

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

- A. Zinc
- B. Sodium
- C. Calcium
- D. Mercury

Answer: B

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

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

Answer: B

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

- A. fusion of atoms of uranium.
- B. fission of U-235 by neutrons.
- C. absorption of neutrons in uranium atoms.
- D. combustion of a nuclear fuel e.g. uranium.

Answer: B

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

- A. 2.25
- B. 4.25
- C. 6.25
- D. 8.25

Answer: C

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

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

Answer: D

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

- A. thermal
- B. fast breeder



- C. enriched uranium
- D. heavy water moderated

Answer: B

7. 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: D

8. Fast breeder reactors do not

- A. use Th-232 as fissile fuel.
- B. use fast neutrons for fission.
- C. use molten sodium as coolant.
- D. convert fertile material to fissile material.

Answer: A

9. 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. 6
- B. 18
- C. 24
- D. 48

Answer: B

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

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

Answer: B

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

- A. Candu reactor
- B. Fast breeder reactor

C. Homogeneous reactor

D. Pressurised water reactor

Answer: B

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

A. α -emission

B. β -emission

C. electron capture

D. positron emission

Answer: B

13. Which of the following may not need a control rod ?

A. Candu reactor.

B. Fast breeder reactor.

C. Liquid metal cooled reactor.

D. None of these.

Answer: D

14. The decay product of tritium (a beta emitter) is

A. helium

B. lithium

C. hydrogen

D. deuterium

Answer: D

15. One 'amu' is equivalent to

A. 931J

B. 931 eV

C. 9.31 MeV

D. 931 MeV

Answer: D

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

A. Narora

B. Pokhran

C. Jaisalmer

D. Kalpakkan

Answer: B

17. 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: C

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

- A. α & β
- B. γ & α
- C. β & γ
- D. α , β , & γ

Answer: C

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

- A. can not 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: D

20. Which of the following may be used to measure the rate of nuclear disintegration?

- A. Cyclotron
- B. Cold chamber
- C. Mass spectrograph
- D. Geiger-Muller Counter

Answer: D

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

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

Answer: B

22. 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
C. A+Z
- B. Z
D. A- Z

Answer: D

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

- A. 1100
C. 3300
- B. 2200
D. 4400

Answer: B

24. The function of moderators in nuclear reactor is to

- A. control the chain reaction.
C. slow down the secondary neutrons.
- B. absorb the secondary neutrons.
D. none of these.

Answer: C

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

- A. thermal
C. swimming pool
- B. fast breeder
D. liquid metal cooled

Answer: B

26. Specific gravity of uranium and plutonium is about

- A. 9
C. 19
- B. 13
D. 27

Answer: C

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

- A. < 0.025
C. 1-25
- B. >1
D. > 200

Answer: A

28. Radioactive decay is a _____ change.

- A. nuclear
- B. physical
- C. chemical
- D. none of these

Answer: A

29. Which is a fertile nuclear fuel ?

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

Answer: D

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

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

Answer: B

31. 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. 4

Answer: C

32. A moderator _____ the neutrons.

- A. absorbs
- B. reflects
- C. slows down
- D. accelerates

Answer: C

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

- A. treatment of spent fuel.
- C. manufacture of nuclear fuel elements/assemblies .
- B. processing of uranium ore.
- D. none of these.

Answer: C

34. _____ nuclear reactor does not require a heat exchanger to supply steam to power turbine.
- A. Boiling water
 - C. Pressurised water
 - B. Helium cooled
 - D. Molten sodium cooled

Answer: A

35. 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. 10
 - C. 30
 - B. 20
 - D. 40

Answer: A

36. Which of the following is not used as a nuclear fuel cladding material ?
- A. Ceramics
 - C. Cadmium
 - B. Zircalloy
 - D. Stainless steel

Answer: C

37. The time required for half of the _____ of a radioactive isotope to decay is called its half life.
- A. nuclei
 - C. neutrons
 - B. protons
 - D. electrons

Answer: A

38. _____ moderator is used in a fast breeder reactor.
- A. No
 - C. Beryllium
 - B. Graphite
 - D. Heavy water

Answer: A

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

- A. absorb the fast neutrons.
- B. slow down the secondary neutrons.
- C. protect the walls of the reactor from radiation damage.
- D. protect the fuel element from coming in contact with the coolant.

