

- (C) Number of protons
 - (D) Number of electrons
- Answer: Option A

10. The number of neutrons accompanying the formation of ${}_{54}\text{Xe}^{139}$ and ${}_{38}\text{Sr}^{94}$ from the absorption of a slow neutron by ${}_{92}\text{U}^{235}$, followed by nuclear fission is

- (A) 1
- (B) 2
- (C) 3
- (D) 4

Answer: Option C

11. Which of the following is not a naturally occurring nuclear fuel?

- (A) Uranium-238
- (B) Thorium-233
- (C) Plutonium-239
- (D) None of these

Answer: Option C

12. An ideal coolant for a nuclear reactor should

- (A) Be a good absorber of neutrons
- (B) Be capable of attaining high temperature, only when it is pressurised
- (C) Have high density, but low heat transfer co-efficient
- (D) Be free from radiation damage and non-corrosive

Answer: Option D

13. Safety rods provided in nuclear reactors to guard against accidents, in case of earthquake are made of

- (A) High carbon steel
- (B) Molybdenum
- (C) Zircaloy
- (D) Boron or cadmium

Answer: Option D

14. Heavy water is preferred over ordinary water as a coolant, because it.

- (A) Acts both as an efficient coolant as well as a moderator
- (B) Can be heated to a higher temperature without pressurizing
- (C) Is less prone to radiation damage
- (D) All (A), (B) and (C)

Answer: Option D

15. Percentage of U-238 in natural uranium is around

- (A) 0.71
- (B) 99.29
- (C) 0.015
- (D) 29.71

Answer: Option B

16. The time taken for a radioactive element to reduce to 50% of its original weight is _____ years, if its half life period is 12 years.

- (A) 24
- (B) 18
- (C) 6
- (D) 36

Answer: Option B

17. Which of the following is not a good moderating material?

- (A) Concrete
- (B) Boron
- (C) 18/8 stainless steel
- (D) All (A), (B) and (C)

Answer: Option D

18. Primary purpose of a _____ nuclear reactor is to supply a high neutron flux of the order of 10^{13} to 10^{14} neutrons/cm² second.

- (A) Research
 - (B) Power
 - (C) Breeder
 - (D) Homogeneous
- Answer: Option A

19. The electric power generation cost in nuclear power plant is less than that in a coal based thermal power plant, mainly because the

- (A) Fuel cost per unit power generated is less
- (B) Thermal efficiency of the former is higher
- (C) Maintenance cost of the former is less
- (D) None of these

Answer: Option A

20. Fast breeder nuclear reactors using enriched uranium as fuel may contain upto a maximum of _____ percent of U-235 (i.e. fissile material).

- (A) 15
- (B) 45
- (C) 65
- (D) 85

Answer: Option D

21. Which is used as a coolant in nuclear reactor due to its high capture cross-section?

- (A) H₂
- (B) N₂
- (C) He
- (D) CO₂

Answer: Option A

22. Water is a better coolant than a gas (like CO₂, He, N₂ etc.), because it

- (A) Is a better neutron moderator as well
- (B) Require comparatively smaller pumps and heat exchanger for a given heat transfer rate
- (C) Has a better heat transfer characteristics, and it can be pressurised to attain a high temperature
- (D) All (A), (B) and (C)

Answer: Option D

23. β -rays emission in radioactive disintegration is always accompanied by the emission of

- (A) γ -rays
- (B) α -rays
- (C) Neutrons
- (D) None of these

Answer: Option A

24. Fuel for a nuclear reactor (thermal) is

- (A) Uranium
- (B) Plutonium
- (C) Radium
- (D) None of these

Answer: Option A

25. Final product of uranium extraction plant at Jadugoda (Bihar) is

- (A) Uranium
- (B) Uranium oxide
- (C) Uranium carbide
- (D) Magnesium diuranate

Answer: Option D

26. A heterogeneous reactor is the one, in which the moderator and the

- (A) Coolant are different materials
- (B) Coolant are present in different phases (e.g., heavy water and graphite)
- (C) Fuel are present in different phases (e.g. uranium and heavy water)
- (D) None of these

Answer: Option C

27. Thorium-232 (a fertile material) on absorption of a neutron gets converted into _____ , which is a fissile material.

- (A) Thorium-233
- (B) Uranium-235
- (C) Uranium-233
- (D) Plutonium-239

Answer: Option C

28. The first underground nuclear test was conducted by India at

- (A) Jaisalmer
- (B) Pokharan
- (C) Kalpakkam
- (D) Narora

Answer: Option B

29. The half life period of a radioactive substance is best determined by counting the number of alpha particles emitted per second in a Geiger Muller counter from its known quantity. If the half life period of a radioactive substance is one month, then

- (A) 3/4th of it will disintegrate in two months
- (B) It will completely disintegrate in two months
- (C) It will completely disintegrate in four months
- (D) 1/8th of it will remain intact at the end of four months

Answer: Option B

30. Tarapur (INDIA) atomic power station

- (A) Has two boiling water reactors of American design
- (B) Has an installed capacity of 400 MW
- (C) Is the first power reactor in India, which became critical in 1969
- (D) All (A), (B) and (C)

Answer: Option D

31. Liquid metal (e.g., molten sodium) is preferred as a coolant in case of a/an _____ reactor.

- (A) Homogeneous
- (B) Graphite moderated
- (C) Fast breeder
- (D) Enriched uranium (3% U-235) fuelled

Answer: Option C

32. Plutonium

- (A) Is recovered from spent fuel from thermal nuclear reactor
- (B) Has much lower melting point (640°C) compared to thorium (1690°C)
- (C) Both (A) and (B)
- (D) Neither (A) nor (B)

Answer: Option C

33. Unit of radioactivity is

- (A) Barn
- (B) Fermi
- (C) Angstrom
- (D) Curie

Answer: Option D

34. Which of the following ores contains maximum percentage of uranium?

- (A) Carnotite
- (B) Thorium
- (C) Rescolite
- (D) Pitchblende

Answer: Option D

35. Out of the following places, a nuclear power plant is not located at

- (A) Talcher (Orissa)
- (B) Kaiga (Karnataka)
- (C) Rawatbhata (Rajasthan)
- (D) Kalpakkam (Tamilnadu)

