The heat loss in a boiler takes place in the form of
 (a) heat carried away by flue gases
 (b) heat carried away by ash
 (c) moisture present in fuel and steam formed by combustion of hydrogen in fuel
 (d) radiation
 (e) all of the above.
- 4.124.** The major axis of elliptical manholes on the shell should be provided
 (a) longitudinally (b) circumferentially
 (c) on dished end (d) anywhere
 (e) vertically.
- 4.125.** In which of the following boilers, the draught in furnace is increased by utilising exhaust steam from engine
 (a) lancashire boiler
 (b) locomotive boiler
 (c) babcock and wilcox boiler
 (d) cochran boiler
 (e) benson boiler.
- 4.126.** With increase in load, radiant superheater has
 (a) drooping characteristic
 (b) linear characteristic
 (c) rising characteristic
 (d) flat characteristic
 (e) none of the above.
- 4.127.** With increase in load, convection superheater has
 (a) drooping characteristic
 (b) linear characteristic
 (c) rising characteristic
 (d) flat characteristic
 (e) none of the above.
- 4.128.** The diameter of fire tubes in Cochran boiler is of the order of
 (a) 2 cm (b) 6 cm
 (c) 8 cm (d) 12 cm
 (e) 15 cm.
- 4.129.** In a recuperative air preheater, the heat is transferred
 (a) from a metal wall from one medium to another
 (b) from heating an intermediate material and then heating the air from this material
 (c) by direct mixing
 (d) heat is transferred by bleeding some gases from furnace
 (e) none of the above.
- 4.130.** A safety valve in a locomotive starts leaking. The leaking medium will be
 (a) water (b) dry steam
 (c) wet steam (d) super heated steam
 (e) supersaturated steam.
- 4.131.** The temperature of flue gases at air heater outlet should be
 (a) 100°C
 (b) above dew-point temperature of flue gases
 (c) below dew-point temperature of flue gases
 (d) less than wet bulb temperature of flue gases
 (e) above wet bulb temperature of flue gases.
- 4.132.** In regenerative air preheater, the heat is transferred
 (a) from a metal wall from one medium to another
 (b) from heating an intermediate material and then heating the air from this material
 (c) by direct mixing

- (d) heat is transferred by bleeding some gas from furnace
(e) none of the above.
- 4.133. In designing air preheater, the important design consideration is that
(a) approach temperature should be as low as possible
(b) handling and maintenance should be easier
(c) heat transfer area should be optimum
(d) stack gases should not be cooled to the dew point
(e) none of the above.
- 4.134. The pressure of reheat steam after passing through reheater compared to inlet condition is
(a) more (b) less
(c) equal
(d) may be more or less depending on capacity of reheater
(e) none of the above.
- 4.135. The function of injector used in small capacity boilers is to
(a) create vacuum
(b) inject chemical solution in feed pump
(c) pump water, similar to boiler feed pump
(d) add make up water in the system
(e) none of the above.
- 4.136. The safety valve at superheater as compared to drum safety valve setting is set at
(a) higher value (b) lower value
(c) same value (d) any value
(e) none of the above.
- 4.137. The height of chimney in a power plant is governed by
(a) the draft to be created
(b) limitation of construction facilities
(c) control of pollution
(d) quantity of flue gases to be handled
(e) all of the above.
- 4.138. Steam exhaust from high pressure turbine is reheated in
(a) boiler drum (b) superheater tubes
(c) economiser (d) a separate coil
(e) a separate coil located in convection path.
- 4.139. Vacuum for reciprocating steam engines compared to steam turbines is
(a) more (b) equal
(c) less
(d) could be more or less depending on the size of plant
(e) none of the above.
- 4.140. Expanding steam to a very low pressure (high vacuum) in steam engines is
(a) desirable (b) economical
(c) essential (d) optional
(e) uneconomical.
- 4.141. In locomotives, the draught is produced by
(a) chimney
(b) induced draft fan
(c) both combined (a) and (b)
(d) steam jet draught
(e) none of the above.
- 4.142. Reheating of steam under ideal conditions takes place at constant
(a) entropy (b) enthalpy
(c) pressure (d) temperature
(e) all of the above.
- 4.143. The maximum discharge through a chimney occurs when the height of chimney is
(a) infinitely long (b) around 200 metres
(c) equal to the height of the hot gas column producing draught
(d) outside temperature is very low
(e) more than the tallest building nearby.
- 4.144. Proximate analysis of fuel is determination of percentage of
(a) carbon, hydrogen, nitrogen, sulphur, moisture
(b) fixed carbon, ash, volatile matter, moisture
(c) higher calorific value
(d) lower calorific value
(e) rough analysis.
- 4.145. Which device is used in thermal power plants to reduce level of pollution
(a) induced draft fan
(b) smoke meter (c) chimney
(d) precipitator (e) pulveriser.
- 4.146. Bomb calorimeter is used to determine
(a) Higher calorific value at constant volume
(b) Lower calorific value at constant volume
(c) Higher calorific value at constant pressure

