**ACTIVE SITE TUTORIALS**

**Date :** 20-08-2019 **TEST ID: 520**

**Time :** 23:45:00 **CHEMISTRY**

**Marks :** 1546

2.STRUCTURE OF ATOM

**Single Correct Answer Type**

| 1. | Beta-emission takes place | | | | | | | |
|  | a) | From the elements above the band of stability | | | | | | | |
|  | b) | When neutron is converted to proton | | | | | | | |
|  | c) | With shifting of the new element one group towards right | | | | | | | |
|  | d) | Following all the facts given above | | | | | | | |
| 2. | The angular momentum of an electron in 4s orbital, 3p orbital, and 4th orbit are | | | | | | | |
|  | a) |  | | | | | | | |
|  | b) |  | | | | | | | |
|  | c) |  | | | | | | | |
|  | d) |  | | | | | | | |
| 3. | Slow neutrons can bring about the fission of | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 4. | When passing through a magnetic field the largest deflection is experienced by | | | | | | | |
|  | a) | rays | b) | rays | c) | rays | d) | All equal |
| 5. | A radioactive element decays by the sequence, and with half-lives, given below  Which of the following statements about this system are correct? | | | | | | | |
|  | a) | After two hours, less than 10% of the initial is left | | | | | | | |
|  | b) | Maximum amount of present at any time before 30 min is less then 50% of the initial amount of | | | | | | | |
|  | c) | Atomic numbers of and are same | | | | | | | |
|  | d) | All of the above are correct statements | | | | | | | |
| 6. | captures a K electron into its nucleus. What is the mass number and atomic number of the nuclide formed? | | | | | | | |
|  | a) | 3,7 | b) | 4,8 | c) | 3,8 | d) | 4,7 |
| 7. | When electronic transition occurs from higher energy state to lower energy state with energy difference equal to electron volts, the wavelength of the line emitted is approximately equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 8. | Which of the following nuclei is unstable? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 9. | Thiosulphate ion, on acidification changes to along with precipitation of sulphur  Which is the correct statement? | | | | | | | |
|  | a) | is in sulphur | b) | is in | c) | is in both | d) | is in none |
| 10. | The electrons, identified by quantum numbers and  Can be placed in the order of increasing energy, from the lowest to highest, as | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 11. | After the emission of a particle followed by particle from the number of neutrons in the atom is | | | | | | | |
|  | a) | 130 | b) | 129 | c) | 128 | d) | 127 |
| 12. | In the Schrodinger’s wave equation represents | | | | | | | |
|  | a) | Orbit | b) | Wave function | c) | Wave | d) | Radial probability |
| 13. | Which of the following has the maximum penetrating power? | | | | | | | |
|  | a) | particle | b) | Proton | c) | particle | d) | Positron |
| 14. | Which of the following projectiles is the best for bombarding the nuclide? | | | | | | | |
|  | a) | particle | b) | Proton | c) | Deuteron | d) | Neutron |
| 15. | Which of the following is false? | | | | | | | |
|  | a) | The energy of an electron in an orbital of a hydrogen-like species depends only on the principal quantum number | | | | | | | |
|  | b) | The angular momentum of an electron of an orbital of a multielectron atom depends on the quantum numbers and | | | | | | | |
|  | c) | The expression of angular momentum of an electron in an orbital is given as | | | | | | | |
|  | d) | The -component of angular momentum of an electron in an orbital is given as | | | | | | | |
| 16. | Which of the following elements belongs to -series? | | | | | | | |
|  | a) | Pb-207 | b) | Bi-209 | c) | Pb-208 | d) | Pb-206 |
| 17. | The radius of second Bohr’s orbit is | | | | | | | |
|  | a) | 0.053 nm | b) |  | c) | nm | d) | nm |
| 18. | Sodium chloride imparts a yellow colour to the Bunsen flame. This can be interpreted due to the | | | | | | | |
|  | a) | Low ionization energy of sodium | | | | | | | |
|  | b) | Sublimation of metallic sodium to give yellow vapour | | | | | | | |
|  | c) | Emission of excess energy absorbed as a radiation in the visible region | | | | | | | |
|  | d) | Photosensitivity of sodium | | | | | | | |
| 19. | When ratio of an isotope is greater than the stable isotope of that element, it emits | | | | | | | |
|  | a) | particles | b) | particles | c) | Neutron | d) | Positron |
| 20. | The electronic configuration of a diapositive ion is 2, 8,14 and its mass number is 56. The number of neutrons present is | | | | | | | |
|  | a) | 32 | b) | 42 | c) | 30 | d) | 34 |
| 21. | Total binding energy of -particles is | | | | | | | |
|  | a) | 28.3 MeV | b) | 2.83 MeV | c) | 20.5 MeV | d) | 0.283 MeV |
| 22. | The energy of an electron in the first Bohr orbit for hydrogen is . Which one of the following is a possible excited state for electron in Bohr orbit of hydrogen atom? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 23. | Rutherford’s experiment, which established the nuclear model of the atom, used a beam of | | | | | | | |
|  | a) | -particles, which impinged on a metal foil and got absorbed | | | | | | | |
|  | b) | -rays, which impinged on a metal foil and ejected electrons | | | | | | | |
|  | c) | Helium atom, which impinged on a metal foil and got scattered | | | | | | | |
|  | d) | Helium nuclei, which impinged on a metal foil and got scattered | | | | | | | |
| 24. | The radiations from a naturally occurring radioactive substance, as seen after deflection by a magnet in one direction, are | | | | | | | |
|  | a) | Definitely alpha rays | | | b) | Definitely beta rays | | |
|  | c) | Both alpha and beta rays | | | d) | Either alpha or beta rays | | |
| 25. | A radioisotope has half life of 10 years. What percentage of the original amount of it would you expect to remain after 20 years? | | | | | | | |
|  | a) | 0 | b) | 12.5 | c) | 25 | d) | 8 |
| 26. | Which of the following nuclear reaction occurs in nature for the formation of tritium? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 27. | The number of neutrons accompanying the formation of and from the absorption of a slow neutron by , followed by nuclear fission is | | | | | | | |
|  | a) | 0 | b) | 2 | c) | 1 | d) | 3 |
| 28. | The first ionization potential in electron volts of nitrogen and oxygen atoms are, respectively, given by | | | | | | | |
|  | a) | 14.6, 13.6 | b) | 13.6, 14.6 | c) | 13.6, 13.6 | d) | 14.6, 14.6 |
| 29. | The most radioactive of the isotopes of an element is the one with the largest value of its | | | | | | | |
|  | a) | Half-life | b) | Neutron number | c) | Atomic number | d) | Decay constant |
| 30. | Which of the following statements about quantum numbers is wrong: | | | | | | | |
|  | a) | If the value of , the electron distribution is spherical | | | | | | | |
|  | b) | The shape of the orbital is given by subsidiary quantum number | | | | | | | |
|  | c) | The Zeeman’s effect is explained by magnetic quantum number | | | | | | | |
|  | d) | The spin quantum number gives the orientations of electron cloud | | | | | | | |
| 31. | One curie of activity is equivalent to | | | | | | | |
|  | a) | disintegrations per second | | | | | | | |
|  | b) | disintegrations per second | | | | | | | |
|  | c) | disintegrations per second | | | | | | | |
|  | d) | None | | | | | | | |
| 32. | The ratio of the energy of photon of wavelength radiation to that of radiation is | | | | | | | |
|  | a) |  | b) | 4 | c) |  | d) | 2 |
| 33. | The correct ground state electronic configuration of chromium atom is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 34. | Which reaction shows artificial transmutation by bombardment? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | None of the above | | |
| 35. | When decays it emits an -particle. The new nuclide in turn emits a -particle to give another nuclide X. The mass number and atomic number of X are, respectively | | | | | | | |
|  | a) | 234 and 91 | b) | 234 and 96 | c) | 232 and 88 | d) | 234 and 88 |
| 36. | Among the following nuclides, the highest binding energy per nucleon is found for | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 37. | in the upper atmosphere is formed by the action of neutron on | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 38. | The kinetic energy of the photoelectrons does not depend upon | | | | | | | |
|  | a) | Intensity of incident radiation | | | b) | Frequency of incident radiation | | |
|  | c) | Wavelength of incident radiation | | | d) | Wave number of incident radiation | | |
| 39. | In uranium mineral, the atomic ratio is nearly equal to one. The age (in years) of the mineral is nearly (half-life period of U-238 is ) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 40. | Hydrogen bomb is based on the principle of | | | | | | | |
|  | a) | Nuclear fission | b) | Nuclear fusion | c) | Nuclear explosion | d) | Chemical reaction |
| 41. | The wave mechanical model of an atom is based upon which of the following equations? | | | | | | | |
|  | a) | Schrodinger’s equation | | | b) | De Broglie’s equation | | |
|  | c) | Heisenberg’s uncertainty principle | | | d) | All the above | | |
| 42. | The correct set of four quantum numbers for the valence (outermost) electron of rubidium () is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 43. | The radiation that produces the greatest number of ions as it passes through matter is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 44. | The decay of a radioactive element follows first order kinetics. Thus, | | | | | | | |
|  | a) | Half-life period = a constant/, where is decay constant | | | | | | | |
|  | b) | The rate of decay is independent of temperature | | | | | | | |
|  | c) | The rate can be altered by changing chemical conditions | | | | | | | |
|  | d) | The element will be completely transformed into new element after expiry of two half-life period | | | | | | | |
| 45. | After three half lives, the percentage of fraction of amount left is | | | | | | | |
|  | a) | 6.35 | b) | 12.5 | c) | 50 | d) | 75 |
| 46. | The SI unit of radioactivity is | | | | | | | |
|  | a) | Curie | b) | Micro-curie | c) | Rutherford | d) | Becquerel |
| 47. | Which nuclear reaction is not balanced? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 48. | Atoms with the same mass number but having different nuclear charges are called | | | | | | | |
|  | a) | Isotopes | b) | Isobars | c) | Isochors | d) | Isotones |
| 49. | The number of radial nodes of and -orbitals are respectively | | | | | | | |
|  | a) | 2, 0 | b) | 0, 2 | c) | 1, 2 | d) | 2, 11 |
| 50. | C-14 has a life of 5760 years. 100 mg of sample containing C-14 is reduced to 25 mg in | | | | | | | |
|  | a) | 11520 years | b) | 2880 years | c) | 1440 years | d) | 17280 years |
| 51. | Tritium,has a half-life of 12.26 yr. A sample of tritiated water has an activity of How many years will it take for the activity to fall to | | | | | | | |
|  | a) | 6.13 | b) | 12.26 | c) | 24.52 | d) | 36.78 |
| 52. | If a radioactive element is placed in an evacuated container, its rate of disintegration | | | | | | | |
|  | a) | Will be increased | | | b) | Will be decreased | | |
|  | c) | Will change very slightly | | | d) | Will remain unchanged | | |
| 53. | A  At equilibrium is | | | | | | | |
|  | a) | 1 | b) | 2 | c) | 0.5 | d) | 20 |
| 54. | In nuclear reactors heavy water is used as a | | | | | | | |
|  | a) | Fuel | b) | Projectile | c) | Moderator | d) | Arrester |
| 55. | The energy of an electron in the first Bohr orbit of H atom is . The possible energy value(s) of the excited state(s) for electrons in Bohr orbits of hydrogen is(are) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 56. | Which one of the following does not consist of charged particles of matter? | | | | | | | |
|  | a) | particles | b) | rays | c) | rays | d) | Anode rays |
| 57. | The phenomenon radioactivity is associated with | | | | | | | |
|  | a) | Decay of nucleus | | | | | | | |
|  | b) | Fussion of nucleus | | | | | | | |
|  | c) | Emission of electrons or protons | | | | | | | |
|  | d) | Rearrangement in the extra nuclear electron | | | | | | | |
| 58. | Which nuclear reaction is an example of emission? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | None of the above | | |
| 59. | The ratio of energy of photon of to that of is | | | | | | | |
|  | a) | 2 | b) |  | c) | 4 | d) |  |
| 60. | Amongst the following elements (whose electronic configurations are given below), the one having the highest ionization energy is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 61. | REM is a unit of | | | | | | | |
|  | a) | Radiation dosage | b) | Binding energy | c) | Packing fraction | d) | Radioactivity |
| 62. | The possible sub-shells in energy shell are: | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | only |
| 63. | In a series of three steps in radioactive disintegration sequence starting with the particles emitted are, successively, and particles. The resulting product is an isotope of | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 64. | The work function of a metal is . If radiations of fall on the metal, then the kinetic energy of the fastest photoelectron is: | | | | | | | |
|  | a) | J | b) | J | c) | J | d) | J |
| 65. | 1 g of emits a particle forming a stable Hg atom. Hg formed at the end of 52 days is | | | | | | | |
|  | a) | 0.0625 g | b) | 0.9375 g | c) | 0.7500 g | d) | 0.2500 g |
| 66. | If the threshold wavelength for ejection of electron from metal is 330 nm, then work function for the photoelectric emission is | | | | | | | |
|  | a) | J | b) | J | c) | J | d) | J |
| 67. | For which of the following electron distributions is ground state, the Pauli’s exclusion principle is violated? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 68. | The transition in ion that would have the same wavelength as the first Lyman line in hydrogen spectrum is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 69. | Aluminiu-25 decays by emitting a positron. The species immediately produced has | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 70. | The reaction  Is an example of | | | | | | | |
|  | a) | Nuclear fission | | | b) | Nuclear fusion | | |
|  | c) | Artificial radioactivity | | | d) | Radioactive disintegration | | |
| 71. | Atomic mass of an element is not necessarily a whole number because | | | | | | | |
|  | a) | It contains electrons, protons, and neutrons | | | b) | It exists in allotropic forms | | |
|  | c) | It contains isotopes | | | d) | Atoms are no longer indivisible | | |