Answer: Option A

36. In nuclear reactions, _____ number is conserved.

- (A) Mass
- (B) Atomic
- (C) Both (A) & (B)
- (D) Neither (A) nor (B)

Answer: Option C

37. Radioactive decay of a material involves a _____ order reaction.

- (A) Third
- (B) Second
- (C) First
- (D) Zero

Answer: Option C

38. The main purpose of control rod in a nuclear reactor is to control the

- (A) Chain reaction and hence the power output by regulating the number of secondary neutrons causing fission
- (B) Emission of hazardous radiation
- (C) Conversion of fissile material into fertile material
- (D) Velocity of the secondary neutrons

Answer: Option A

39. Thermal neutrons which are used to cause the fission of U-235 have energy _____ eV.

- (A) < 0.025
- (B) > 1
- (C) 1-25
- (D) > 200

Answer: Option A

40. The decrease in the atomic number is not observed in case of

- (A) Electron capture
- (B) β -emission
- (C) α -emission
- (D) Positron emission

Answer: Option B

41. Net efficiency of ordinary light water cooled nuclear reactor is about _____ percent.

- (A) 32
- (B) 52
- (C) 72
- (D) 88

Answer: Option A

42. Number of secondary neutron emitted on fission of an atom of U-235 by slow neutron bombardment is

- (A) 3
- (B) 235
- (C) 200
- (D) 92

Answer: Option A

43. Bhabha Atomic Research Centre (BARC) located at Trombay (near Bombay, INDIA) has

- (A) Five operating research reactors (namely Apsara, Cirus Zerelina, Purnima and Dhurva)
- (B) A 420 MW nuclear power plant
- (C) A very large capacity (100 tons/yr) heavy water plant
- (D) All (A), (B) and (C)

Answer: Option A

44. Thorium can be converted into U-233 in a _____ reactor.

- (A) Liquid metal cooled
- (B) Fast breeder
- (C) Thermal
- (D) Swimming pool

Answer: Option B

45. Which of the following may not need a moderator?

- (A) Candu reactor
- (B) Fast breeder reactor
- (C) Homogeneous reactor
- (D) Pressurised water reactor

Answer: Option B

46. Isotopes of an element have the same

- (A) Number of neutrons
- (B) Mass number
- (C) Electronic configuration
- (D) Atomic weight

Answer: Option C

47. Which of the following factors is the most important in the site selection for a nuclear power plant?

- (A) Absence of earthquake prone zone in nearby areas
- (B) Abundant availability of water
- (C) Remotely located from residential areas
- (D) Proximity to fuel source

Answer: Option A

48. Use of molten metal as a coolant in fast breeder reactor helps in

- (A) Rapid heat transfer from the core
- (B) Accelerating the reaction rate in the core
- (C) Breeding neutrons
- (D) Accelerating the neutrons

Answer: Option A

49. Graphite is used in nuclear reactor as

- (A) Insulation lining of the reactor
- (B) Fuel
- (C) Lubricant
- (D) Retarder of neutron velocity

Answer: Option D

50. A nuclear reactor can't be used for

- (A) The production of radioisotopes
- (B) Supplying intense fields or beams of neutron for scientific experiments
- (C) Marine ship propulsion
- (D) None of these

Answer: Option D

51. Which of the following nuclear reactors is the most efficient thermodynamically while operating between the same temperature and pressure limits of the reactor?

- (A) Molten sodium cooled
- (B) CO₂ gas cooled
- (C) Pressurised water
- (D) Boiling water

Answer: Option D

52. Pick out the wrong statement.

- (A) Isotopes have the same number of protons & electrons, but different number of neutrons
- (B) Hydrogen has two isotopes
- (C) In ordinary hydrogen, ${}_1\text{H}^1$ and ${}_1\text{H}^2$ are present in the ratio 6400:1
- (D) None of these

Answer: Option B

53. Which of the following is the most harmful for the human being?

- (A) β -rays
- (B) X-rays
- (C) γ -rays
- (D) Ultra violet rays

Answer: Option C

54. Emission of β -particles during radioactive decay of a substance is from

- (A) Innermost shell
- (B) Nucleus
- (C) Outermost shell
- (D) None of these

Answer: Option B

55. Energy equivalent to one atomic mass unit (amu) is _____ MeV.

- (A) 9.31
- (B) 93.1
- (C) 931
- (D) 9310

Answer: Option C

56. Solar energy results from _____ reaction.

- (A) Fission
- (B) Combustion
- (C) Thermonuclear
- (D) None of these

Answer: Option C

57. The critical mass of a fissionable material can be reduced by

- (A) Heating it
- (B) Cooling it
- (C) Surrounding it by neutron reflecting material
- (D) Surrounding it by neutron absorbing material

Answer: Option C

58. Heavy water used in the nuclear reactors to slow down the speed of neutrons is

- (A) Highly purified water
- (B) A compound of oxygen and deuterium
- (C) Water having dissolved salts of heavy metals
- (D) None of these

Answer: Option B

59. If 4 gm of a radioisotope has a half life period of 10 days, the half life of 2 gm of the same isotope will be _____ days.