- (d) Lower calorific value at constant pressure
(e) None of the above.
- 4.147.** Ultimate analysis of fuel is determination of percentage of
(a) carbon, hydrogen, nitrogen, sulphur, moisture
(b) fixed carbon, ash, volatile matter, moisture
(c) higher calorific value
(b) lower calorific value
(e) best analysis.
- 4.148.** For combustion of a fuel, following is essential
(a) correct fuel air ratio
(b) proper ignition temperature
(c) O₂ to support combustion
(d) all the three above
(e) none of the above.
- 4.149.** Spontaneous combustion is a phenomenon in which
(a) all the fuel burns instantaneously producing high energy release
(b) fuel burns with less air
(c) coal bursts into flame without any external ignition source but by itself due to gradual increase in temperature as a result of heat released by combination of oxygen with coal
(d) explosion in furnace
(e) none of the above.
- 4.150.** The economiser is used in boilers to
(a) increase thermal efficiency of boiler
(b) economise on fuel
(c) extract heat from the exhaust flue gases
(d) increase flue gas temperature
(e) to heat feed water by bled steam.
- 4.151.** An economiser in a boiler
(a) increases steam pressure
(b) increases steam flow
(c) decreases fuel consumption
(d) decreases steam pressure
(e) increases life of boiler.
- 4.152.** O₂ content in atmospheric air on volume basis is
(a) 21% (b) 23%
(d) 30% (d) 40%
(e) 70%.
- 4.153.** O₂ content in atmospheric air on weight basis is
(a) 21% (b) 23%
(c) 30% (d) 40%
(e) 70%.
- 4.154.** Primary air is the air used to
(a) provide air around burners for obtaining optimum combustion
(b) transport and dry the coal
(c) convert CO (formed in lower zone of furnace) into CO₂ at higher zone
(d) air-delivered by forced draft fan
(e) none of the above.
- 4.155.** Sulphur content of fuels is very important to the plant operators because it
(a) has high heating value
(b) retards electric precipitation
(c) promotes complete combustion
(d) has highly corrosive effect
(e) facilitates ash removal.
- 4.156.** Presence of moisture in fuel oil would
(a) keep the burner tips cool
(b) aid in proper combustion
(c) cause sputtering, possibly extinguishing flame
(d) clean the nozzles
(e) reduce flame length.
- 4.157.** Gusset stays in a boiler are provided to
(a) prevent the bulging of flat surfaces
(b) avoid explosion in furnace
(c) prevent leakage of hot flue gases
(d) support furnace freely from top
(e) prevent atmospheric air leaking into furnace.
- 4.158.** Water and sediment in fuel oil can be removed by
(a) heating the oil in the settling tanks
(b) cooling the oil in the settling tanks
(c) burning the oil
(d) suspension
(e) filtering.
- 4.159.** Pour point of fuel oil is the
(a) lowest temperature at which oil will flow under set condition
(b) storage temperature
(c) temperature at which fuel is pumped through burners
(d) temperature at which oil is transported
(e) none of the above.

- 4.160.** Secondary air is the used to
 (a) provide air around burners for obtaining optimum combustion
 (b) transport and dry the coal
 (c) convert CO (formed in lower zone of furnace) into CO₂ at higher zone
 (d) air delivered by induced draft fan
 (e) air fed to pulverisers.
- 4.161.** The behaviour of coal in a furnace is determined by
 (a) the content of sulphur
 (b) the content of ash and heating value
 (c) the proximate analysis
 (d) the exact analysis
 (e) its type.
- 4.162.** Pick up wrong statement about desired properties of a good fuel
 (a) high-calorific value
 (b) produce minimum smoke and gases
 (c) ease in storing
 (d) high ignition point
 (e) economical
- 4.163.** Sulphur in coal results in
 (a) causing clinkering and slagging
 (b) corroding air heaters
 (c) spontaneous combustion during coal storage
 (d) facilitating ash precipitation
 (e) all of the above.
- 4.164.** Caking coals are those which
 (a) form lumps or masses of coke
 (b) burn freely
 (c) show little or no fusing aciton
 (d) burn completely
 (e) do not form ash.
- 4.165.** Green coal, in order to be burnt, must be
 (a) heated sufficiently
 (b) burnt in excess air
 (c) heated to its ignition point
 (d) burnt as powder
 (e) burnt as lumps.
- 4.166.** The ultimate analysis of fuel lists
 (a) various chemical constituents, carbon, hydrogen, oxygen etc, plus ash as percents by volume
 (b) various chemical constituents, carbon, hydrogen, oxygen, etc, plus ash as percents by weight

- (c) fuel constituents as percents by volume of moisture, volatile, fixed carbon and ash
 (d) fuel constituents as percents by weight of moisture, volatile, fixed carbon and ash
 (e) moisture and ash free heating value.
- 4.167.** The proximate analysis of fuel lists
 (a) various chemical constituents, carbon, hydrogen, oxygen etc, plus ash as percents by volume
 (b) various chemical constituents, carbon, hydrogen, oxygen, etc, plus ash as percents by weight
 (c) fuel constituents as percents by volume of moisture, volatile, fixed carbon and ash
 (d) fuel constituents as percents by weight of moisture, volatile, fixed carbon and ash
 (e) moisture and ash free heating value.
- 4.168.** Tertiary air is the air used to
 (a) provide air around burners for obtaining optimum combustion
 (b) transport and dry the coal
 (c) cool the scanners
 (d) supply air for ignitors
 (e) convert CO (formed in lower zone of furnace) into CO₂ at higher zone.
- 4.169.** The safety valve on boiler drum compared to safety valve on superheater is set at
 (a) same value (b) higher value
 (c) lower value
 (d) lower/higher depending on steam flow
 (e) unpredicatble.
- 4.170.** Which is not correct statement about pulverised fuel firing
 (a) high burning rate is possible
 (b) heat release can be easily controlled
 (c) fuel burns economically
 (d) it is the best technique for burning high ash content fuel haveing low fusion ash
 (e) separate mills are required to powder the coal.
- 4.171.** The three "Ts" for good combustion are
 (a) temperature, time, and turbulance
 (b) total air, true fuel, and turbulance
 (c) thorough mixing, total air, and temperature