| 72. | Which of the following arrangements of electrons is mostly likely to be stable? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 73. | A photon of frequency causes photoelectric emission from a surface with threshold frequency . The de Broglic wavelength of the photoelectron emitted is given as | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 74. | The total number of unpaired electrons are | | | | | | | |
|  | a) | 1 | | | | | | | |
|  | b) | 2 | | | | | | | |
|  | c) | 3 | | | | | | | |
|  | d) | 4 | | | | | | | |
| 75. | Which of the following is false? | | | | | | | |
|  | a) | Bracket spectral series for which and lies in the infrared region of the electromagnetic radiation | | | | | | | |
|  | b) | The orbital is symmetrical about -axis | | | | | | | |
|  | c) | The orbital has no probability of finding electron along- and -axis | | | | | | | |
|  | d) | The orbital has no probability of finding electron along - and -axis | | | | | | | |
| 76. | The energy equivalent to 1 amu is? | | | | | | | |
|  | a) | 931.5 MeV | b) | 93.15 MeV | c) | 460 MeV | d) | 554 MeV |
| 77. | 1 g atom of an -emitting (half life = 10 hr) was placed in sealed containers, . Helium atoms will accumulate in the container after | | | | | | | |
|  | a) | 4.52 hr | b) | 10.00 hr | c) | 9.40 hr | d) | 20.00 hr |
| 78. | The two electrons have the following sets of quantum numbers:  What is true of the following | | | | | | | |
|  | a) | X and Y have same energy | | | b) | X and Y have unequal energy | | |
|  | c) | X and Y represent same electron | | | d) | None of the statement is correct | | |
| 79. | For a given principal level , the energy of its subshells is of the order | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 80. | The unstable nucleus decays with - particle emission, having a half-life of 10 h. From this it follows that the  I. mass number of the product is 212  II. atomic number of the product is 81  III. fraction of the original isotope remaining after 20 h is 1/4  IV. Nucleus formed is stable  Select the correct alternate | | | | | | | |
|  | a) | I, II and III | b) | I and III | c) | II and IV | d) | IV |
| 81. | Which is different in isotopes of an element? | | | | | | | |
|  | a) | Atomic number | b) | Mass number | c) | Number of protons | d) | Number of electrons |
| 82. | If uranium (mass number 238 and atomic number 92) emits an -particle, the product has mass number and atomic number | | | | | | | |
|  | a) | 236 and 92 | b) | 234 and 90 | c) | 238 and 90 | d) | 236 and 90 |
| 83. | Which of the following is false? | | | | | | | |
|  | a) | The angular momentum of an electron due to its spinning is given as , where can take a value of 1/2 | | | | | | | |
|  | b) | The angular momentum of an electron due to its spinning is given as , where can take the value of | | | | | | | |
|  | c) | The azimuthal quantum number cannot have negative values | | | | | | | |
|  | d) | The potential energy of an electron in an orbit is twice in magnitude as compared to its kinetic energy | | | | | | | |
| 84. | product product  and are two radioactive elements with half-life periods and (in years) and and If half-life periods are equal, disintegration rate at the start of disintegration with same concentration would be | | | | | | | |
|  | a) |  | b) | 0.693 | c) | Both (a) and (b) | d) | None of these |
| 85. | The orbital diagram in which the Aufbau principle is violated is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 86. | Two nuclei are not identical but have the same number of nucleons. These are | | | | | | | |
|  | a) | Isotopes | b) | Isobars | c) | Isotones | d) | None |
| 87. | When undergoes reaction, the radioisotope formed is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 88. | For an emitting isotope, the value of disintegration constant is per year. The amount of the isotope of a given sample will reduce to half its value after a period (in years) of nearly | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 89. | The number of spherical nodes in orbital are: | | | | | | | |
|  | a) | One | b) | Three | c) | None | d) | Two |
| 90. | The transition of electrons in H atom that will emit maximum energy is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 91. | The end product of (4n+2) disintegration series is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 92. | The limiting line in Balmer series will have a frequency of | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 93. | An atom bomb is based on the principle of | | | | | | | |
|  | a) | Nuclear fusion | b) | Nuclear fission | c) | Radioactivity | d) | Combustion |
| 94. | The heaviest subatomic particle is | | | | | | | |
|  | a) | Neutron | b) | Positron | c) | Electron | d) | Proton |
| 95. | The exact path of electron orbital cannot be determined, the above statement is based upon | | | | | | | |
|  | a) | Hund’s rule | b) | Bohr’s rule | c) | Uncertainty principle | d) | Aufbau principle |
| 96. | The ratio of potential energy and total energy of an electron in a Bohr orbit of a hydrogen-like species is | | | | | | | |
|  | a) | 2 | b) |  | c) | 1 | d) |  |
| 97. | The orbital diagram in which the Aufbau principle is violated is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 98. | Which nuclear reaction is an example of fusion emission? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 99. | is a member of actinium series. Another member of the same series of | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 100. | Water used as moderator in nuclear reactor is called | | | | | | | |
|  | a) | Heavy water | b) | Hared water | c) | Nuclear water | d) | Critical water |
| 101. | For the energy levels in an atom, which one of the following statement is correct? | | | | | | | |
|  | a) | There are seven principal electron energy levels | | | | | | | |
|  | b) | The second principal energy level has four sub-energy levels and contain a maximum of eight electrons | | | | | | | |
|  | c) | The principal energy level N can have a maximum of 32 electrons | | | | | | | |
|  | d) | The sub-energy level has high energy than subenergy level | | | | | | | |
| 102. | The outermost electronic configuration of the most electronegative element is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 103. | One microcurie of radiation is the quantity of radioactive substance which produces | | | | | | | |
|  | a) | disintegration per second (dps) | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 104. | Ionizing radiation is | | | | | | | |
|  | a) | Radiation that only interacts with ions | | | | | | | |
|  | b) | The same as a proton | | | | | | | |
|  | c) | A neutron that has acquired a charge, thus forming an ion | | | | | | | |
|  | d) | High-energy radiation that removes electrons from atom or molecules | | | | | | | |
| 105. | Which combinations of quantum number for the electron in an atom does not provide a permissible solution of the wave equation? | | | | | | | |
|  | a) |  | b) | 3,3,1, | c) | 3,2,1, | d) | 3,1,1, |
| 106. | Which of the following is true? | | | | | | | |
|  | a) | Diapositive zinc exhibits paramagnetism due to loss of two electrons from a orbital of neutral atom | | | | | | | |
|  | b) | In -emission from a nucleus, the atomic number of the daughter element decreases by 1 | | | | | | | |
|  | c) | The emission of one -particle from a radioactive atom results in the decrease of atomic number by 2 and mass number by 4 | | | | | | | |
|  | d) | The successive emission of two -particles from a radioactive atom results in the decrease of atomic number by 1 | | | | | | | |
| 107. | The term nucleon refers to | | | | | | | |
|  | a) | Electrons belonging to an atom that undergoes nuclear decay | | | | | | | |
|  | b) | Electrons that are emitted from a nucleus in a nuclear reaction | | | | | | | |
|  | c) | The nuclei of a specific isotope | | | | | | | |
|  | d) | Both protons and neutrons | | | | | | | |
| 108. | Bohr’s atomic model can explain the spectrum of | | | | | | | |
|  | a) | Hydrogen atoms only | | | b) | Atoms or ions which are unielectron | | |
|  | c) | Atoms or ions which have only two electrons | | | d) | Hydrogen molecule | | |
| 109. | changes to by emission of | | | | | | | |
|  | a) | particle | b) | particle | c) | Positron | d) | Proton |
| 110. | ‘Fat man’ relates to | | | | | | | |
|  | a) | Pu-bomb | | | b) | U-bomb | | |
|  | c) | Th-bomb | | | d) | Literary word from a book | | |
| 111. | Ionizing radiation is dangerous to living things because | | | | | | | |
|  | a) | It causes nuclear reactions | | | | | | | |
|  | b) | It causes thermal burns | | | | | | | |
|  | c) | It alters the chemical structure of atom molecules | | | | | | | |
|  | d) | It causes electrons to be captured by the nucleus | | | | | | | |
| 112. | Select the correct statement | | | | | | | |
|  | a) | MRI uses radiowaves to stimulate certain nuclei in the presence of magnetic field | | | | | | | |
|  | b) | P-32 is used for leukemia therapy | | | | | | | |
|  | c) | I-123 is used in imaging the brain | | | | | | | |
|  | d) | All of the above | | | | | | | |
| 113. | One atomic unit is equal to | | | | | | | |
|  | a) | ergs | b) | ergs | c) | ergs | d) | None |
| 114. | Of the following nuclides, the one most likely to be radioactive is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 115. | Which is the best description of an alpha particle? | | | | | | | |
|  | a) | Charge mass of high penetrating power | | | | | | | |
|  | b) | Charge mass of low penetrating power | | | | | | | |
|  | c) | Charge mass of medium penetrating power | | | | | | | |
|  | d) | Charge mass of no penetrating power | | | | | | | |
| 116. | The negative value of packing fraction indicates that the isotope is | | | | | | | |
|  | a) | Unstable | b) | Very stable | c) | Artificial | d) | Stable |
| 117. | The maximum number of electrons that can have principle quantum number, and spin quantum number, , is | | | | | | | |
|  | a) | 3 | b) | 5 | c) | 7 | d) | 9 |
| 118. | To trace the flow of blood, radioisotope used is | | | | | | | |
|  | a) | Co-60 | b) | Na-24 | c) | P-32 | d) | I-123 |
| 119. | The radiant energy from the sun is due to | | | | | | | |
|  | a) | Combustion | b) | Nuclear fusion | c) | Nuclear fission | d) | Chemical reaction |
| 120. | The nuclear process that takes place when a hydrogen bomb is exploded is of the same nature as the process | | | | | | | |
|  | a) | In the center of the earth | | | b) | In the sun and stars | | |
|  | c) | During a red dust storm | | | d) | During atom bomb fission | | |
| 121. | The total spin and magnetic moment for the atom with atomic number 24 are: | | | | | | | |
|  | a) | BM | b) | BM | c) |  | d) |  |
| 122. | For two different disintegration half-lives are equal at equilibrium. This is only when | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | All of these |
| 123. | Bohr’s model of atom is not in agreement with | | | | | | | |
|  | a) | Line spectra hydrogen atom | | | | | | | |
|  | b) | Pauli’s principle | | | | | | | |
|  | c) | Planck’s theory | | | | | | | |
|  | d) | Heisenberg’s principle | | | | | | | |
| 124. | The correct ground state electronic configuration of chromium atom is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 125. | Bombardment of aluminium by particle leads to its artificial disintegration in two ways, (i) and (ii) as shown. Products and respectively are | | | | | | | |
|  | a) | Proton, neutron, positron | | | b) | Neutron, positron, proton | | |
|  | c) | Proton, positron, neutron | | | d) | Positron, proton, neutron | | |
| 126. | When two electrons are placed in two degenerate orbitals of the atom, the energy is lower if their spin is parallel. The statement is based upon | | | | | | | |
|  | a) | Pauli’s exclusion | b) | Bohr’s rule | c) | Hund’s rules | d) | Aufbau principle |
| 127. | At two stages of disintegration, disintegration constants are respectively and At first stage 2000 atoms are disintegrating. At second stage number of atoms disintegrating would be | | | | | | | |
|  | a) | 2 | b) |  | c) |  | d) |  |
| 128. | The correct set of quantum numbers for the unpaired electron of chlorine atom is: | | | | | | | |
|  | a) | 2 1 0 | b) | 2 1 1 | c) | 3 1 1 | d) | 3 0 0 |
| 129. | The correct set of quantum numbers for the unpaired electron of chloride atom is   |  |  |  | | --- | --- | --- | |  |  |  | | | | | | | | |
|  | a) | |  |  |  | | --- | --- | --- | | 2 | 1 | 0 | | | | b) | |  |  |  | | --- | --- | --- | | 2 | 1 | 0 | | | |
|  | c) | |  |  |  | | --- | --- | --- | | 3 | 1 | 1 | | | | d) | |  |  |  | | --- | --- | --- | | 3 | 0 | 0 | | | |
| 130. | The energy released during the fission of 1 kg of uranium is | | | | | | | |
|  | a) | ergs | b) | ergs | c) | ergs | d) | ergs |
| 131. | is written as | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 132. | Rutherford’s scattering experiment is related to the size of the | | | | | | | |
|  | a) | Nucleus | b) | Atom | c) | Electron | d) | Neutron |
| 133. | Which of the radioactive isotopes is used for temperature control in blood disease? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 134. | A cyclotron is used to | | | | | | | |
|  | a) | Accelerate neutrons | b) | Accelerate electrons | c) | Accelerate protons | d) | Accelerate -particles |
| 135. | Heisenberg’s uncertainty principle rules out the exact simultaneous measurement of: | | | | | | | |
|  | a) | Probability and intensity | | | b) | Energy and velocity | | |
|  | c) | Charge density and radius | | | d) | Position and velocity | | |
| 136. | The sum of the number of neutrons and proton in the isotope of hydrogen is | | | | | | | |
|  | a) | 6 | b) | 5 | c) | 4 | d) | 3 |
| 137. | Which of the following is not an example of ionizing radiation? | | | | | | | |
|  | a) | X-rays | b) | rays | c) | rays | d) | UV-rays |
| 138. | An isotope of is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 139. | Of the following nuclides, the one most likely to decay by positron emission is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 140. | In vivo studies, radioisotope used is | | | | | | | |
|  | a) | Cr-51 | b) | Co-60 | c) | Na-24 | d) | P-32 |
| 141. | Which hydrogen like species will have same radius as that of Bohr orbit hydrogen atom? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 142. | The ratio of the energy of photon of wavelength radiation to that of radiation is | | | | | | | |
|  | a) | 1⁄4 | b) | 4 | c) | 1⁄2 | d) | 2 |