- (A) 5
- (B) 10
- (C) 20
- (D) 30

Answer: Option B

60. The ratio of volume of an atom to that of its nucleus is

- (A) 10^{12}
- (B) 10^{-12}
- (C) 10^{-8}
- (D) 10^8

Answer: Option A

61. The new nucleus formed after β -decay of a radioactive element has

- (A) Less atomic number
- (B) Less atomic weight
- (C) More atomic number
- (D) More atomic weight

Answer: Option A

62. A control rod

- (A) Should have small absorption cross-section
- (B) Is generally made of boron, hafnium or cadmium
- (C) Should have large absorption cross-section
- (D) Both (B) and (C)

Answer: Option D

63. Which of the following is a non-fissile material?

- (A) Plutonium-239
- (B) Uranium-235
- (C) Uranium-233
- (D) Thorium-232

Answer: Option D

64. Which of the following types of nuclear reactors is most prone to radioactive hazards?

- (A) Pressurised water reactor
- (B) Gas cooled reactor
- (C) Molten sodium cooled reactor
- (D) Boiling water reactor

Answer: Option D

65. Which of the following is not, a fertile material?

- (A) Th-232
- (B) U-238
- (C) U-233
- (D) None of these

Answer: Option C

66. Uranium Corporation of India Limited (UCIL) engaged in the mining & concentration of uranium ore is located at

- (A) Alwaye (in Kerala)
- (B) Jadugoda (in Jharkhand)
- (C) Kalpakkam (in Tamilnadu)
- (D) Gopalpur coast (in Orissa)

Answer: Option B

67. Uranium ore is mined & concentrated in India at

- (A) Jadugoda (Jharkhand)
- (B) Kota (Rajasthan)
- (C) Tuticorin (Tamilnadu)
- (D) Talcher (Orissa)

Answer: Option A

68. Coolant used in a fast breeder reactor is

- (A) Molten sodium
- (B) Heavy water
- (C) Ordinary water
- (D) Helium

Answer: Option A

69. Nuclear fuel complex, Hyderabad is engaged in the job of

- (A) Manufacture of nuclear fuel elements/assemblies
- (B) Processing of uranium ore
- (C) Treatment of spent fuel
- (D) None of these

Answer: Option A

70. Hydrogen bomb employs the nuclear fusion of

- (A) Hydrogen
- (B) Deuterium
- (C) Tritium
- (D) Helium

Answer: Option B

71. Which of the following is a fuel for a fusion reactor (thermonuclear reactor)?

- (A) Deuterium and tritium
- (B) U-233
- (C) Thorium
- (D) Heavy water

Answer: Option A

- 72. Nuclear power generation capacity in India is**
(A) 3000 MW
(B) 10000 MW
(C) More than hydroelectric power generation capacity
(D) More than thermal power generation capacity
Answer: Option A

- 73. Pressure of CO₂ gas (which is a coolant) in the Calder-Hall nuclear reactor is _____ kgf/cm².**
(A) 0.2
(B) 7
(C) 35
(D) 50
Answer: Option B

- 74. How many atoms are present in one gm-atom of an element?**
(A) 2×10^{23}
(B) 6×10^{23}
(C) 6×10^{32}
(D) 5×10^5
Answer: Option B

- 75. Which of the following may be used to measure the rate of nuclear disintegration?**
(A) Geiger-Muller Counter
(B) Cyclotron
(C) Cold chamber
(D) Mass spectrograph
Answer: Option A

- 76. 'Light water' used as a coolant in nuclear reactor is nothing but**
(A) Ordinary water
(B) Mildly acidic (pH = 6) water
(C) Mildly alkaline (pH = 8) water
(D) None of these
Answer: Option A

- 77. Which of the following undergoes fission reaction easily?**
(A) U-235
(B) U-238
(C) Th-232
(D) None of these
Answer: Option A

- 78. A radioactive isotope undergoes decay with respect to time following _____ law.**
(A) Logarithmic
(B) Exponential
(C) Linear
(D) Inverse square
Answer: Option B

- 79. The function of moderators in nuclear reactor is to**
(A) Slow down the secondary neutrons
(B) Absorb the secondary neutrons
(C) Control the chain reaction
(D) None of these
Answer: Option A

- 80. The decay product of tritium (a beta emitter) is**
(A) Lithium
(B) Helium
(C) Deuterium
(D) Hydrogen
Answer: Option B

- 81. The molecular weight of heavy water is**

- (A) 10
- (B) 18
- (C) 20
- (D) 36

Answer: Option C

82. Enriched uranium means that, it contains

- (A) More than 0.71% of U-235
- (B) Only fertile material
- (C) Only fissile material
- (D) No impurities

Answer: Option A

83. In the nuclear reaction, ${}_{93}\text{N}^{239} \rightarrow {}_{94}\text{Pu}^{239} + ?$; the missing particle is a/an

- (A) Electron
- (B) Proton
- (C) Neutron
- (D) Positron

Answer: Option A

84. Which is a fertile nuclear fuel?

- (A) U-233
- (B) U-235
- (C) Pu-239
- (D) Th-232

Answer: Option D

85. Spent fuel from the nuclear thermal reactor contains

- (A) Fission products
- (B) Plutonium
- (C) Unused fuel
- (D) All (A), (B) & (C)

Answer: Option D

86. Heavy water is used as a moderator in a

- (A) Pressurised water reactor (PWR)
- (B) Boiling water reactor (BWR)
- (C) Candu reactor
- (D) Molten sodium cooled reactor

Answer: Option C

87. Heavy water has maximum density at _____ °C.

- (A) 4
- (B) 11.6
- (C) 0
- (D) 18.6

Answer: Option B

88. Candu reactor is a _____ nuclear reactor.

- (A) Natural uranium fuelled heavy water cooled & moderated
- (B) Highly enriched uranium (85% U-235) fuelled
- (C) Homogeneous
- (D) Fast breeder

Answer: Option A

89. The most commonly used nuclear fuel in boiling water reactor is

- (A) Enriched uranium
- (B) Natural uranium
- (C) Plutonium
- (D) Monazite sand

Answer: Option A

90. Which one is the radioactive isotope of hydrogen?

- (A) Deuterium
- (B) Ortho-hydrogen

- (C) Tritium
 - (D) None of these
- Answer: Option C

91. The phenomenon of nuclear fission is opposite to that of

- (A) Radioactive decay
- (B) Thermionic emission
- (C) Nuclear fusion
- (D) Combustion