Answer: C

40. Pick out the wrong statement.

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

Answer: A

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

- A. isoters
- B. isobars
- C. isotopes
- D. isotones

Answer: D

42. Fuel for a nuclear reactor (thermal) is

- A. radium
- B. uranium
- C. plutonium
- D. none of these

Answer: B

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

- A. Isobars
- B. Isotopes
- C. Isotones
- D. none of these

Answer: A

44. The most commonly used nuclear fuel in boiling water reactor is
- A. plutonium
 - B. monazite sand
 - C. natural uranium
 - D. enriched uranium

Answer: D

45. Percentage of U-238 in natural uranium is around
- A. 0.015
 - B. 0.71
 - C. 29.71
 - D. 99.29

Answer: A

46. Graphite is used in nuclear reactor as
- A. fuel
 - B. lubricant
 - C. insulation lining of the reactor.
 - D. retarder of neutron velocity.

Answer: D

47. Nuclides having the same atomic numbers are termed as
- A. isobars
 - B. isomers
 - C. isotopes
 - D. isotones

Answer: B

48. A fertile material is the one, which can be
- A. fissioned by fast neutrons.
 - B. fissioned by slow (thermal) neutrons.
 - C. fissioned by either slow or fast neutrons.
 - D. converted into fissile material on absorption of neutron.

Answer: D

49. Emission of β -particles during radioactive decay of a substance is from
- A. nucleus
 - B. innermost shell
 - C. outermost shell
 - D. none of these

Answer: A

50. A radioactive isotope undergoes decay with respect to time following _____ law.

- A. linear
- B. logarithmic
- C. exponential
- D. inverse square

Answer: C

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

- A. Thorium
- B. Rescolite
- C. Carnotite
- D. Pitchblende

Answer: D

52. Which one is radioactive in nature ?

- A. Helium
- B. Tritium
- C. Deuterium
- D. Heavy hydrogen

Answer: B

53. 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: D

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

- A. U-233
- B. U-235
- C. U-238
- D. Pu-239

Answer: B

55. Uranium ore is currently mined & concentrated at

- A. Khetri
- B. Alwaye
- C. Ghatsila
- D. Jadugoda

Answer: D

56. A fast breeder reactor employs

- A. U-235 as fuel.
- B. water as coolant.
- C. graphite as moderator.
- D. molten sodium as coolant as well as moderator.

Answer: A

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

- A. amount
- B. pressure
- C. temperature
- D. none of these

Answer: D

58. Main source of _____ is monazite sand.

- A. uranium
- B. hafnium
- C. thorium
- D. polonium

Answer: C

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

- A. Narora
- B. Jaisalmer
- C. Pokharan
- D. Kalpakkam

Answer: C

60. 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 per

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- A. $\frac{3}{4}$ th of it will disintegrate in two months. B. it will completely disintegrate in four months.
C. it will completely disintegrate in two months. D. $\frac{1}{8}$ th of it will remain intact at the end of four months.

Answer: C

61. Candu reactor is a _____ nuclear reactor.
A. fast breeder B. homogeneous
C. highly enriched uranium (85% U-235) fuelled D. natural uranium fuelled heavy water cooled & moderated

Answer: D

62. The main ore of thorium is
A. galena B. limonite
C. pitchblende D. monazite sand

Answer: D

63. Unit of radioactivity is
A. barn B. curie
C. fermi D. angstrom

Answer: B

64. 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. $\frac{1}{2}$ B. $\frac{1}{4}$
C. $\frac{1}{8}$ D. $\frac{1}{16}$

Answer: D

65. Function of control rod in a nuclear reactor is to control

- A. pressure
- B. temperature
- C. fuel consumption
- D. absorption of neutrons

Answer: D

66. Extraction of uranium from its ore is done using _____ methods.
- A. chemical
 - B. pyrometallurgical
 - C. electrometallurgical
 - D. physical beneficiation

Answer: A

67. U-235 content in enriched uranium, that is normally used in power reactors (e.g., at Tarapur atomic power plant), is about _____ percent.
- A. 3
 - B. 50
 - C. 85
 - D. 97

Answer: A

68. "Critical mass" is the minimum mass of nuclear fissile material required for the
- A. economic power generation.
 - B. sustainment of chain reaction.
 - C. power generation on commercial scale.
 - D. none of these

Answer: B

69. Which of the following nuclear materials is fissile ?
- A. Thorium-232
 - B. Uranium-238
 - C. Plutonium-239
 - D. None of these