| 143. | The energy of an electron in the first Bohr orbit of H atom is . The possible energy value() of the excited state () for electrons in Bohr orbits of hydrogen is/are | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 144. | Neutrons are more effective projectiles than protons because they | | | | | | | |
|  | a) | Are attracted by the nuclei | | | b) | Are not repelled by the nuclei | | |
|  | c) | Travel with high speed | | | d) | None of above | | |
| 145. | is a stable isotope. is expected to disintegrate by | | | | | | | |
|  | a) | emission | b) | emission | c) | Positron emission | d) | Neutron emission |
| 146. | If two light nuclei are fused together in nuclear reaction, the average energy per nucleon | | | | | | | |
|  | a) | Increases | | | b) | Decreases | | |
|  | c) | Cannot be determined | | | d) | Remains same | | |
| 147. | A sievert is | | | | | | | |
|  | a) | The amount of radiation that produces units of charge in one of air | | | | | | | |
|  | b) | A unit used to measure the amount of radiation absorbed per gram of tissue | | | | | | | |
|  | c) | A unit that allows both for the energy and the penetrating power of different types of radiation | | | | | | | |
|  | d) | The SI unit for radiation absorbed | | | | | | | |
| 148. | Radioactive disintegration differs from a chemical change in being a/an | | | | | | | |
|  | a) | Nuclear process | b) | Exothermic change | c) | Spontaneous process | d) | First order kinetics |
| 149. | If Hund’s rule is not followed, magnetic moment of , and all having 24 electrons will be in order | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 150. | The nuclear reaction is of the type | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 151. | Which of the following is artificial radioactive series? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 152. | Radioactive disintegration differs from a chemical change in being | | | | | | | |
|  | a) | An exothermic change | | | b) | A spontaneous process | | |
|  | c) | A nuclear process | | | d) | A unimolecular first-order reaction | | |
| 153. | The instability of a nucleus is due to | | | | | | | |
|  | a) | High proton electron ratio | | | b) | High electron neutron ratio | | |
|  | c) | Low proton electron ratio | | | d) | Low proton neutron ratio | | |
| 154. | The electronic configuration of an element is . This represents its | | | | | | | |
|  | a) | Excited state | b) | Ground state | c) | Cationic form | d) | Anionic form |
| 155. | The distance between nucleons in atomic nucleus is of the order of (1 Fermi = cm) | | | | | | | |
|  | a) | 2 Fermi | b) | 25 Fermi | c) | 100 Fermi | d) | 40 Fermi |
| 156. | The decreasing order of energy for the electrons represented by the following sets of quantum numbers is:  1.  2.  3.  4. | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 157. | The equipment used to carry out nuclear reaction in a controlled manner is called | | | | | | | |
|  | a) | Breeder reactor | | | b) | Nuclear reactor | | |
|  | c) | Thermonuclear fission | | | d) | Cyclotron | | |
| 158. | The atomic mass and atomic number of lead are 208 and 82. The atomic mass and atomic number of bismuth are 209 and 83. The neutron/proton ratio in an atom | | | | | | | |
|  | a) | Is higher in lead than in bismuth | | | b) | Is lower in lead than in bismuth | | |
|  | c) | Is equal in both lead and bismuth | | | d) | None | | |
| 159. | How many particles are emitted in the nuclear transformation: | | | | | | | |
|  | a) | 0 | b) | 1 | c) | 2 | d) | 3 |
| 160. | The work function () of some metals is listed below. The number of metals which will show photoelectric effect when light of 300 nm wavelength falls on the metals is :   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Metal | Li | Na | K | Mg | Cu | Ag | Fe | Pt | W | |  | 2.4 | 2.3 | 2.2 | 3.7 | 4.8 | 4.3 | 4.7 | 6.3 | 4.75 | | | | | | | | |
|  | a) | 2 | | | | | | | |
|  | b) | 4 | | | | | | | |
|  | c) | 6 | | | | | | | |
|  | d) | 8 | | | | | | | |
| 161. | Which is the correct combination?  Change in  Emission Atomic Mass Neutron  Number number number | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 162. | In the esterification of an organic acid by alcohol of acid is isotopic    Which of the following statement is correct? | | | | | | | |
|  | a) | is in ester | | | | | | | |
|  | b) | is in water | | | | | | | |
|  | c) | is in both | | | | | | | |
|  | d) | is in none | | | | | | | |
| 163. | Constituents of wine are carbon, hydrogen and oxygen. Half-lives of and are respectively 5730 yr, 124 s and 12.5 yr. A bottle of wine was sealed about 6 years ago. To confirm its age, which of the isotopes would you choose to determine its age? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | Any of these |
| 164. | Which of the following is true? | | | | | | | |
|  | a) | The electron density in the -plane in orbital is zero | | | | | | | |
|  | b) | The electron densities in the - and -plane in orbital are zero | | | | | | | |
|  | c) | The electron density in the -plane in orbital is zero | | | | | | | |
|  | d) | Pauli exclusion principle is followed by bosons which have integral spin | | | | | | | |
| 165. | Atomic weight of Th is 232 and its atomic number is 90. The number of - and -particles which will be lost so that an isotope of lead (atomic weight 208 and atomic number 82) is produced is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 166. | (IIIB) emits particles such that new element is in IIA. Particles emitted is/are | | | | | | | |
|  | a) | One one | b) | One one | c) | Only one | d) | Only one |
| 167. | The radius of the first Bohr orbit for is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 168. | The age of rocks on earth or the samples of rocks and dust brought back form the moon can be found by determining the proportion of radioactive ………. In the rock of dust. | | | | | | | |
|  | a) | Potassium and stable calcium | | | b) | Uranium and stable lead | | |
|  | c) | Carbon and stable carbon | | | d) | Radium and stable lead | | |
| 169. | Which of the following has magic number of neutrons? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 170. | The chemist who helped in the discovery of the maximum number of transuranic element is: | | | | | | | |
|  | a) | Sir Robert Robinson | b) | Sir J.J. Thomson | c) | Professor Sea Borg | d) | Sir N.C. Hishel-wood |
| 171. | Which of the following set of quantum numbers is an impossible arrangement? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 172. | Which of the following are fissile isotopes?  1. 2. 3. 4.  Select the correct answer from the following. | | | | | | | |
|  | a) | 1 and 2 | b) | 2 and 3 | c) | 1 and 4 | d) | All of these |
| 173. | Rutherford’s -particle scattering experiment eventually led to the conclusion that | | | | | | | |
|  | a) | Mass and energy are related | | | | | | | |
|  | b) | Electrons occupy space around the nucleus | | | | | | | |
|  | c) | Neutrons are buried deep in the nucleus | | | | | | | |
|  | d) | The point of impact with matter can be precise determined | | | | | | | |
| 174. | How many electrons in an atom with atomic number 105 can have | | | | | | | |
|  | a) | 30 | b) | 17 | c) | 15 | d) | Unpredictable |
| 175. | The density of nucleus is about …………times the density of atom | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 176. | The set of quantum numbers not applicable to an electron | | | | | | | |
|  | a) | 1,1,1, +1/2 | b) | 1,0,0,+1⁄2 | c) | 1,0,0, | d) | 2,0,0,+1⁄2 |
| 177. | Weight of to have radioactivity 1 curie disintegration constant is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 178. | The maximum binding energy per nucleon is indicated in the mass number range | | | | | | | |
|  | a) | 40-60 | b) | 50-60 | c) | 20-30 | d) | 55-60 |
| 179. | Which of the following nuclear changes is incorrect? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 180. | The total number of -electrons are | | | | | | | |
|  | a) | 6 | b) | 12 | c) | 18 | d) | 24 |
| 181. | The triad of nuclei that are isotonic is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 182. | Consider the following nuclear reactions  I.  II.  III.  IV.  Examples of induced radioactivity would include reactions | | | | | | | |
|  | a) | III and IV | b) | I and II | c) | I, III and IV | d) | I, II, III and IV |
| 183. | The radius of an atomic nucleus is of the order of | | | | | | | |
|  | a) | cm | b) | cm | c) | cm | d) | cm |
| 184. | Moderator used in a nuclear reactor is | | | | | | | |
|  | a) | Graphite | b) | Heavy water | c) | Both (a) and (b) | d) | None of these |
| 185. | Living things contain and is stable and decays and declines in proportional quantity. The technique that used this principle for determining the age of fossils skeletons, old trees, and dinosaurs is called | | | | | | | |
|  | a) | C-12 dating | b) | Radiocarbon dating | c) | Carbon age | d) | Fossil carbon |
| 186. | The line spectrum of two elements is not identical because | | | | | | | |
|  | a) | They do not have same number of neutrons | | | | | | | |
|  | b) | They have dissimilar mass number | | | | | | | |
|  | c) | They have different energy level schemes | | | | | | | |
|  | d) | They have different number of valence electrons | | | | | | | |
| 187. | Which of the following nuclear reactions is an example of nuclear fusion? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 188. | The high temperature required to initiate nuclear fusion reaction is initially attained through | | | | | | | |
|  | a) | Solar energy | | | b) | Burning of hydrocarbon | | |
|  | c) | Nuclear fission | | | d) | All of the above | | |
| 189. | When the quantity of radioactive substance is increased two times, the number of atoms disintegrating per unit time is | | | | | | | |
|  | a) | Doubled | | | b) | Increased by square of two | | |
|  | c) | Increased but not to a great extent | | | d) | Not affected | | |
| 190. | Among the following transitions in hydrogen and hydrogen-like ion spectrum, which one emits light of longest wavelength? | | | | | | | |
|  | a) | to for | | | b) | to for | | |
|  | c) | to for | | | d) | to for H | | |
| 191. | Match Column I with Column II and select the correct answer   |  |  |  |  | | --- | --- | --- | --- | | Column I  (Isotope) | | Column II  (Characteristic) | | | A |  | 1. | Unstable, emitter | | B |  | 2. | Unstable, emitter | | C |  | 3. | Unstable, positron emitter | | D |  | 4. | stable |   Codes  A B C D | | | | | | | |
|  | a) | 1 2 3 4 | | | b) | 1 3 2 4 | | |
|  | c) | 4 3 2 1 | | | d) | 4 2 3 1 | | |
| 192. | In what ratio should and be present so as to obtain | | | | | | | |
|  | a) | 1:2 | b) | 1:1 | c) | 1:3 | d) | 3:1 |
| 193. | If the wavelength of the first line of the Balmer series of hydrogen atom is 656.1 nm, the wavelength of the second line of this series would be | | | | | | | |
|  | a) | 218.7 nm | b) | 328.0 nm | c) | 486.0 nm | d) | 640.0 nm |
| 194. | The half-life of is 6.0 h. Hence, average-life is | | | | | | | |
|  | a) | 4.17 h | b) | 3.0 h | c) | 8.66 h | d) | 8.00 h |
| 195. | Which equation is true for transient equilibrium? disintegration constant; half-life) | | | | | | | |
|  | a) |  | b) |  | c) | Both (a) and (b) | d) | None of these |
| 196. | Which of the following statements concerning Bohr’s model is false? | | | | | | | |
|  | a) | It predicts that probability of electron near nucleus is more | | | | | | | |
|  | b) | The angular momentum of electron in H atom = | | | | | | | |
|  | c) | It introduces the idea of stationary states | | | | | | | |
|  | d) | It explains the line spectrum of hydrogen | | | | | | | |
| 197. | (III B, actinide series) emits one particle. New element will be a/an | | | | | | | |
|  | a) | Alkali metal | b) | Alkaline earth metal | c) | Actinide | d) | Chalcogen |
| 198. | Which reaction is an example of chain reaction? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 199. | The nucleus of an atom is made up of protons and neutrons. For the most stable and abundant nuclei | | | | | | | |
|  | a) | even, odd | b) | both odd | c) | odd, even | d) | both even |
| 200. | Eka-Hg will have IUPAC nomenclature as Uub. Its atomic number is | | | | | | | |
|  | a) | 80 | b) | 110 | c) | 111 | d) | 112 |
| 201. | The shortest and longest wave number in H spectrum of Lyman series is (Rydberg constant) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 202. | The radioisotope used in the treatment of cancer is | | | | | | | |
|  | a) | C-12 | b) | Co-60 | c) | I-31 | d) | P-31 |
| 203. | Which of the following properties of an element is a whole number? | | | | | | | |
|  | a) | Atomic mass | b) | Atomic volume | c) | Atomic radius | d) | Mass number |
| 204. | Which of the following particles is emitted in the nuclear reaction | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 205. | The half-life of is 15.0 h. What percentage of it remains after 60 h? | | | | | | | |
|  | a) | 0.00% | b) | 3.13% | c) | 6.25% | d) | 12.5% |
| 206. | Which of the following does not characterize -rays? | | | | | | | |
|  | a) | The radiations can ionize gases | | | | | | | |
|  | b) | They cause to fluoresce | | | | | | | |
|  | c) | They are deflected by electric and magnetic fields | | | | | | | |
|  | d) | They have wavelengths shorter than ultraviolet rays | | | | | | | |
| 207. | Which of the following is false? | | | | | | | |
|  | a) | The orbitals are no more degenerate in the presence of a magnetic field | | | | | | | |
|  | b) | The spin quantum number was introduced to explain the splitting of spectral lines of hydrogen atom in the presence of a magnetic field | | | | | | | |
|  | c) | Pauli exclusion principle is followed by fermions which have half integral spins | | | | | | | |
|  | d) | The energy of an orbital in an atom remains the same with increase in the positive charge in its nucleus | | | | | | | |
| 208. | When a radioactive isotope decays into a nucleus which is also unstable and undergoes decay, and this process is repeated several times, the succession of reaction is called | | | | | | | |
|  | a) | Decay series | b) | Fission reaction | c) | Fusion reaction | d) | Spallation |
| 209. | The total number of s electrons are | | | | | | | |
|  | a) | 8 | b) | 6 | c) | 4 | d) | 10 |
| 210. | If Aufbau rule is not followed in filling of suborbitals, then block of the element will change in | | | | | | | |
|  | a) | K(19) | b) |  | c) |  | d) |  |
| 211. | What is X in the nuclear reaction | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 212. | In excited H atom, when electron drops from 4,5,6 to , there is emission of | | | | | | | |