Answer: Option C

92. Both tritium and deuterium have the same number of

- (A) Neutrons
- (B) Electrons
- (C) Protons
- (D) Nucleons

Answer: Option A

93. The disintegration rate of a radioactive element

- (A) Progressively increases
- (B) Progressively decreases
- (C) Remains constant throughout
- (D) May increase or decrease depending on the material

Answer: Option B

94. A fast breeder reactor employs

- (A) Graphite as moderator
- (B) Water as coolant
- (C) Molten sodium as coolant as well as moderator
- (D) U-235 as fuel

Answer: Option D

95. The largest stable nucleus is

- (A) U-235
- (B) U-238
- (C) Pb-206
- (D) Bi-209

Answer: Option A

96. Heavy water plant is not located at (INDIA)

- (A) Talcher
- (B) Tuticorin
- (C) Ramagundam
- (D) Kota

Answer: Option C

97. In β -decay of radioactive material, the ratio of neutron to proton

- (A) Increases
- (B) Remain same
- (C) Decreases
- (D) Is unpredictable; may increase or decrease

Answer: Option C

98. Main source of _____ is monazite sand.

- (A) Uranium
- (B) Polonium
- (C) Hafnium
- (D) Thorium

Answer: Option D

99. Thermal nuclear reactors using enriched uranium as fuel contains a maximum of _____ percent fissile material i.e. U-235.

- (A) 1
- (B) 2
- (C) 3

(D) 7

Answer: Option C

100. Research reactors are normally meant for

- (A) Producing high neutron flux 10^{12} - 10^{13} neutrons/cm², sec and studying the effect of neutron bombardment on different materials
- (B) Accelerating the neutrons
- (C) Power generation
- (D) None of these

Answer: Option A

101. The phenomenon of radioactivity was discovered by

- (A) Madam Curie
- (B) Becquerel
- (C) Roentgen
- (D) J.J. Thomson

Answer: Option B

102. Artificially produced radioactive isotopes are used for

- (A) Power generation
- (B) Treatment of certain diseases
- (C) Initiating nuclear fission and fusion
- (D) All (A), (B) and (C)

Answer: Option B

103. First experimental observation of nuclear fission was done by

- (A) Plane
- (B) Rutherford
- (C) Fermi
- (D) Hahn and Strassmann

Answer: Option C

104. Which one is different for the neutral atoms of the isotopes of an element?

- (A) Atomic weights
- (B) Atomic numbers
- (C) Number of protons
- (D) Number of electrons

Answer: Option A

105. Ordinary water is not used as a moderator because, it

- (A) Has a low absorption cross-section
- (B) Has a low scattering cross-section
- (C) Absorbs neutrons
- (D) Does not absorb neutrons

Answer: Option C

106. Uranium is recovered from its ore (pitchblende) by

- (A) Froth floatation technique
- (B) Leaching with sulphuric acid
- (C) Smelting in a furnace
- (D) Dissolving in water

Answer: Option B

107. Percentage of heavy water in ordinary water is around

- (A) 0.015
- (B) 7.54
- (C) 0.71
- (D) 32.97

Answer: Option A

108. Which of the following is not an ore of uranium?

- (A) Pitchblende
- (B) Kyanite
- (C) Carnotite
- (D) Rescolite

Answer: Option B

109. Atoms with same number of neutrons, but different number of nucleons are called

- (A) Isotones
- (B) Isobars
- (C) Isotopes
- (D) Isostere

Answer: Option A

110. "Critical mass" is the minimum mass of nuclear fissile material required for the

- (A) Sustainment of chain reaction
- (B) Power generation on commercial scale
- (C) Economic power generation
- (D) None of these

Answer: Option A

111. The emission of an α -particle causes the resultant nucleus to have

- (A) More atomic weight and less atomic number
- (B) Less atomic weight and less atomic number
- (C) Less atomic weight and more atomic number
- (D) None of these

Answer: Option A

112. When the difference between mass number and atomic number of atoms of two or more elements are same, the atoms are termed as

- (A) Isomers
- (B) Isotopes
- (C) Isobars
- (D) Isotones

Answer: Option D

113. Neutrons have mass approximately equal to that of _____ atoms.

- (A) Hydrogen
- (B) Helium
- (C) Deuterium
- (D) None of these

Answer: Option A

114. Nuclear fuel generally used in reactors is uranium oxide instead of uranium, because the former has higher

- (A) Melting point, hence can be subjected to higher temperature
- (B) Density; hence core volume for a given power output would be smaller
- (C) Resistance to effects of irradiation
- (D) All (A), (B) and (C)

Answer: Option D

115. Which of the following is artificially produced as it does not occur in nature?

- (A) Uranium-235
- (B) Uranium-233
- (C) Plutonium-239
- (D) Both (B) and (C)

Answer: Option D

116. Radioactivity of an isotope is expressed in

- (A) Barn
- (B) MeV
- (C) Curie
- (D) Ergs

Answer: Option C

117. Hydrogen differs from deuterium in _____ properties.

- (A) Radioactive
- (B) Physical
- (C) Chemical
- (D) All (A), (B) and (C)

Answer: Option B

118. The half life period of a radioactive element is 100 days. After 400 days, one gm of the element will be reduced to _____ gm.

- (A) 1/4
- (B) 1/8
- (C) 1/2
- (D) 1/16

Answer: Option D

119. The atomic weight and atomic number of an element are A and Z respectively. What is the number of neutrons in the atom of that element?