Answer: C

70. Fast breeder reactors are most usable in India, because of our largest _____ deposits.
- A. uranium
 - B. thorium
 - C. plutonium
 - D. none of these

Answer: B

71. Nucleus of tritium has _____ neutrons.

- A. 1
- B. 2
- C. 3
- D. 4

Answer: B

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

- A. protons
- B. electrons
- C. neutrons
- D. electrons and three protons

Answer: C

73. First experimental observation of nuclear fission was done by

- A. Fermi
- B. Plane
- C. Rutherford
- D. Hahn and Strassman

Answer: A

74. 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. 2
- C. 3
- D. 4

Answer: A

75. Coolant present in the primary circuit of a pressurised water reactor is high pressure

- A. saturated steam
- B. saturated water
- C. sub cooled water
- D. superheated steam

Answer: B

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

- A. it is difficult to initiate fusion reaction. B. it is difficult to control nuclear fusion reaction.
- C. the fuel required (i.e., deuterium & tritium) is scarce. D. quantity of fuel required for initiating fusion reaction is prohibitively high.

Answer: B

77. 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: C

78. The main ore of uranium is

- A. cassiterite B. chalcopyrite
C. pitchblende D. monazite sand

Answer: C

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

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

Answer: A

80. Percentage of natural uranium present in uranium ore found in Jadugoda (Jharkhand) is

- A. 0.1 B. 1
C. 3 D. 12

Answer: A

81. Activity is proportional to number of

- A. father nuclei B. decayed nuclei

C. daughter nuclei

D. undecayed nuclei

Answer: D

82. Energy given to nucleus to dismantle it increases the

A. kinetic energy of individual nucleons

B. potential energy of individual nucleons

C. chemical energy of individual nucleons

D. mechanical energy of individual nucleons

Answer: B

83. Radioactive decay is a

A. random process

B. regular process

C. massive process

D. non-spontaneous process

Answer: A

84. In gamma emission, change in nucleon number is

A. zero

B. definite

C. increase by 1

D. decreases by 1

Answer: A

85. At higher energy, bodies have

A. zero mass

B. small mass

C. large mass

D. smaller weight

Answer: C

86. Time taken by a radioactive substance to decay half is called

A. half life

B. time delay

C. half period

D. time constant

Answer: A

87. Most stable isotope in nature is of

- A. iron-56
- B. carbon-12
- C. uranium-235
- D. uranium-238

Answer: A

88. Activity of one decay per second is equal to

- A. 1 Bq
- B. 1 Cd
- C. 1 atm
- D. 1 mol

Answer: A

89. Greater decay constant

- A. less size
- B. less activity
- C. greater size
- D. greater activity

Answer: D

90. Total amount of mass and energy together in a system is

- A. zero
- B. constant
- C. increasing
- D. decreasing

Answer: B

91. Process by which energy is released in sun is

- A. fusion
- B. fission
- C. radioactivity
- D. Haber's process

Answer: A

92. Minimum energy required to pull nucleus apart is called

- A. electron affinity
- B. binding energy
- C. chemical energy
- D. ionization energy

Answer: B

93. Mass excess for U-235 is

- A. 0.05 u
- B. 0.06 u
- C. 0.034 u
- D. 0.043 u

Answer: D

94. As compare to proton, mass of neutron is

- A. 0.1% greater
- B. 1% greater
- C. 5% greater
- D. 10% greater

Answer: A

95. If energy is released from a system, it's mass

- A. zero
- B. constant
- C. increases
- D. decreases

Answer: D

96. New nucleus after alpha particle decay is called

- A. parent nucleus
- B. decayed nucleus
- C. daughter nucleus
- D. undecayed nucleus

Answer: C

97. If nucleus is formed from separate nucleons, then energy is

- A. gained
- B. released
- C. absorbed
- D. converted

Answer: B

98. Nuclear power is _____ thermal power.

- A. Cheaper than
- B. Costlier than
- C. Equal in amount
- D. They cannot be related

Answer: A

99. Radioactive substances can be produced readily in

- A. A transistor
- B. An atomic pile
- C. An electron gun
- D. A Wilson cloud chamber

Answer: B

100. Which among the following is a positively charged particle emitted by a radioactive element?

- A. Beta ray
- B. Alpha ray
- C. Cathode ray
- D. Gamma ray

Answer: B