|  | a) | UV light | b) | Visible light | c) | IR light | d) | Radio waves |
| 213. | How many unpaired electrons are there in ? | | | | | | | |
|  | a) | 0 | b) | 2 | c) | 4 | d) | 8 |
| 214. | Which of the following is a natural radioactive element? | | | | | | | |
|  | a) | Uranium | b) | Radium | c) | Thorium | d) | All of these |
| 215. | The wave number of the first line of Balmer series of hydrogen is . The wave number of the first Balmer line of ion is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 216. | Rutherford’s scattering experiment is related to the size of the | | | | | | | |
|  | a) | Nucleus | b) | Atom | c) | Electron | d) | Neutron |
| 217. | An oxide of N has vapour density 46. Find the total number of electrons in its 92 g. Avogadro’s number) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 218. | Select the correct statement | | | | | | | |
|  | a) | The more negative the packing fraction of an element, the more stable should be the nucleus | | | | | | | |
|  | b) | Packing fraction | | | | | | | |
|  | c) | Fe and Al have positive values of packing fraction | | | | | | | |
|  | d) | All of the above | | | | | | | |
| 219. | The number of protons and neutrons for most stable element is | | | | | | | |
|  | a) | Even-odd | b) | Even-even | c) | Odd-odd | d) | Odd-even |
| 220. | is the recently discovered element IUPAC nomenclature is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 221. | Which of the following is true? | | | | | | | |
|  | a) | The half-filled and fully-filled electronic configurations are less stable than the other configurations having the same number of electrons | | | | | | | |
|  | b) | The symbol for the orbitals having has its origin from the term spherical symmetrical | | | | | | | |
|  | c) | The increasing order for the values of (charge/mass) for electron (e), proton (p), neutron(n), and alpha particle is | | | | | | | |
|  | d) | The energy of photon having wavelength 800 nm is larger than that having 400 nm | | | | | | | |
| 222. | The emission of a particle from an unstable nucleus is called | | | | | | | |
|  | a) | Mutation | b) | Fission | c) | Nuclear decay | d) | Fusion |
| 223. | If assumed to decay only by emitting two - and one -particles, the possible product of decay is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 224. | Which results in the formation of an isotope of the parent element? | | | | | | | |
|  | a) | Emission of oneparticle | | | b) | Emission of two particles | | |
|  | c) | Emission of one and two particles | | | d) | None of the above | | |
| 225. | ‘Little boy’ relates to | | | | | | | |
|  | a) | Pu-bomb | b) | U-bomb | c) | H-bomb | d) | He-bomb |
| 226. | The wavelength associated with a golf ball weighing 200 g and moving at a speed of 5 is of the order | | | | | | | |
|  | a) | m | b) | m | c) | m | d) | m |
| 227. | Which of the following is false? | | | | | | | |
|  | a) | The number of orbitals for a given value of is equal to | | | | | | | |
|  | b) | The number of orbitals for a given value of is equal to | | | | | | | |
|  | c) | An atom having unpaired electrons is diamagnetic in nature | | | | | | | |
|  | d) | All orbitals are spherical symmetrical in shape | | | | | | | |
| 228. | An orbital with is | | | | | | | |
|  | a) | Symmetrical about -axis only | | | b) | Symmetrical about -axis only | | |
|  | c) | Spherically symmetrical | | | d) | Unsymmetrical | | |
| 229. | The half-life of nickel-65 is 2.5 days. How much of a 100 g sample has decyed after 7.5 days? | | | | | | | |
|  | a) | 12.5 g | b) | 50.0 g | c) | 75.0 g | d) | 87.5 g |
| 230. | The energy released in nuclear reactions corresponding to 1 amu is about | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 231. | Rutherford’s experiment on the scattering of *-*particles showed for the first time that the atom has | | | | | | | |
|  | a) | Electrons | b) | Protons | c) | Nucleus | d) | Neutrons |
| 232. | In which of the following the magic numbers of both protons and neutrons are present | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 233. | Which product is formed by emission from | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 234. | Which of the following is true? | | | | | | | |
|  | a) | According to Pauli’s exclusion principle, no two electrons in an atom can have the same values of quantum numbers and | | | | | | | |
|  | b) | The total energy of an electron in an orbit is half of its potential energy | | | | | | | |
|  | c) | The speed of an electron in a orbit increases with increase of its quantum number | | | | | | | |
|  | d) | The energy of an electron in a orbit decreases with increase of its quantum number | | | | | | | |
| 235. | The neutron/proton ratio in an isotope can be decreased by the emission of | | | | | | | |
|  | a) | An electron | b) | A neutron | c) | A gamma ray | d) | A positron |
| 236. | In an oil drop experiment, the following charges (in arbitrary units) were found on a series of oil droplets:  The magnitude of charge on the electron (in the same unit) is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 237. | The half-life period of a substance is 1600 min. How much fraction of the substance will remain after 6400 min? | | | | | | | |
|  | a) | 1/16 | b) |  | c) | 1/8 | d) |  |
| 238. | The principal quantum number of an atom is related to the | | | | | | | |
|  | a) | Size of the orbital | | | b) | Spin angular momentum | | |
|  | c) | Orientation of the orbital in space | | | d) | Orbital angular momentum | | |
| 239. | The wavelength of a spectral line for an electronic transition is inversely related to | | | | | | | |
|  | a) | The number of electrons undergoing the transition | | | | | | | |
|  | b) | The nuclear charge of the atom | | | | | | | |
|  | c) | The difference in the energy of the energy levels involved in the transition | | | | | | | |
|  | d) | The velocity of the electrons undergoing the transition | | | | | | | |
| 240. | The number of nodal planes in a orbital is | | | | | | | |
|  | a) | One | b) | Two | c) | Three | d) | Zero |
| 241. | Which of the following sets of quantum numbers is not possible? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 242. | captures a K-electron into its nucleus. The product atom formed is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 243. | Which of the following orbitals does not have the angular node? | | | | | | | |
|  | a) | *-*orbital | b) | -orbital | c) | -orbital | d) | -orbital |
| 244. | Which of the following is true? | | | | | | | |
|  | a) | Neutrino is a positively charged electron | | | | | | | |
|  | b) | The magnetic moment of an atom is related to the number of unpaired electrons in its electronic configuration | | | | | | | |
|  | c) | Bohr theory can be successfully modified to explain the electronic spectrum of multielectron atom | | | | | | | |
|  | d) | The angular momentum of an electron in an atom is given as | | | | | | | |
| 245. | In the nuclear reaction, is | | | | | | | |
|  | a) | Si | b) | P | c) | S | d) | Ar |
| 246. | The number of spherical nodes in orbital is | | | | | | | |
|  | a) | 4 | b) |  | c) | 2 | d) | 3 |
| 247. | Electromagnetic radiation with the maximum wavelength is | | | | | | | |
|  | a) | Ultraviolet | b) | Radio wave | c) | -ray | d) | Infrared |
| 248. | Binding energy due to mass defect of is Thus, binding energy per nucleon is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 249. | Which of the following is used as neutron absorber in the nuclear reactor? | | | | | | | |
|  | a) | Water | | | b) | Deuterium | | |
|  | c) | Some compound of uranium | | | d) | Cadmium | | |
| 250. | The number of spectral lines obtained in Bohr spectrum of hydrogen atom when an electron is excited from 2nd orbit to 5th orbit, is | | | | | | | |
|  | a) | 3 | | | | | | | |
|  | b) | 6 | | | | | | | |
|  | c) | 10 | | | | | | | |
|  | d) | 5 | | | | | | | |
| 251. | Which one of the following sets of quantum number represents an impossible arrangement?   |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | | | | | | | | |
|  | a) | |  |  |  |  | | --- | --- | --- | --- | | 3 | 2 |  | 1/2 | | | | b) | |  |  |  |  | | --- | --- | --- | --- | | 4 | 0 | 0 | 1/2 | | | |
|  | c) | |  |  |  |  | | --- | --- | --- | --- | | 3 | 2 |  | 1/2 | | | | d) | |  |  |  |  | | --- | --- | --- | --- | | 5 | 3 | 0 |  | | | |
| 252. | The radius of the second Bohr orbit for is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 253. | Which of the following species will produce the shortest wavelength for the transition to ? | | | | | | | |
|  | a) | Hydrogen atom | | | b) | Singly ionized helium | | |
|  | c) | Deuterium atom | | | d) | Doubly ionized lithium | | |
| 254. | Nuclear fission was experimentally observed by | | | | | | | |
|  | a) | Planck | b) | Rutherford | c) | J. J. Thomson | d) | Hahn and Strassman |
| 255. | The fundamental particles which are responsible for keeping nucleons together is: | | | | | | | |
|  | a) | Meson | b) | Antiproton | c) | Positron | d) | Electron |
| 256. | In hydrogen spectrum, the series of lines appearing in ultra violet region of electromagnetic spectrum are called | | | | | | | |
|  | a) | Balmer lines | b) | Lyman lines | c) | Pfund lines | d) | Brackett lines |
| 257. | The ratio of kinetic energy and total energy of an electron in a Bohr orbit of a hydrogen-like species is | | | | | | | |
|  | a) |  | b) |  | c) | 1 | d) |  |
| 258. | Atomic radii of fluorine and neon in Angstrom units are respectively given by | | | | | | | |
|  | a) | 0.72, 1.60 | b) | 1.60, 1.60 | c) | 0.72, 0.72 | d) | None of these |
| 259. | The wavelength associated with a golf ball weighing 200 g and moving at a speed of is of the order | | | | | | | |
|  | a) | m | b) | m | c) | m | d) | m |
| 260. | Which of the following pairs represents isobars? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 261. | Least branching is found in which of the following radioactive series? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 262. | All of the statements about nuclear reactions are true except | | | | | | | |
|  | a) | Nuclear reactions involve changes in the nucleus of an atom | | | | | | | |
|  | b) | The rate of a nuclear reaction is increased by the addition of a catalyst | | | | | | | |
|  | c) | A nuclear reaction is unaffected by the chemical state of the atoms involved | | | | | | | |
|  | d) | Nuclear reactions of the same element vary according to which isotope is involved | | | | | | | |
| 263. | Which of the following is not a characteristic of Planck’s quantum theory of radiation? | | | | | | | |
|  | a) | Radiations are associated with energy | | | | | | | |
|  | b) | Magnitude of energy associated with a quantum is equal to | | | | | | | |
|  | c) | Radiation energy is neither emitted nor absorbed continuously | | | | | | | |
|  | d) | A body can emit less or more than a ‘quantum of energy’ | | | | | | | |
| 264. | All nuclides exhibit radioactivity when the atomic number exceeds | | | | | | | |
|  | a) | 80 | b) | 83 | c) | 90 | d) | 92 |
| 265. | Which of the following pairs is not a fissionable material? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 266. | Match the radioisotopes with their applications from the alternates given  **Radioisotopes Applications**  I. Cobalt-60 P. Leukemia therapy  II. Potassiu-40 Q. Thyroid therapy  III. Iodine-123 R. Geological dating  IV. Phosphours-32 S. Cancer therapy  V. Carbon-14 T. Archeological dating  I II III IV V | | | | | | | |
|  | a) | P Q R S T | | | b) | T S R Q P | | |
|  | c) | S R Q P T | | | d) | S R Q T P | | |
| 267. | The half-life period of a radioactive element is 140 days. After 560 days, one gram of the element will reduce to | | | | | | | |
|  | a) | g | b) | g | c) | g | d) | g |
| 268. | The orbital angular momentum of an electron in orbital is | | | | | | | |
|  | a) |  | b) | Zero | c) |  | d) |  |
| 269. | Which of the following sets of quantum number is allowable: | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 270. | Any orbital can accommodate upto | | | | | | | |
|  | a) | Fore electrons | | | b) | Six electrons | | |
|  | c) | Two electrons with parallel spins | | | d) | Two electrons with opposite spins | | |
| 271. | The missing fission product in the reaction  is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 272. | When a radioactive substance is subjected to a vacuum, the rate of disintegration per second | | | | | | | |
|  | a) | Increases considerably | | | | | | | |
|  | b) | Increases only if the products are gaseous | | | | | | | |
|  | c) | Is not affected | | | | | | | |
|  | d) | Suffers a slight decrease | | | | | | | |
| 273. | Select the correct alternate. | | | | | | | |
|  | a) | is positron emission | | | b) | is K-electron capture | | |
|  | c) | Both (a) and (b) | | | d) | None of the above | | |
| 274. | Which of the properties of radioisotopes make them useful as tracers in medical or agricultural applications?  I. Their chemical behaviour is the same as non-radioactive isotope  II. They emit various types of radiation  III. The nuclear reaction is unaffected by the chemical state of the isotope | | | | | | | |
|  | a) | I only | b) | I and III | c) | I and II | d) | All of these |
| 275. | A certain metal when irradiated to light ) emits photoelectrons with twice kinetic energy as did photoelectrons when the same metal is irradiated by light Hz) The (threshold frequency) of metal is | | | | | | | |
|  | a) | Hz | b) | Hz | c) | Hz | d) | Hz |
| 276. | A method which uses radioactivity for determining the age of prehistoric materials is called | | | | | | | |
|  | a) | Carbon dating | b) | Deuterium dating | c) | Radium dating | d) | Uranium dating |
| 277. | What transition in the hydrogen spectrum would have the same wavelength as the Balmer transition and of spectrum? | | | | | | | |
|  | a) | to | b) | to | c) | to | d) | to |
| 278. | Which is based on nuclear fusion reaction? | | | | | | | |
|  | a) | Hydrogen bomb | b) | Atom bomb | c) | RDX | d) | REX |
| 279. | If half-life period is 100 years, average life is nearly | | | | | | | |
|  | a) | 100 yr | b) | 70 yr | c) | 44 yr | d) | 90 yr |
| 280. | If velocity of an electron is 1st orbit of H atom is V, what will be the velocity in 3rd orbit of ? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 281. | From the reaction given below, deduce the group of polonium in the periodic table (Pb belongs to group 14) | | | | | | | |
|  | a) | 2 | b) | 14 | c) | 6 | d) | 16 |
| 282. | Which of the following relates to photon both as wave motion and as a stream of particles? | | | | | | | |