- (A) $A + Z$
- (B) $A - Z$
- (C) A
- (D) Z

Answer: Option B

120. The mass number of an element is not changed, when it emits _____ radiations.

- (A) α & β
- (B) β & γ
- (C) γ & α
- (D) α , β , & γ

Answer: Option B

121. Pressure in a Pressurised Water Reactor (PWR) is used for

- (A) Maintaining constant pressure in the primary cooling circuit under varying loads
- (B) Superheating the steam
- (C) Pressurising the water in the primary coolant circuit
- (D) None of these

Answer: Option A

122. The half life period of a radioactive element depends upon the

- (A) Temperature
- (B) Pressure
- (C) Amount of element present
- (D) None of these

Answer: Option D

123. The main ore of uranium is

- (A) Pitchblende
- (B) Monazite sand
- (C) Cassiterite
- (D) Chalcopyrite

Answer: Option A

124. The half life period of a radioactive element depends on its

- (A) Temperature
- (B) Pressure
- (C) Amount
- (D) None of these

Answer: Option D

125. Commercial power generation from fusion reactor is not yet possible, because

- (A) It is difficult to control fusion reaction
- (B) The fuel required (e.g. deuterium and tritium) is scarce
- (C) It is difficult to initiate fusion reaction
- (D) Quantity of fuel required for initiating fusion reaction is prohibitively high

Answer: Option A

126. Biological shield is provided in a nuclear power reactor to protect the _____ from radiation damage.

- (A) Fuel elements
- (B) Operating personnels
- (C) Walls of the reactor

(D) None of these
Answer: Option B

127. A fast breeder reactor

- (A) Uses natural uranium as fuel
 - (B) Does not require a moderator
 - (C) Both (A) and (B)
 - (D) Neither (A) nor (B)
- Answer: Option B

128. H₂ is a better coolant than CO₂, due to its relatively

- (A) Lower density
 - (B) Higher specific heat
 - (C) Non-reactivity to uranium
 - (D) Lower neutron capture cross-section
- Answer: Option B

129. Uranium ore is currently mined & concentrated (in India) at

- (A) Jadugoda
 - (B) Ghatshila
 - (C) Khetri
 - (D) Alwaye
- Answer: Option A

130. Velocity of the thermal neutron (< 0.025 eV) used for fission of U-235 is around _____ m/sec.

- (A) 1
 - (B) 2200
 - (C) 3×10^{11}
 - (D) 9×10^{21}
- Answer: Option B

131. Which of the following accounts for the maximum energy release in the nuclear fission process?

- (A) Kinetic energy of fission products
 - (B) Radioactive decay of fission products
 - (C) Instantaneous release of γ -rays
 - (D) Kinetic energy of neutrons
- Answer: Option A

132. Pick out the wrong statement.

- (A) α -particle emission from a radioactive element makes it electrically negative
 - (B) β -particle emission from a radioactive element makes it electrically positive
 - (C) A radioactive element having a half life period of 20 years will completely disintegrated in 40 years
 - (D) The disintegration constant of a radioactive isotope is independent of pressure, temperature or concentration
- Answer: Option C

133. The ratio of mass of a neutron to that of an electron is about 1839. What is the ratio of the mass of a proton to that of an electron?

- (A) 159
 - (B) 1837
 - (C) 2537
 - (D) 10000
- Answer: Option B

134. _____ moderator is used in a fast breeder reactor.

- (A) Graphite
 - (B) Heavy water
 - (C) Beryllium
 - (D) No
- Answer: Option D

135. The second underground nuclear test was conducted by India at

- (A) Jaisalmer
 - (B) Pokhran
 - (C) Kalpakkam
 - (D) Narora
- Answer: Option B

136. Nuclear fuel usually used in a Boiling Water Reactor (BWR) is

- (A) Plutonium
 - (B) Enriched uranium
 - (C) Natural uranium
 - (D) Thorium
- Answer: Option B

137. In the gaseous diffusion process of uranium enrichment, the natural uranium is converted into gaseous

- (A) Uranium oxide
 - (B) Uranium hexafluoride
 - (C) Uranium carbide
 - (D) Uranium sulphate
- Answer: Option B

138. Atoms of U-238 and U-235 differ in structure by three

- (A) Electrons and three protons
 - (B) Protons
 - (C) Neutrons
 - (D) Electrons
- Answer: Option C

139. Enrichment of uranium is done to increase the concentration of _____ in the natural uranium.

- (A) U-238
- (B) U-233
- (C) U-235
- (D) Pu-239

Answer: Option C

140. Moderating material used in a thermal-reactor should be a

- (A) Good absorber of neutrons
- (B) Solid substance
- (C) Poor absorber of neutrons
- (D) None of these

Answer: Option C

141. A pressurised water reactor (PWR) uses pressurised water as a

- (A) Coolant
- (B) Working fluid in power turbine
- (C) Moderator
- (D) None of these

Answer: Option A

142. Which of the following radiations is the least penetrating?

- (A) α -rays
- (B) β -rays
- (C) γ -rays
- (D) X-rays

Answer: Option A

143. Critical energy should be _____ the neutron binding energy of the atom in order to initiate a nuclear fission.

- (A) Equal to
- (B) Less than
- (C) More than
- (D) Either more or less

Answer: Option C

144. _____ nuclear reactor does not require a heat exchanger to supply steam to power turbine.

- (A) Molten sodium cooled
- (B) Helium cooled
- (C) Boiling water
- (D) Pressurised water

Answer: Option C

145. Hydrogen has _____ isotopes.

- (A) No
- (B) One
- (C) Two
- (D) Three

Answer: Option D

146. A thermal nuclear reactor compared to a fast breeder reactor

- (A) Uses slower neutrons for fission
- (B) Uses faster neutrons for fission
- (C) Gives higher power density
- (D) Requires less fuel to run at the same power level

Answer: Option A

147. Which of the following is not used as a moderator in nuclear reactor?

- (A) Molten sodium
- (B) Light water
- (C) Beryllium
- (D) Boron hydride

Answer: Option A

148. Pick out the wrong statement.

- (A) Atoms with same number of nucleons but different number of protons are called isobars
- (B) Atoms with same number of protons but different number of nucleons are called isoters
- (C) Out of α , β , and γ -rays, the one having maximum penetration power are γ -rays
- (D) The product formed by emission of α -particle has mass number less by 4 units than the parent nuclide