|  | a) | Interference | b) |  | c) | Diffraction | d) |  |
| 283. | The first use of quantum theory to explain the structure of atom was made by | | | | | | | |
|  | a) | Heisenberg | b) | Bohr | c) | Planck | d) | Einstein |
| 284. | Which of the following is true? | | | | | | | |
|  | a) | The outer electronic configuration of the ground state chromium atom is | | | | | | | |
|  | b) | Gamma rays are electromagnetic radiations of wavelengths of cm to cm | | | | | | | |
|  | c) | The energy of the electron in the orbital is less than that in the orbital of a hydrogen atom | | | | | | | |
|  | d) | The electron density in the -plane in orbital is zero | | | | | | | |
| 285. | The increasing order (lowest first) for the values of (charge/mass) for electron , proton , neutron , and alpha particle is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 286. | Which of the following related to photons both as wave motion and as a stream of particles? | | | | | | | |
|  | a) | Interference | b) |  | c) | Diffraction | d) |  |
| 287. | The total number of -electrons are | | | | | | | |
|  | a) | 1 | b) | 2 | c) | 3 | d) | 4 |
| 288. | Which of the following gave the idea of nucleus of the atom? | | | | | | | |
|  | a) | Oil drop experiment | | | b) | Davisson and Germer’s experiment | | |
|  | c) | -ray scattering experiment | | | d) | Austen’s mass spectrogram experiment | | |
| 289. | The energy of hydrogen atom in its ground state is . The energy of the level corresponding to the quantum number is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 290. | The experimental evidence for dual nature of matter comes from | | | | | | | |
|  | a) | Planck’s experiment | | | b) | De Broglie’s experiment | | |
|  | c) | Davison and Germer’s experiment | | | d) | Rutherford’s experiment | | |
| 291. | Which of the following sets of quantum is not correctly represented in case of the indicated spectral series of hydrogen atom? | | | | | | | |
|  | a) | Lyman series | | | b) | Balmer series | | |
|  | c) | Paschen series | | | d) | Lyman series | | |
| 292. | Which of the following is true? | | | | | | | |
|  | a) | The ionization energy of a hydrogen-like species in its ground state is equal to the magnitude of energy of the orbit having | | | | | | | |
|  | b) | The ionization energy of a hydrogen-like species in its ground state increases in proportion to the positive charge in its nucleus | | | | | | | |
|  | c) | According to the uncertainty principle, | | | | | | | |
|  | d) | The energy of an electron in an orbital of a multielectron atom depends only on the principal quantum number | | | | | | | |
| 293. | In a radioactive series, a radioactive isotope decays to stable isotope.decays by emission of six and four particles. Stable isotope is | | | | | | | |
|  | a) | Pu-256 | b) | Th-232 | c) | Rn-220 | d) | Pb-208 |
| 294. | Bohr’s model can explain | | | | | | | |
|  | a) | The spectrum of hydrogen atom only | | | | | | | |
|  | b) | The spectrum of an atom or ion containing one electron only | | | | | | | |
|  | c) | The spectrum of a hydrogen molecule | | | | | | | |
|  | d) | The solar spectrum | | | | | | | |
| 295. | Fuel used in a breeder-reactor is | | | | | | | |
|  | a) | Uranium-235 | b) | Plutonium-239 | c) | Uranium-238 | d) | All of these |
| 296. | Group displacement law was given by | | | | | | | |
|  | a) | Becquerel | b) | Rutherford | c) | Mendeleef | d) | Soddy and Fazan |
| 297. | A certain nuclide has a half life period of 30 min. If a sample containing 600 atoms is allowed to decay for 90 min, how many atoms will remain? | | | | | | | |
|  | a) | 200 atoms | b) | 450 atoms | c) | 75 atoms | d) | 150 atoms |
| 298. | For a electron, the orbital angular momentum is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 299. | Which of the following has the maximum number of unpaired electrons? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 300. | At radioactive equilibrium, the ratio between the atoms of two radioactive elements and was found to be respectively. If of the element is then of the element is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 301. | Which shape is associated with the orbital designated by ? | | | | | | | |
|  | a) | Spherical | b) | Tetrahedral | c) | Dumb-bell | d) | Pyramidal |
| 302. | A unit used to measure the amount of radiation absorbed per gram of tissue is | | | | | | | |
|  | a) | Curie | b) | Roentgen | c) | Rem | d) | Rad |
| 303. | Which out of the following configurations is incorrect? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 304. | Consider the following statements  I. ‘Carbon-dating’ is based on the measurement of activity of  II. is used to determine age of the objects up to 1 million years old  III. The uranium-lead method is based on the natural uranium-238 decay series which ends up with the production of stable lead-206  Select the correct statements | | | | | | | |
|  | a) | I, II | b) | II, III | c) | I, III | d) | I, II, III |
| 305. | A substance is kept for 2 hours and three-fourth of that substance disintegrates during this period. The half life of the substance is | | | | | | | |
|  | a) | 2 hr | b) | 1 hr | c) | 30 min | d) | 4 hr |
| 306. | The exchange of particles considered responsible for holding the nucleus together are called | | | | | | | |
|  | a) | Mesons | b) | Antiprotons | c) | Positron | d) | Neutrons |
| 307. | The ratio of the radii of the three Bohr orbits is | | | | | | | |
|  | a) |  | b) | 1:2:3 | c) | 1:4:9 | d) | 1:8:27 |
| 308. | The spectral line obtained when an electron jumps from to level in hydrogen atom belongs to the | | | | | | | |
|  | a) | Balmer series | b) | Lyman series | c) | Paschen series | d) | Pfund series |
| 309. | An element is isobaric with the inert gas atom. The electronic arrangement of the element is . How many neutrons does each atom of the element carry in its nucleus? | | | | | | | |
|  | a) | 22 | b) | 20 | c) | 18 | d) | 16 |
| 310. | The ratio of the radii of the atom to the nucleus is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 311. | The wavelength of line of Balmer series is . What is the of line of Balmer series | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 312. | In which process maximum energy is attained? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | Equal | | |
| 313. | The amount of radiation that produces units of charge in of air is | | | | | | | |
|  | a) | Curie | b) | Roentgen | c) | Rem | d) | Rad |
| 314. | Which type of radiation is attracted towards a positive plate? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 315. | Atoms with the same atomic number and different mass numbers are called | | | | | | | |
|  | a) | Isobars | b) | Isomers | c) | Isotones | d) | Isotopes |
| 316. | If the energy of electron in H atom is given by expression,, then the energy required to excite the electron from ground state to second orbit is | | | | | | | |
|  | a) | kJ | b) | kJ | c) | kJ | d) | kJ |
| 317. | An isotone of is  i. ii.  iii. iv. | | | | | | | |
|  | a) | Only (i) and (ii) | b) | Only (ii) and (iii) | c) | Only (ii) and (iv) | d) | (ii), (iii), and (iv) |
| 318. | There are of and of in a rock. If of is age of the rock is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 319. | Radioactivity can be used in | | | | | | | |
|  | a) | Diagnostic | b) | Therapeutic | c) | Both (a) and (b) | d) | None of these |
| 320. | The radius of an atomic nucleus is of the order of | | | | | | | |
|  | a) | cm | b) |  | c) | cm | d) | cm |
| 321. | Match Column I with Column II and select the correct answer, using the codes given   |  |  |  |  | | --- | --- | --- | --- | | Column I | | Column II | | | A |  | 1. | Location of tumour in brain | | B |  | 2. | Location of blood clots and circulatory disorders | | C |  | 3. | Radio-therapy | | D |  | 4. | Agriculture research |   Codes  A B C D | | | | | | | |
|  | a) | 4 1 2 3 | | | b) | 4 3 2 1 | | |
|  | c) | 4 2 3 1 | | | d) | 3 1 2 4 | | |
| 322. | If wavelength is equal to the distance travelled by the electron in one second, then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 323. | The valency of element is | | | | | | | |
|  | a) | +2 | | | | | | | |
|  | b) | +3 | | | | | | | |
|  | c) | Both +2 and +3 | | | | | | | |
|  | d) | +1 | | | | | | | |
| 324. | A cricket ball of 0.5 kg is moving with a velocity of . The wavelength associated with its motion is | | | | | | | |
|  | a) | cm | b) | m | c) | m | d) | m |
| 325. | Which of the following is false? | | | | | | | |
|  | a) | Pfund spectral series for which and Lies in the far infrared region of the electromagnetic radiation | | | | | | | |
|  | b) | Visible region of electromagnetic radiations has wavelength from 400 nm to 800 nm | | | | | | | |
|  | c) | Balmer spectral series lies in the visible portion of the electromagnetic radiation | | | | | | | |
|  | d) | Lyman spectral series lies in the visible portion of the electromagnetic radiation | | | | | | | |
| 326. | Select the correct statement | | | | | | | |
|  | a) | and particles can be detected by a Geiger counter | | | | | | | |
|  | b) | Neutron can be detected by conversion into particle by addition of | | | | | | | |
|  | c) | Both (a) & (b) | | | | | | | |
|  | d) | None of the above | | | | | | | |
| 327. | The number of spectral lines obtained in Bohr spectrum of hydrogen atom when an electron is excited from ground level to 5th orbit is | | | | | | | |
|  | a) | 10 | b) | 5 | c) | 8 | d) | 15 |
| 328. | Which electronic level would allow the hydrogen atom to absorb a photon but not to emit a photon? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 329. | At equilibrium, number of atoms disintegrating at two different stages are in the ration of If half-life of first stage is 15 minutes, half-life second stage would be | | | | | | | |
|  | a) | 150 min | b) | 15 min | c) | 1.5 min | d) | 30 min |
| 330. | The magnetic quantum number of an atom is related to the | | | | | | | |
|  | a) | Size of the orbital | | | b) | Spin angular momentum | | |
|  | c) | Orbital angular momentum | | | d) | Orientation of the orbital in space | | |
| 331. | is a stable isotope. is expected to disintegrate by | | | | | | | |
|  | a) | emission | b) | emission | c) | Positron emission | d) | Proton emission |
| 332. | Which experimental observation given in the first column correctly accounts for the phenomenon given in the second column?  **Experimental observation Phenomenon** | | | | | | | |
|  | a) | -ray spectra p. Charge on nucleus | | | | | | | |
|  | b) | -particle scattering q. Quantized electron orbit | | | | | | | |
|  | c) | Photo electric effect r. The nuclear atom | | | | | | | |
|  | d) | Emission spectra s. Quantisation of energy | | | | | | | |
| 333. | Any orbital can accomodate up to | | | | | | | |
|  | a) | Four electrons | | | b) | Two electrons with parallel spin | | |
|  | c) | Six electrons | | | d) | Two electrons with opposite spin | | |
| 334. | The unit of radiation exposure which allows for the energy and penetrating power of different types of radiation is | | | | | | | |
|  | a) | Curie | b) | Roentgen | c) | Rem | d) | Sievert |
| 335. | At , hydrogen molecules have velocity . The de Broglie wavelength in this case is approximately | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 336. | In nuclear reaction,  The mass loss is nearly 0.02 amu. Hence, the energy released (in units of million kcal/mol) in the process is approximately | | | | | | | |
|  | a) | 430 | b) | 220 | c) | 120 | d) | 50 |
| 337. | A neutral atom of an element has 2K, 8L, 9M and 2N electrons. The atomic number of element is: | | | | | | | |
|  | a) | 20 | b) | 21 | c) | 22 | d) | 23 |
| 338. | The end product of 4n series is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 339. | The total spin and magnetic moment for the atom with atomic number 7 are: | | | | | | | |
|  | a) | BM | b) | BM | c) |  | d) | BM |
| 340. | If is radius of first orbit, the radius of nth orbit of the H atom will be | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 341. | Artificial radioactivity was first discovered by | | | | | | | |
|  | a) | Sea Borg | b) | Rutherford | c) | Einstein | d) | Irene Curie |
| 342. | Which of the following orbital does not make sense? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 343. | 1 amu is equal to | | | | | | | |
|  | a) |  | b) |  | c) | 1 kg | d) |  |
| 344. | If 8.0 g of radioactive isotope has a half life of 10 hours, the half life of 2.0 g of the same substance is | | | | | | | |
|  | a) | 2.5 hours | b) | 5.0 hours | c) | 10 hours | d) | 40 hours |
| 345. | The ionization potential hydrogen atom is . The energy required to remove an electron in the state of the hydrogen atom is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 346. | The electronic configuration of an element is . This represents its | | | | | | | |
|  | a) | Excited state | b) | Ground state | c) | Cationic form | d) | Anionic form |
| 347. | Magic number elements are those isotopes of elements | | | | | | | |
|  | a) | In which the number of protons or neutrons is 2,8,20,28,50,82, or 125 | | | | | | | |
|  | b) | Which are relatively more abundant | | | | | | | |
|  | c) | Which are unusually stable | | | | | | | |
|  | d) | All of these | | | | | | | |
| 348. | Assuming that only particles emitted from atoms during natural radioactive decay are and particles, which of the following atoms could not possibly result from the natural decay of | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 349. | The important principles that do not help in assigning electronic configuration to atoms are | | | | | | | |
|  | a) | Aufbau rule | | | b) | Hund’s rule | | |
|  | c) | Heisenberg uncertainty principle | | | d) | Pauli’s exclusion principle | | |
| 350. | The binding energy of an element is 64 Mev. If BE/nucleon is 6.4, then the number of nucleons are | | | | | | | |
|  | a) | 10 | b) | 64 | c) | 16 | d) | 6 |
| 351. | The ratio of kinetic energy and potential energy of an electron in a Bohr orbit of a hydrogen-like species is | | | | | | | |
|  | a) |  | b) |  | c) | 1 | d) |  |
| 352. | In the chain reaction.  Neutrons and energy produced at step will be : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 353. | Due to emission ratio changes to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 354. | Which of the following is an artificial man-made series? | | | | | | | |
|  | a) | Thorium series | b) | Neptunium series | c) | Uranium series | d) | Actinium series |

**Multiple Correct Answers Type**

| 355. | Which sets of quantum number are consistent with the theory? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 356. | The lightest particle is/are | | | | | | | |
|  | a) | Electron | b) | Proton | c) | Neutron | d) | -particle |
| 357. | When -particles are sent through a thin metal foil, most of them go straight through the foil because | | | | | | | |
|  | a) | -particles are much heavier than electrons | | | b) | -particles are positively charged | | |
|  | c) | Most part of the atom is empty space | | | d) | -particles move with high velocity | | |
| 358. | Many elements have non-integral atomic masses because | | | | | | | |
|  | a) | They have isotopes | | | | | | | |
|  | b) | Their isotopes have non-integral masses | | | | | | | |
|  | c) | Their isotopes have different masses | | | | | | | |
|  | d) | The constituents neutrons, protons, and electrons combine to given fractional masses | | | | | | | |
| 359. | The isotone(s) of is/are | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 360. | Mass defect of 1 g gives energy equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 361. | Which of the following sets of quantum number is/are not permitted? | | | | | | | |
|  | a) |  | | | | | | | |
|  | b) |  | | | | | | | |
|  | c) |  | | | | | | | |
|  | d) |  | | | | | | | |
| 362. | When a photon simulates the emission of another photon, the two photons have: | | | | | | | |
|  | a) | Same energy | b) | Same direction | c) | Same phase | d) | Same wavelength |
| 363. | Heisenberg uncertainty principle is not valid for | | | | | | | |
|  | a) | Moving electrons | b) | Motor car | c) | Stationary particles | d) | All of the above |
| 364. | The energy of an electron in the first Bohr orbit of H atom is . The possible energy value (s) of the excited state(s) for electron in Bohr orbits of hydrogen is(are) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 365. | Which of the following is true? | | | | | | | |
|  | a) | A configuration with the maximum spin multiplicity has the minimum energy and thus is most stable | | | | | | | |
|  | b) | The energy of orbital may be greater than or lesser than, or equal to that of orbital depending upon the atomic number of the atom | | | | | | | |
|  | c) | All p orbitals have the same type of angular dependence irrespective of the value of principal quantum number | | | | | | | |
|  | d) | In a given electrical field, -particles are deflected more than -particles in spite of -particles having larger change | | | | | | | |
| 366. | The ground state electronic configuration of nitrogen atom can be represented by | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 367. | Carbon-14 dating method is based on the fact that | | | | | | | |
|  | a) | Carbon-14 fraction is same in all objects | | | | | | | |
|  | b) | Carbon-14 is highly insoluble | | | | | | | |
|  | c) | Ratio of carbon-14 and carbon-12 remains constant during disintegration | | | | | | | |
|  | d) | Carbon-14 is highly soluble | | | | | | | |
| 368. | Which of the following statement/s is/are correct for an electron of quantum number and ? | | | | | | | |
|  | a) | The value of may be 2 | | | | | | | |
|  | b) | The value of may be 3 | | | | | | | |
|  | c) | The value of may be | | | | | | | |
|  | d) | The value of may be | | | | | | | |
| 369. | Which cannot be correct value of angular momentum of an electron in an orbit? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 370. | If the wavelength of light in an experiment on photoelectric effect is doubled: | | | | | | | |
|  | a) | The photoelectric emission will not take place | | | | | | | |
|  | b) | The photoelectric emission may or may not take place | | | | | | | |
|  | c) | The stopping potential will increase | | | | | | | |
|  | d) | The stopping potential will decrease | | | | | | | |
| 371. | The atomic model accurately predicts the spectrum of: | | | | | | | |
|  | a) | The hydrogen atom | | | | | | | |
|  | b) | The hydrogen molecule | | | | | | | |
|  | c) | Hydrogen-like species | | | | | | | |
|  | d) | All atoms | | | | | | | |
| 372. | When nucleus of an electrically neutral atom undergoes a radioactive decay process, it will remain neutral after the decay if the process is: | | | | | | | |
|  | a) | An -decay | b) | A -decay | c) | A -capture process | d) | A -decay |
| 373. | Which of the following is/are possible? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 374. | How many spherical nodes are present in 4s orbital in a hydrogen atom? | | | | | | | |
|  | a) | 0 | b) | 2 | c) | 3 | d) | 4 |
| 375. | The half life period of a radioactive element does not depend upon: | | | | | | | |
|  | a) | Temperature | | | | | | | |
|  | b) | Pressure | | | | | | | |
|  | c) | Initial amount of radioactive element taken | | | | | | | |
|  | d) | Nature of radioactive element | | | | | | | |
| 376. | The radial part of wave function depends on the quantum numbers | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | only |
| 377. | Which of the following species has (have) five unpaired electrons? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 378. | For emission of a-particle from uranium nucleus:  Shortage of two electrons in thorium is due to | | | | | | | |
|  | a) | Conversion of electron to positron | | | | | | | |
|  | b) | Adsorption in the nucleus | | | | | | | |
|  | c) | Annihilation | | | | | | | |
|  | d) | Combination with positron to evolve energy | | | | | | | |
| 379. | An electron jumps from th level to 1st level, the fact(s) which is/are correct of -atom, is/are: | | | | | | | |
|  | a) | Number of spectral lines | | | | | | | |
|  | b) | Number of spectral lines | | | | | | | |
|  | c) | If the number of spectral lines | | | | | | | |
|  | d) | Number of spectral lines | | | | | | | |
| 380. | The energy of an electron in the first energy level of H atom is . The possible energy value (s) of the excited state (s) for the electron in is (are) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 381. | Two radioactive substances and have disintegration constant in the ratio 2 : 1. If half-life of is 4 days then after 12 days starting with equal mole fraction of each in mixture of and | | | | | | | |
|  | a) | Mole fraction of and remains unchanged | | | | | | | |
|  | b) | Mole fraction of is larger than that of | | | | | | | |
|  | c) | Mole fraction of is smaller than that of | | | | | | | |
|  | d) | Half-life of is smaller than that of | | | | | | | |
| 382. | Which orbital of the following is lower in energy in a many electron atom? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 383. | The maximum kinetic energy of photoelectrons is directly proportional to . . . . of the incident radiation | | | | | | | |
|  | a) | Wave number | b) | Wavelength | c) | Frequency | d) | Intensity |
| 384. | The angular momentum of P electron is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 385. | Decrease in atomic number is observed during | | | | | | | |
|  | a) | Alpha emission | b) | Beta emission | c) | Positron emission | d) | Electron capture |
| 386. | Which of the following configuration is/are correct for the first excitation state of given species? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 387. | Which of the following statements about radioactivity is/are true? | | | | | | | |
|  | a) | It involves outer electrons activity. | | | | | | | |
|  | b) | It is not affected by temperature or pressure. | | | | | | | |
|  | c) | It is an exothermic process. | | | | | | | |
|  | d) | The radioactivity of an element is not affected by any other element compounded by it. | | | | | | | |
| 388. | In a sample of H-atoms, electrons make transitions from to . If all the spectral lines are observed, then the line having the third highest energy will correspond to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 389. | Which among the following nuclides is/are likely to be stable? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 390. | If electrons fall from 4th level to observant lower level finally attains 1st level in atom, then which is/are correct? | | | | | | | |
|  | a) | Possible lines may belong to Lyman, , series | | | | | | | |
|  | b) | Possible wavelengths emitted out may be six | | | | | | | |
|  | c) | Only one wavelength will come out | | | | | | | |
|  | d) | Only Lyman series will be formed | | | | | | | |
| 391. | Which of the following elements are isotopes | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 392. | Which of the following statement/s is/are correct? | | | | | | | |
|  | a) | A photon is a positively charged nuclear particle | | | | | | | |
|  | b) | A photon is a particle of light energy | | | | | | | |
|  | c) | A photon is a quantum of light | | | | | | | |
|  | d) | A photon is a bundle of energy of definite magnitude but not necessarily light energy | | | | | | | |
| 393. | The wave nature of electron was verified by | | | | | | | |
|  | a) | De Broglie | b) | Davisson and Germer | c) | G.P. Thomson | d) | Rutherford |
| 394. | Ground state configuration of nitrogen can be represented as: | | | | | | | |
|  | a) |  | | | | | | | |
|  | b) |  | | | | | | | |
|  | c) |  | | | | | | | |
|  | d) |  | | | | | | | |
| 395. | The atomic nucleus contains | | | | | | | |
|  | a) | Protons | b) | Neutrons | c) | Electrons | d) | Photons |
| 396. | If the value of is more than 3 and less than 6, then what will be the possible number of orbitals? | | | | | | | |
|  | a) | 6 | b) | 9 | c) | 10 | d) | 13 |
| 397. | Which of the following statements is/are correct? | | | | | | | |
|  | a) | For all values of , the orbitals have the same shape, but the overall size increases as increase, for a given atom | | | | | | | |
|  | b) | The fact that there is a particular direction along which each orbital has maximum electron density, plays an important role in determining molecular geometries. | | | | | | | |
|  | c) | The charge cloud of a single electron in atomic orbitals consists of two lobes of electron density | | | | | | | |
|  | d) | None is correct | | | | | | | |
| 398. | Which among the following is/are fissible? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 399. | An electron has spin quantum number + and magnetic quantum number is . It can be present in | | | | | | | |
|  | a) | orbital | b) | orbital | c) | orbital | d) | orbital |
| 400. | The sum of the number of neutrons and protons in the isotope of hydrogen is | | | | | | | |
|  | a) | 6 | b) | 5 | c) | 4 | d) | 3 |
| 401. | Which of the following statement is/are correct? | | | | | | | |
|  | a) | The energy of an electron in a many electron atom generally increases with an increase in value of , but for a given, the lower the value of the lower the energy | | | | | | | |
|  | b) | An electron close to the nucleus experiences a large electrostatic attraction | | | | | | | |
|  | c) | For a given value of , an-electron penetrates of the nucleus more than a -electron, which penetrates more than a -electron, and so on | | | | | | | |
|  | d) | None is correct | | | | | | | |
| 402. | In the decay process: | | | | | | | |
|  | a) | A and B are isodiaphers | | | b) | A and C are isotones | | |
|  | c) | A and D are isotopes | | | d) | B, C, and D are isobars | | |
| 403. | The nuclear reaction(s) accompanied with the emission of neutron(s) is/are | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 404. | Radioactivity is generally does not found in | | | | | | | |
|  | a) | Light nuclei | | | b) | Stable nuclei | | |
|  | c) | Heavy nuclei | | | d) | Nuclei of intermediate mass | | |
| 405. | Select the correct statement: | | | | | | | |
|  | a) | The concept of shell was given by | | | | | | | |
|  | b) | The concept of subshells within a shell was given by | | | | | | | |
|  | c) | The degeneracy of orbitals exists in presence of magnetic field | | | | | | | |
|  | d) | The splitting of a line in fine lines under the influence of magnetic field was proposed by Zeeman | | | | | | | |
| 406. | Let and be the area enclosed by the th and first orbit in a hydrogen atom. The graph of against : | | | | | | | |
|  | a) | Will pass through the origin | | | | | | | |
|  | b) | Will be a straight line with slope 4 | | | | | | | |
|  | c) | Will be a monotonically increasing non-linear curve | | | | | | | |
|  | d) | Will be a circle | | | | | | | |
| 407. | Which of the following statements are correct for an electron that has and ? | | | | | | | |
|  | a) | The electron may be in a -orbital | | | | | | | |
|  | b) | The electron is in the fourth principal electronic shell | | | | | | | |
|  | c) | The electron may be in a -orbital | | | | | | | |
|  | d) | The electron must have the spin quantum number = | | | | | | | |
| 408. | The mass defect of the nuclear reaction the wrong expression is/are | | | | | | | |
|  | a) | atomic mass of . | | | | | | | |
|  | b) | atomic mass of mass of one electron. | | | | | | | |
|  | c) | atomic mass of mass of one positron. | | | | | | | |
|  | d) | atomic mass of mass of one electrons. | | | | | | | |
| 409. | Photoelectric effect supports quantum nature of light because: | | | | | | | |
|  | a) | There is a minimum frequency below which no photoelectrons are emitted | | | | | | | |
|  | b) | The maximum kinetic energy of photoelectrons depends only on the frequency of light and not on its intensity | | | | | | | |
|  | c) | Even when the metal surface is faintly illuminated the photoelectrons depends only on the frequency of light and not on its intensity | | | | | | | |
|  | d) | Electric charge of the photoelectrons is quantized | | | | | | | |
| 410. | Ground state electronic configuration of nitrogen atom can be represented as | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 411. | The correct starting material and product of different disintegration series is/are | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 412. | Which is correct statement in case of Hund’s rule? | | | | | | | |
|  | a) | It states that if more than one atomic orbital of the same energy is available, electrons will occupy different atomic orbitals with parallel spins, as far as possible, in the configuration of lowest energy | | | | | | | |
|  | b) | Total energy of many electron atom with more than one electron occupying a set of degenerate orbitals is lowest, if as far as possible, electrons occupy different atomic orbitals and have parallel spins | | | | | | | |
|  | c) | Hund’s rule forbid any configuration that does not violate the Pauli’s exclusion principle | | | | | | | |
|  | d) | Hund’s rule simply tells us which of the possible configurations is lowest in energy and other configurations are those of excited states, higher in energy than the ground state | | | | | | | |
| 413. | Which of the following is/are correct? | | | | | | | |
|  | a) | 1 Fermi dps | | | b) | 1 curie dps | | |
|  | c) | 1 rutherford dps | | | d) | 1 becquerel dps | | |
| 414. | When -particles are sent through a thin metal foil, most of them go straight through the foil because, | | | | | | | |
|  | a) | -particles are much heavier than electrons | | | | | | | |
|  | b) | -particles are positively charged | | | | | | | |
|  | c) | Most part of the atom is empty space | | | | | | | |
|  | d) | -particles move with high speed | | | | | | | |
| 415. | The probability of finding the electron in orbital is | | | | | | | |
|  | a) | Maximum on two opposite sides of the nucleus along -axis | | | | | | | |
|  | b) | at the nucleus | | | | | | | |
|  | c) | They produce heating effect | | | | | | | |
|  | d) | They can affect photographic plate | | | | | | | |
| 416. | When an electron makes a transition from state to state, the frequency of emitted radiations is related to according to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 417. | Which of the following statements is/are correct? | | | | | | | |
|  | a) | Neutron was discovered by Chadwick | | | | | | | |
|  | b) | Nuclear fission was discovered by Hahn and Strassmann. | | | | | | | |
|  | c) | Polonium was discovered by Madam Curie. | | | | | | | |
|  | d) | Nuclear fusion was discovered by Fermi. | | | | | | | |
| 418. | Which of the following are -emitters? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 419. | Which of the following products in a hydrogen atom are independent of the principle quantum number The symbol(s) has/have their usual meanings: | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 420. | Which of the following contain (s) material particles? | | | | | | | |