Answer: Option B

149. Which one is radioactive in nature?

- (A) Helium
- (B) Deuterium
- (C) Heavy hydrogen
- (D) Tritium

Answer: Option D

150. Sodium melts (at atmospheric pressure) at a temperature of _____ °C.

- (A) 58
- (B) 98
- (C) 348
- (D) 588

Answer: Option B

151. Which is not a fissile nuclear material?

- (A) U-233
- (B) U-235
- (C) U-238
- (D) Pu-239

Answer: Option C

152. The radioisotope used to study the thyroid gland is

- (A) Iodine
- (B) Cobalt
- (C) Iron
- (D) Carbon

Answer: Option A

153. Fast breeder reactors are most usable in India, because of our largest _____ deposits.

- (A) Thorium
- (B) Plutonium
- (C) Uranium
- (D) None of these

Answer: Option A

154. Which of the following is not used as a nuclear fuel cladding material?

- (A) Zircaloy
- (B) Cadmium
- (C) Ceramics
- (D) Stainless steel

Answer: Option B

155. An electron has a mass that is approximately _____ that of the proton.

- (A) 1836 (approximately)
- (B) 1/1836 (approximately)
- (C) 1
- (D) ∞

Answer: Option B

156. 75% of a radioactive element decays in 6 hours. Its half life period is _____ hours.

- (A) 3/4
- (B) 1/6
- (C) 3
- (D) 4

Answer: Option C

157. Which of the following reactors is operated at high neutron flux and low power level?

- (A) Breeder reactor
- (B) Research reactor
- (C) Heterogeneous reactor
- (D) Liquid metal (e.g., molten sodium) cooled reactor

Answer: Option B

158. Secondary cooling circuit is a must in molten sodium cooled fast breeder reactor for

- (A) Achieving high degree of superheat in the steam
- (B) Faster heat removal rate from the core
- (C) Lowering the coolant circulation pressure
- (D) Avoiding the mixing of water with radioactive sodium, as it may cause explosion

Answer: Option D

159. Absorption/scattering cross-section of an element is expressed in "barn", which is equivalent to

- (A) 10^{-24} cm²
- (B) 10^{-12} cm
- (C) 1 Angstrom
- (D) 10^{-24} cm

Answer: Option A

160. One 'amu' is equivalent to

- (A) 9.31 MeV
- (B) 931 eV
- (C) 931 Mev
- (D) 931 J

Answer: Option C

161. Isotopes of an element have different

- (A) Mass number
- (B) Electronic configuration
- (C) Nuclear charge
- (D) Chemical properties

Answer: Option A

162. Indian monazite sand contains _____ percent thorium.

- (A) 10
- (B) 25
- (C) 60
- (D) 90

Answer: Option A

163. An element having large number of _____ is most easily subjected to nuclear fission.

- (A) Protons
- (B) Electrons
- (C) Neutrons
- (D) Nucleons

Answer: Option D

164. Thorium metal

- (A) Resembles steel in appearance
- (B) Is less hard (in the range of silver)
- (C) Is highly ductile
- (D) All (A), (B) and (C)

Answer: Option D

165. The amount of a radioactive material (having a half life of 100 years) remaining after 400 years will be _____ of its original weight.

- (A) 1/2
- (B) 1/4
- (C) 1/8
- (D) 1/16

Answer: Option D

166. Which of the following isotopes is not present in natural uranium?

- (A) U-238
- (B) U-234
- (C) U-235
- (D) U-232

Answer: Option D

167. Mass of a positron is same as that of a/an

- (A) Electron
- (B) α -particle
- (C) Proton
- (D) Neutron

Answer: Option A

168. U-235 content in enriched uranium, that is normally used in power reactors (e.g., at Tarapur atomic power plant), is about _____ percent.

- (A) 85
- (B) 50
- (C) 3
- (D) 97

Answer: Option C

169. Pick out the wrong statement.

- (A) The nucleus of a hydrogen atom is identical with a proton
- (B) A, β -ray particle is identical with an electron
- (C) Mass of an electron is about 1/1800th of the lightest nucleus
- (D) Positron is heavier than a proton

Answer: Option D

170. Thorium-232 is converted into uranium-233 in a/an _____ nuclear reactor.

- (A) Thermal
- (B) Fast breeder
- (C) Heavy water moderated
- (D) Enriched uranium

Answer: Option B

171. Nuclear power plant in INDIA is not located at

- (A) Talcher (Orissa)
 - (B) Rawatbhata (Rajasthan)
 - (C) Kalpakkam (Tamilnadu)
 - (D) Kaiga (Karnataka)
- Answer: Option A

172. Heavy water plant (in INDIA) is not located at

- (A) Kota and Baroda
 - (B) Talcher (Orissa)
 - (C) Tuticorin (Tamilnadu)
 - (D) Korba (Chhattisgarh)
- Answer: Option D

173. The number of neutrons in the nucleus of Uranium-233 (${}_{92}\text{U}^{233}$) is

- (A) 141
 - (B) 92
 - (C) 233
 - (D) 325
- Answer: Option A

174. Nuclides having the same atomic numbers are termed as

- (A) Isotopes
 - (B) Isomers
 - (C) Isotones
 - (D) Isobars
- Answer: Option B

175. A homogeneous reactor is the one, in which the

- (A) Fissile atoms are evenly distributed throughout the mass of nuclear reactor
 - (B) Same substance (e.g. heavy water) is used as moderator & coolant
 - (C) The fuel and the moderator is mixed to form a homogeneous material
 - (D) All (A), (B) and (C)
- Answer: Option C

176. The size of an atom is of the order of one

- (A) °Angstrom
 - (B) Fermi
 - (C) Micron
 - (D) mm
- Answer: Option A

177. Molten sodium is used as a coolant in a fast breeder reactor, because of its

- (A) Excellent moderating properties
 - (B) Neutron breeding capability
 - (C) Faster heat removal capability from the core
 - (D) Capability to increase the reaction rate in the core
- Answer: Option C

178. Specific gravity of uranium and plutonium is about

- (A) 8
 - (B) 13
 - (C) 19
 - (D) 27
- Answer: Option

179. Heat is generated in a nuclear reactor (thermal) by

- (A) Combustion of a nuclear fuel e.g. uranium
 - (B) Fusion of atoms of uranium
 - (C) Absorption of neutrons in uranium atoms
 - (D) Fission of U-235 by neutrons
- Answer: Option D

180. The atomic mass of an element is fractional, because

- (A) Of uncertainty principle
- (B) It may have isobars

- (C) It contains neutrons
 - (D) It may have isotopes
- Answer: Option D

181. In a homogeneous nuclear reactor, the _____ are mixed together.

- (A) Fuel & coolant
- (B) Fuel & moderator
- (C) Coolant & moderator
- (D) None of these

Answer: Option B

182. "Critical mass" is the minimum mass of nuclear fissile material required for the

- (A) Sustainment of chain reaction
- (B) Power generation on commercial scale
- (C) Economic power generation
- (D) None of these

Answer: Option A

183. A fertile material is the one, which can be

- (A) Converted into fissile material on absorption of neutron
- (B) Fissioned by slow (thermal) neutrons
- (C) Fissioned by fast neutrons
- (D) Fissioned by either slow or fast neutrons

Answer: Option A

184. The atomic number of an element is equal to the number of _____ present in its atom.

- (A) Neutrons
- (B) Electrons
- (C) Protons
- (D) Either (B) or (C)

Answer: Option D

185. In a pressurised water reactor (PWR), the

- (A) Fuel is natural uranium and heavy water acts both as moderator & coolant
- (B) Coolant water boils in the core of the reactor
- (C) Coolant water is pressurised to prevent bulk boiling of water in the core
- (D) Use of moderator is not required

Answer: Option C

186. Fast breeder test reactor at Kalpakkam (INDIA) is designed for using

- (A) Thorium as a fertile material
- (B) U-238 as a fertile material
- (C) Helium as a coolant
- (D) Uranium ore directly as a fuel

Answer: Option A

187. What is the average life of a radioactive atom having a 'half life period' of T ?

- (A) $1.44 T$
- (B) $0.144 T$
- (C) $14.4 T$
- (D) $2T$

Answer: Option A

188. Radioactive decay is a _____ change.

- (A) Chemical
- (B) Nuclear
- (C) Physical
- (D) None of these

Answer: Option B

189. In a nuclear explosion, the energy is released primarily in the form of _____ energy.

- (A) Potential
- (B) Thermal
- (C) Kinetic
- (D) Electrical

Answer: Option C

190. The sum of masses of two nuclei produced in nuclear fission compared to the mass of original nucleus is

- (A) Less
- (B) More
- (C) Same
- (D) Much more

Answer: Option A

191. The mass number of an element is equal to the number of _____ in the nucleus.

- (A) Electrons
- (B) Neutrons
- (C) Protons
- (D) Neutrons plus protons (i.e., nucleons)

Answer: Option D

192. Heavy water (D₂O) in a nuclear reactor serves as a

- (A) Coolant
- (B) Moderator
- (C) Both (A) & (B)
- (D) Neutron absorber

Answer: Option C

193. _____ have the same mass number, but different nuclear charge.

- (A) Isotopes
- (B) Isobars
- (C) Isotones
- (D) None of these

Answer: Option B

194. A boiling water reactor is the one, in which the

- (A) Coolant water is allowed to boil in the core of the reactor
- (B) Coolant water, after being heated in the reactor core, generates steam in a boiler
- (C) Pressurised water is pumped into the core
- (D) Fuel and the coolant are thoroughly mixed to form a homogeneous solution

Answer: Option A

195. Energy produced in the nuclear fission is of the order of _____ MeV.

- (A) 20
- (B) 200
- (C) 1000
- (D) 2000

Answer: Option B

196. The most abundant isotope of natural uranium is

- (A) ${}_{92}\text{U}^{238}$
- (B) ${}_{92}\text{U}^{235}$
- (C) ${}_{92}\text{U}^{234}$
- (D) None of these

Answer: Option A

197. A fast breeder reactor

- (A) Utilises fast neutrons for causing fission
- (B) Converts fertile material (e.g., U-238) into fissile material (Pu-239)
- (C) Normally employs molten sodium as coolant
- (D) All (A), (B) and (C)

Answer: Option D

198. A moderator _____ the neutrons.

- (A) Slows down
- (B) Absorbs
- (C) Accelerates
- (D) Reflects

Answer: Option A

199. Which is the most commonly used molten metal for cooling of nuclear reactors?

- (A) Calcium
- (B) Sodium
- (C) Mercury
- (D) Zinc

Answer: Option B

200. Extraction of uranium from its ore is done by _____ method.

- (A) Chemical
- (B) Pyrometallurgical
- (C) Physical beneficiation
- (D) Electrometallurgical

Answer: Option A

201. Percentage of the heavy water in ordinary water is around

- (A) 0.015
- (B) 7.54
- (C) 0.71
- (D) 32.97

Answer: Option A

202. Pick out the wrong statement.

- (A) The ratio of the density of the 'nucleus' to that of the 'atom' is 10^{12}
- (B) α -particle is identical with a doubly charged helium ion
- (C) The mass of deuterium atom is half that of helium atom
- (D) Gamma rays are high energy electrons

Answer: Option D

203. The ${}_{92}\text{U}^{238}$ emits an α -particle. The product is

- (A) ${}_{90}\text{U}^{234}$
- (B) ${}_{90}\text{U}^{238}$
- (C) ${}_{90}\text{U}^{236}$
- (D) ${}_{92}\text{U}^{236}$

Answer: Option A

204. The atomic number of a radioactive element is not changed, when it emits _____ rays.

- (A) α
- (B) β
- (C) γ
- (D) α & β

Answer: Option C

205. Coolant used in a boiling water reactor is

- (A) Hydrogen gas
- (B) Water
- (C) Steam
- (D) A mixture of water & steam

Answer: Option D

206. Isotopes of an element have different

- (A) Mass number
- (B) Electronic configuration
- (C) Nuclear charge
- (D) Chemical properties

Answer: Option A

207. The ratio of neutrons to protons of an element having a mass number and atomic number of 80 and 40 respectively is

- (A) 1
- (B) 0.5
- (C) 2
- (D) 4

Answer: Option A

208. The ratio of atomic radius to its nuclear radius is about

- (A) 10^5
- (B) 10^8
- (C) 10^{12}
- (D) 10^{15}

Answer: Option A

209. Fast breeder Test Reactor (FBTR) is located at

- (A) Kalpakkam (near Madras)
- (B) Kota (in Rajasthan)
- (C) BARC (Trombay)
- (D) Tarapur (in Maharashtra)

Answer: Option A

210. Out of the following places, heavy water plant is not located at

- (A) Baroda
- (B) Ramagundam
- (C) Talcher
- (D) Tuticorin

Answer: Option B

211. A radioactive substance does not emit

- (A) α -ray
- (B) Proton
- (C) Positron
- (D) β -ray

Answer: Option B

212. Which of the following nuclear materials is fissile?

- (A) Uranium-238
- (B) Thorium-232
- (C) Plutonium-239
- (D) None of these

Answer: Option C

213. Thermal shield is used in high powered nuclear reactors to

- (A) Protect the walls of the reactor from radiation damage
- (B) Absorb the fast neutrons
- (C) Slow down the secondary neutrons
- (D) Protect the fuel element from coming in contact with the coolant

Answer: Option A

214. Gas cooling as compared to water cooling of nuclear reactors

- (A) Cannot attain a high temperature
- (B) Is more efficient as gas has a higher specific heat
- (C) Can produce only saturated steam for feeding to power turbine
- (D) None of these

Answer: Option D

215. Pick out the wrong statement.

- (A) The disintegration rate of a radioactive substance cannot be increased by heating it
- (B) Electrons have negligible mass and unit negative charge
- (C) Deuterium atom has one proton and two neutrons in its nucleus
- (D) Cadmium is capable of absorbing neutrons

Answer: Option C

216. Unit of radioactivity is

- (A) Barn
- (B) Fermi
- (C) Angstrom
- (D) Curie

Answer: Option D

217. Commercial power generation from fusion reactor is not yet possible, because

- (A) It is difficult to control nuclear fusion reaction

- (B) The fuel required (i.e., deuterium & tritium) is scarce
 - (C) It is difficult to initiate fusion reaction
 - (D) Quantity of fuel required for initiating fusion reaction is prohibitively high
- Answer: Option A

218. The velocity of thermal (slow) neutrons triggering nuclear fission reaction (having energy equal to 0.025 eV) is about _____ metres/second.

- (A) 1100
- (B) 2200
- (C) 3300
- (D) 4400

Answer: Option B

219. Molten sodium (as a coolant in fast breeder reactor)

- (A) Can't attain high temperature at normal pressure
- (B) Is not at all corrosive, even at a higher temperature
- (C) Is highly radioactive at elevated temperatures and can cause explosion, when it comes in contact with air or water
- (D) None of these

Answer: Option C

220. Positron is a/an

- (A) Nucleus having two protons
- (B) Helium nucleus
- (C) Electron with positive charge
- (D) Nucleus with one proton and one neutron

Answer: Option C

221. Out of the following, nucleus of _____ atom contains the largest number of neutrons.

- (A) U-235
- (B) U-238
- (C) U-239
- (D) Pu-239

Answer: Option C

222. Nuclear power reactor located at Tarapur is of _____ type.

- (A) Fast breeder
- (B) Pressurised water
- (C) Boiling water
- (D) Gas cooled

Answer: Option C

223. The amount of a radioisotope remaining undecayed after a time equal to four times its half life, will be _____ percent.

- (A) 3.125
- (B) 6.25
- (C) 12.50
- (D) 25

Answer: Option B

224. Quantity of fissionable material (i.e. U-235) in natural uranium is _____ percent.

- (A) 0.71
- (B) 6.31
- (C) 99.29
- (D) 12.73

Answer: Option A

225. Nuclear reactors are provided with shield to guard against the emission of mainly _____ rays.

- (A) X
- (B) α and β
- (C) Neutrons & gamma
- (D) Infrared

Answer: Option C

226. Extraction of uranium from its ore is done using _____ methods.

- (A) Electrometallurgical
- (B) Pyrometallurgical
- (C) Chemical
- (D) Physical beneficiation

Answer: Option C

227. Which of the following is a moderating material used in nuclear reactor?

- (A) Graphite
- (B) Cadmium
- (C) Zircaloy (an alloy of zirconium and aluminium)
- (D) Stainless steel

Answer: Option A

228. Pick out the correct statement.

- (A) Positron is the antiparticle of electron
- (B) In α -decay, the ratio of neutron to proton decreases
- (C) Ionising power of β -rays is higher than that of α -rays
- (D) Speed of α -rays is more than that of γ -rays

Answer: Option A

229. Uranium percentage in monazite sand is about

- (A) 0.01
- (B) 0.25
- (C) 1.2
- (D) 7

Answer: Option B

230. Percentage of natural uranium present in uranium ore found in Jadugoda (Jharkhand, India) is

- (A) 0.1
- (B) 1
- (C) 2
- (D) 12

Answer: Option A

231. Fast breeder reactors do not

- (A) Use Th-232 as fissile fuel
- (B) Convert fertile material to fissile material
- (C) Use fast neutrons for fission
- (D) Use molten sodium as coolant

Answer: Option A

232. Pick out the correct statement.

- (A) Loss of electrons from neutral atoms produces negative ions
- (B) The radius of nucleus & atomic size are of the order of 10^{-12} cm & 10^{-8} cm respectively
- (C) Gain of electrons by neutral atoms form cations
- (D) Proton to neutron ratio in a stable nucleus is 2 : 1

Answer: Option B

233. Fuel for a fast breeder reactor is

- (A) Plutonium
- (B) Uranium
- (C) Radium
- (D) Neptunium

Answer: Option A

234. The main ore of thorium is

- (A) Pitchblende
- (B) Monazite sand
- (C) Limonite
- (D) Galena

Answer: Option B

235. MeV is the unit of