|  | a) | rays | b) | rays | c) | rays | d) | Anode rays |
| 421. | Which of the following is/are correct configuration(s)? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 422. | Magnetic moment of ,and are *,* respectively, hence | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 423. | Which of the following statements concerning Bohr’s model is/are true? | | | | | | | |
|  | a) | It predicts that probability of electron near nucleus is more | | | | | | | |
|  | b) | Angular momentum of electron in H atom = | | | | | | | |
|  | c) | It introduces the idea of stationary states | | | | | | | |
|  | d) | It explains line spectrum of hydrogen | | | | | | | |
| 424. | Rutherford’s -scattering experiment led to the following conclusions: | | | | | | | |
|  | a) | Atom has largely empty space | | | | | | | |
|  | b) | The centre of the atom has positively charged nucleus | | | | | | | |
|  | c) | The size of the nucleus is very small as compared to the size of the atom | | | | | | | |
|  | d) | Electrons revolve around the nucleus | | | | | | | |
| 425. | Which of the followings nuclides belong to actinium series? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 426. | The nuclide X undergoes -decay and another nuclides Y undergoes -decay, which of the following statements is/are correct? | | | | | | | |
|  | a) | The -particles emitted by Y may have widely different speeds. | | | | | | | |
|  | b) | The -particles emitted by X may have widely different speeds. | | | | | | | |
|  | c) | The -particles emitted by X will have almost same speed. | | | | | | | |
|  | d) | The -particles emitted by X will have almost same speed. | | | | | | | |
| 427. | Which of the following statements is/are correct? | | | | | | | |
|  | a) | There is no probability of finding a -electron right at the nucleus | | | | | | | |
|  | b) | The orbital has two lobes of electron density directed along the -axis anda ring of electron density (called dough nut) centred in the -plane | | | | | | | |
|  | c) | The orientation of and orbitals minimizes electron-electron repulsion in many electron atoms | | | | | | | |
|  | d) | None is correct | | | | | | | |
| 428. | Which statement (s) about cathode rays is/are correct? | | | | | | | |
|  | a) | They travel in straight lines towards cathode | | | | | | | |
|  | b) | They produce fluorescent discharge through the walls of the tube | | | | | | | |
|  | c) | They produce heating effect | | | | | | | |
|  | d) | They can affect photographic plate | | | | | | | |
| 429. | What transition in ion shall have the same wave number as the first line in Balmer series of H atoms? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 430. | Which of the following is/are not indicated by the sign of lobes in an atom? | | | | | | | |
|  | a) | Sign of charges | | | b) | Sign of probability distribution | | |
|  | c) | Sign of wave function | | | d) | Presence or absence of electron | | |
| 431. | The charge cloud of a single electron in a atomic orbital has two lobes of electron density. This means | | | | | | | |
|  | a) | There is a high probability of locating the electron in the atomic orbital at values of | | | | | | | |
|  | b) | There is a high probability of locating it at values of but no probability at all of the locating it any where in the -plane along which | | | | | | | |
|  | c) | There is a great probability of finding a electron right at the nucleus | | | | | | | |
|  | d) | All are correct | | | | | | | |
| 432. | Which of the following statements are correct? | | | | | | | |
|  | a) | The electronic configuration of is (atomic number of | | | | | | | |
|  | b) | The magnetic quantum number may have a negative value | | | | | | | |
|  | c) | In Silver atom, 23 electrons have a spin of one type and 24 of the opposite type. (Atomic number of ) | | | | | | | |
|  | d) | The oxidation state of nitrogen in is | | | | | | | |
| 433. | When the intensity of a light source is increased: | | | | | | | |
|  | a) | The number of photons emitted by the source in unit time increases | | | | | | | |
|  | b) | The total energy of the photons emitted per unit time increases | | | | | | | |
|  | c) | More energetic photons are emitted | | | | | | | |
|  | d) | Faster photons are emitted | | | | | | | |
| 434. | Which of the following statements is/are correct? | | | | | | | |
|  | a) | The electronic configuration of is (atomic number of Cr is 24) | | | | | | | |
|  | b) | The magnetic quantum number may have a negative value | | | | | | | |
|  | c) | In silver atom, 23 electrons have a spin of one type and 24 of the opposite type (atomic number of Ag is 47) | | | | | | | |
|  | d) | The oxidation state of nitrogen in is | | | | | | | |
| 435. | Select the correct statement(s) | | | | | | | |
|  | a) | is used for the treatment of thyroid cancer | | | | | | | |
|  | b) | cannot be used for treatment of cancer | | | | | | | |
|  | c) | is used for treatment of leukemia | | | | | | | |
|  | d) | Excessive use of radioactive elements cause cancer | | | | | | | |
| 436. | Which statement (s) is/are correct? | | | | | | | |
|  | a) | Electrons in motion behave as if they are waves | | | | | | | |
|  | b) | -orbital is non-directional | | | | | | | |
|  | c) | An orbital can accommodate a maximum of two electrons with parallel spins | | | | | | | |
|  | d) | The energies of the various sub-levels in the same shell of atom are in order | | | | | | | |
| 437. | (III B) undergoes follows emissions  Which is/are correct statements? | | | | | | | |
|  | a) | will be of IB group | | | b) | will be of IIIB group | | |
|  | c) | will be of IIA (alkaline earth metal) group | | | d) | will be of IIIA (boron family) group | | |
| 438. | Half-life period for ratioactive element is | | | | | | | |
|  | a) | Always constant | | | b) | Variable | | |
|  | c) | Independent of final concentration | | | d) | Independent of initial concentration | | |
| 439. | Which of the following statement(s) is/are correct? | | | | | | | |
|  | a) | Electrons behaves as a wave | | | | | | | |
|  | b) | -orbital is non-directional | | | | | | | |
|  | c) | An orbital can accommodate a maximum of two electrons with parallel spins | | | | | | | |
|  | d) | The energies of the various sub-shells in the same shell are in the order | | | | | | | |
| 440. | Consider the ground state of atom The number of electrons with the azimuthal quantum number, and 2, respectively, are | | | | | | | |
|  | a) | 16 and 5 | b) | 12 and 5 | c) | 16 and 5 | d) | 12 and 4 |
| 441. | Which of the following nuclei are doubly magic? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 442. | The magnitude of spin angular momentum of an electron is given by | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 443. | In a nuclear reactor, oxides of which of the following metals are used as fuel material? | | | | | | | |
|  | a) | Uranium | b) | Thorium | c) | Actinium | d) | Plutonium |
| 444. | Which of the following statement/s is/are correct? | | | | | | | |
|  | a) | The oxidation state of nitrogen in is 3 | | | | | | | |
|  | b) | The electronic configuration of is | | | | | | | |
|  | c) | In silver atom, 23 electrons have a spin of one type and 24 of the opposite type (At. No. 47) | | | | | | | |
|  | d) | The magnetic quantum number may have negative values | | | | | | | |
| 445. | Which of the following properties are possessed by cathode ray? | | | | | | | |
|  | a) | Dual nature | | | b) | Travel with speed of light | | |
|  | c) | Have negative charge | | | d) | Possess magnetic effect | | |
| 446. | Which of the following are isotones? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 447. | Which of the following does not relate to photon both as wave motion and as stream of particles? | | | | | | | |
|  | a) |  | b) |  | c) | Interference | d) | Diffraction |
| 448. | A hydrogen-like atom in ground state absorbs photons having the same energy and its emits exactly photons when electrons transition takes placed. Then, the energy of the absorbed photon may be | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 449. | An electron is not deflected on passing through a certain region because | | | | | | | |
|  | a) | There is no magnetic field in that region | | | | | | | |
|  | b) | There is a magnetic field but velocity of the electron is parallel to the direction of magnetic field | | | | | | | |
|  | c) | The electron is a chargeless particle | | | | | | | |
|  | d) | None of the above | | | | | | | |
| 450. | Which of the following is/are incorrect? | | | | | | | |
|  | a) | 1 curie dis | | | | | | | |
|  | b) | Actinium series starts with . | | | | | | | |
|  | c) | Nuclear isomers contain the same number of protons and neutrons. | | | | | | | |
|  | d) | The decay constant is independent of the amount of the substance taken. | | | | | | | |
| 451. | Select the correct statement (s). | | | | | | | |
|  | a) | Neutron-proton ratio after a nuclide, loses an particle is 1.6 | | | | | | | |
|  | b) | can be converted to by reaction | | | | | | | |
|  | c) | Nuclear fusion reactions are known as thermonuclear reactions | | | | | | | |
|  | d) | Larger the value of disintegration constant, greater the stability of radioactive element | | | | | | | |
| 452. | Which of the following series in H-spectra occurs in 1R region | | | | | | | |
|  | a) | Lyman | b) | Pashen | c) | Bracket | d) | Balmer |
| 453. | Which of the following is/are not radioactive element(s)? | | | | | | | |
|  | a) | Sulphur | b) | Tellurium | c) | Selenium | d) | Polonium |
| 454. | Radioactive disintegration rate is affected by | | | | | | | |
|  | a) | Temperature | b) | Pressure | c) | Electric field | d) | None of these |
| 455. | Which statement(s) concerning light is/are true? | | | | | | | |
|  | a) | It is a form of energy | | | | | | | |
|  | b) | It can be deflected by a magnet | | | | | | | |
|  | c) | It consists of photons of same energy | | | | | | | |
|  | d) | It is part of electromagnetic spectrum | | | | | | | |
| 456. | Which of the following are correct? | | | | | | | |
|  | a) | Only Lyman series is observed in emission and absorption spectrum both | | | | | | | |
|  | b) | The continuum in line spectrum is noticed after a certain value of | | | | | | | |
|  | c) | The wavelength of line of series is | | | | | | | |
|  | d) | The number of spectral lines given when electron drops from 5th to 2nd shell are six | | | | | | | |
| 457. | Which of the following is/are the examples of induced radioactivity? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 458. | Which of the following is/are correct when a nuclide of mass number and atomic number undergoes radioactive process? | | | | | | | |
|  | a) | Both and decrease, the process is called -decay. | | | | | | | |
|  | b) | remains unchanged and decreases by 1. The process is called or positron decay or -electron capture. | | | | | | | |
|  | c) | Both and remain unchanged, the process is called -decay. | | | | | | | |
|  | d) | Both and increase, the process is called nuclear isomerism. | | | | | | | |
| 459. | Which of the following is/are true? | | | | | | | |
|  | a) | The most radioactive element present in pitchblende is uranium. | | | | | | | |
|  | b) | P-32 is used for the treatment of leukaemia. | | | | | | | |
|  | c) | present in the air contains C-12 only. | | | | | | | |
|  | d) | Omission of -rays changes the mass number but not atomic number | | | | | | | |
| 460. | Which of the following statements about radioactivity are correct? | | | | | | | |
|  | a) | It is a nuclear property | | | | | | | |
|  | b) | It does not involve any rearrangement of electrons | | | | | | | |
|  | c) | It is not affected by the presence of other elements | | | | | | | |
|  | d) | Its rate is affected by the change in temperature and/or pressure | | | | | | | |
| 461. | Which of the following statement/s is/are correct? | | | | | | | |
|  | a) | Stark effect is the splitting of spectral lines when source is placed in electric field | | | | | | | |
|  | b) | Beyond a certain limit in spectrum of an atom, there is continuum | | | | | | | |
|  | c) | The intensities of spectral line in line spectrum decreases with increase in the value of | | | | | | | |
|  | d) | Shielding effect is possible in -atom | | | | | | | |
| 462. | atomic model is based on the following postulates: | | | | | | | |
|  | a) | An atom consists of nucleus | | | | | | | |
|  | b) | An electron can rotate only in certain energy levels | | | | | | | |
|  | c) | An electron remains moving with continuous loss of energy | | | | | | | |
|  | d) | None of the above | | | | | | | |
| 463. | A radioactive element A decays by the sequence and with half-lives given below:  Which of the following statements about this system are correct? | | | | | | | |
|  | a) | The mass number of B is greater than A | | | | | | | |
|  | b) | After two hours, less than 10% of the initial A is left | | | | | | | |
|  | c) | Maximum amount of B present at any time is less than 50% of the initial amount of A | | | | | | | |
|  | d) | The atomic numbers of A and C are the same | | | | | | | |
| 464. | Which of the following orbitals has (have) one spherical node? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 465. | Ground state electronic configuration of nitrogen atom can be represented by | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 466. | Which of the following statements are incorrect? | | | | | | | |
|  | a) | The third ionization energy of lithium is 9 times the second ionization energy of helium | | | | | | | |
|  | b) | The second ionization energy of helium is 4 times the first ionization of hydrogen | | | | | | | |
|  | c) | Radius of third orbit of is 3 times the radius of third orbit of hydrogen atom | | | | | | | |
|  | d) | For designating an orbital three quantum numbers are needed | | | | | | | |
| 467. | In a nuclear reactor, heavy water is used to | | | | | | | |
|  | a) | Increases the speed of neutrons | | | b) | Decreases the speed of neutrons | | |
|  | c) | Transfer the heat from the reactor | | | d) | None of above | | |
| 468. | Which of the following is/are correct? | | | | | | | |
|  | a) | rays are more penetrating than -rays. | | | | | | | |
|  | b) | rays have greater ionizing power than -rays. | | | | | | | |
|  | c) | -particles are not present in the nucleus, yet they are emitted from the nucleus. | | | | | | | |
|  | d) | rays are not emitted simultaneously with and -rays. | | | | | | | |
| 469. | Which of the following statement about quantum number is correct? | | | | | | | |
|  | a) | If the value of , the electron distribution is spherical | | | | | | | |
|  | b) | The shape of orbital is given by subsidiary quantum number | | | | | | | |
|  | c) | The Zeeman’s effect is explained by magnetic quantum number | | | | | | | |
|  | d) | The spin quantum number gives the orientations of electron cloud | | | | | | | |
| 470. | The total energy of the electron of H-atom in the second quantum state is . The total energy of the atom in the third quantum state is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 471. | Which of the following provides wave nature to light? | | | | | | | |
|  | a) | Diffraction | b) | Interference | c) | Photoelectric effect | d) |  |
| 472. | Target nucleus is converted to product nucleus by as :  In this case | | | | | | | |
|  | a) | and are isotopes | | | b) | and are isobars | | |
|  | c) | and are isotones | | | d) | has higher atomic number than that of | | |
| 473. | Ionization energy of a hydrogen-like ion is greater than that of another hydrogen-like ion Let and represent the radius of the orbit, speed of the electron, energy of the atom and orbital angular momentum of the electron respectively. in ground state: | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 474. | In which of the following situations the heavier of the two particles have smaller wavelength? The two particles : | | | | | | | |
|  | a) | Move with the same speed | | | | | | | |
|  | b) | Move with same linear momentum | | | | | | | |
|  | c) | Move with the same kinetic energy | | | | | | | |
|  | d) | Have fallen through the same height | | | | | | | |
| 475. | The angular momentum of electron is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |

**ACTIVE SITE TUTORIALS**

**Date :** 20-08-2019 **TEST ID: 520**

**Time :** 23:45:00 **CHEMISTRY**

**Marks :** 1546

2.STRUCTURE OF ATOM

|  |
| --- |
| **: ANSWER KEY :** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1) d 2) a 3) a 4) b**  **5) d 6) a 7) a 8) b**  **9) a 10) a 11) c 12) b**  **13) c 14) d 15) b 16) c**  **17) c 18) c 19) a 20) c**  **21) a 22) a 23) d 24) d**  **25) c 26) c 27) d 28) a**  **29) d 30) d 31) b 32) d**  **33) a 34) a 35) a 36) c**  **37) a 38) a 39) b 40) b**  **41) d 42) b 43) a 44) a**  **45) b 46) a 47) b 48) b**  **49) a 50) a 51) d 52) d**  **53) b 54) c 55) a 56) c**  **57) a 58) a 59) a 60) b**  **61) a 62) a 63) c 64) c**  **65) b 66) b 67) c 68) c**  **69) c 70) b 71) c 72) a**  **73) d 74) a 75) d 76) a**  **77) d 78) b 79) b 80) b**  **81) b 82) b 83) b 84) c**  **85) b 86) b 87) b 88) c**  **89) a 90) a 91) c 92) c**  **93) b 94) a 95) c 96) a**  **97) b 98) c 99) a 100) a**  **101) c 102) c 103) c 104) d**  **105) b 106) c 107) d 108) b**  **109) c 110) a 111) c 112) d**  **113) a 114) d 115) b 116) d**  **117) d 118) b 119) b 120) b**  **121) a 122) d 123) d 124) a**  **125) a 126) c 127) b 128) c**  **129) c 130) a 131) c 132) a**  **133) a 134) c 135) d 136) d**  **137) d 138) a 139) a 140) a**  **141) c 142) d 143) a 144) b**  **145) d 146) b 147) d 148) a**  **149) b 150) c 151) a 152) c**  **153) d 154) b 155) a 156) c**  **157) b 158) d 159) b 160) b**  **161) b 162) b 163) c 164) b**  **165) b 166) d 167) b 168) b**  **169) b 170) c 171) d 172) c**  **173) b 174) b 175) b 176) a**  **177) a 178) b 179) c 180) b**  **181) a 182) d 183) b 184) c**  **185) b 186) c 187) c 188) c**  **189) a 190) c 191) d 192) c**  **193) c 194) c 195) c 196) a**  **197) c 198) d 199) d 200) d**  **201) a 202) c 203) d 204) c**  **205) c 206) c 207) d 208) a**  **209) a 210) a 211) c 212) a**  **213) b 214) d 215) d 216) a**  **217) a 218) d 219) b 220) c**  **221) c 222) c 223) d 224) c**  **225) b 226) c 227) c 228) c**  **229) d 230) b 231) c 232) b**  **233) a 234) b 235) a 236) a**  **237) a 238) a 239) c 240) b**  **241) c 242) a 243) d 244) b**  **245) b 246) d 247) b 248) c**  **249) d 250) b 251) c 252) a**  **253) d 254) d 255) a 256) b**  **257) d 258) a 259) c 260) d**  **261) d 262) b 263) d 264) b**  **265) a 266) c 267) d 268) b**  **269) a 270) d 271) b 272) c**  **273) c 274) d 275) d 276) a**  **277) a 278) a 279) c 280) a**  **281) d 282) d 283) b 284) c**  **285) d 286) d 287) a 288) c**  **289) a 290) c 291) c 292) a**  **293) d 294) b 295) d 296) d**  **297) c 298) a 299) d 300) b**  **301) c 302) d 303) a 304) d**  **305) b 306) a 307) c 308) a**  **309) b 310) a 311) b 312) c**  **313) b 314) b 315) d 316) c**  **317) c 318) b 319) c 320) b**  **321) c 322) d 323) c 324) c**  **325) d 326) c 327) a 328) d**  **329) a 330) d 331) b 332) d**  **333) d 334) c 335) a 336) a**  **337) b 338) a 339) c 340) a**  **341) d 342) b 343) a 344) c**  **345) a 346) b 347) a 348) c**  **349) c 350) a 351) b 352) d**  **353) c 354) b 1) a,b,c 2) a,d 3) c 4) a,c**  **5) b,d 6) c 7) a,b,c 8) a, b, c, d**  **9) b,c 10) a 11) a,b,c,d 12) a,d**  **13) c 14) a, b, c 15) a, d 16) b, d**  **17) a, c 18) b,c 19) b,d 20) c**  **21) a,b,c 22) a,b 23) b,c 24) c,d**  **25) a, b, c 26) b,d 27) c, d 28) a**  **29) a,c 30) b,c 31) a,c,d 32) c, d**  **33) b,c,d 34) c 35) b,c 36) a, b**  **37) a,b,c 38) b, c 39) a,b 40) a, d**  **41) a,b 42) d 43) a,b,c 44) a,c**  **45) b,c,d 46) d 47) a,b,c 48) a,c,d**  **49) a,d 50) a,b,d 51) a,d 52) a, b**  **53) b,d 54) a,b,c 55) a, b, c 56) a,d**  **57) a,d 58) a,b,c,d 59) c,d 60) a,c**  **61) a,b,d 62) a 63) a,b,c 64) a,d**  **65) a, b 66) a,b,d 67) a, b, c, d 68) c**  **69) b,c,d 70) a,b,c 71) a,b 72) b,c**  **73) a,b,c 74) b, c, d 75) b 76) a,b,d**  **77) a,b,c 78) a,b,c 79) a, b 80) a,b,c**  **81) a, b 82) a, b 83) b, c 84) a,d**  **85) a,b 86) b 87) b,c,d 88) b,c**  **89) a, b, d 90) b,c,d 91) a,b,c,d 92) a,b,c**  **93) b,c,d 94) a,b 95) a,b 96) c,d**  **97) a, b, c 98) b,c 99) a,b,c 100) a**  **101) a, d 102) a, b, d 103) a,b,c,d 104) a,b,c**  **105) b,c 106) a,b,c 107) a, b, c 108) a, b**  **109) b,d 110) b,d 111) a,d 112) a,b,c**  **113) b,c 114) b,c,d 115) a,b,c 116) a,c**  **117) a, b, d 118) b, d 119) b, c 120) a, c, d**  **121) a,b** | | | | |

**ACTIVE SITE TUTORIALS**

**Date :** 20-08-2019 **TEST ID: 520**

**Time :** 23:45:00 **CHEMISTRY**

**Marks :** 1546

2.STRUCTURE OF ATOM

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| --- |
| **: HINTS AND SOLUTIONS :** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | **(a)**  2K, 8L, 9M, and 2N  Structure is  Atomic number 21  The total number of | | | | | | | |
| 5 | **(d)**  is atomic number of  Half-life period of  Total time  number of half-lives  left after 4 half-lives  Thus, (a) is true  Before 30 min ( = half-life) amount of left > 50%  Hence, formed < 50%  (since half-life of ) is 2880 min >> half-life of )  Thus, (b) is correct  and are isotopes with same atomic number thus, (c) is correct | | | | | | | |
| 6 | **(a)**  So, atomic number=3, mass number=7 | | | | | | | |
| 7 | **(a)** | | | | | | | |
| 10 | **(a)**  According to Aufbau’s principle, filling of electrons in various subshells of an atom takes place in the increasing order of energy, starting with the lower most  The following order is observed:  According to Bohr-Bury rule, rule, the subshell with the lower value of is filled first. If the values for are equal, the one with the smaller value of is filled first   |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | | **i.** | 4 | 1 | 5 | | **ii.** | 4 | 0 | 4 | | **iii.** | 3 | 2 | 5 | | **iv**. | 3 | 1 | 4 | | | | | | | | |
| 11 | **(c)**  Neutron | | | | | | | |
| 12 | **(b)**  =wave function | | | | | | | |
| 14 | **(d)**  Neutron is the best projectile | | | | | | | |
| 15 | **(b)**  **True**  **False**. The angular momentum depends only on the azimuthal quantum number  **True**  **True** | | | | | | | |
| 16 | **(c)**  Pb-208 belongs to series | | | | | | | |
| 17 | **(c)** | | | | | | | |
| 19 | **(a)**  Isotope must have some number of proton, therefore -particle will be emitted | | | | | | | |
| 20 | **(c)**  Electronic configuration of  Since two has been lost in forming ion from metal, so total number of protons should be  Hence, number of neutrons | | | | | | | |
| 22 | **(a)**  The possible excited state values are:  So, the value is only | | | | | | | |
| 25 | **(c)**  year; years  We know ,  And | | | | | | | |
| 27 | **(d)** | | | | | | | |
| 28 | **(a)**  Ionization potential of nitrogen is more that of oxygen. This is because nitrogen has more stable fully half-filled orbitals | | | | | | | |
| 29 | **(d)**  Greater the values of (decays constant) greater the activity | | | | | | | |
| 30 | **(d)**  Spin does not give the orientation of electron cloud | | | | | | | |
| 32 | **(d)**  and | | | | | | | |
| 33 | **(a)**  This is because is a more stable half-filled configuration. Reasons for the stability of half-filled and fully filled orbitals are symmetry and exchange energy | | | | | | | |
| 34 | **(a)**  is bombarded by particle | | | | | | | |
| 35 | **(a)**  Equating mass number of both sides  Equating atomic number of both sides | | | | | | | |
| 37 | **(a)** | | | | | | | |
| 39 | **(b)** | | | | | | | |
| 42 | **(b)**  For the last electron: | | | | | | | |
| 44 | **(a)** | | | | | | | |
| 45 | **(b)**  Given , we know that  Or | | | | | | | |
| 47 | **(b)**  LHS RHS  Mass number 242 242 balanced  Atomic number 94 95 unbalanced | | | | | | | |
| 48 | **(b)**  Isobars have different mass number | | | | | | | |
| 49 | **(a)**  Number of radial nodes  For (number of radial node=2)  For (number of radial node=0) | | | | | | | |
| 51 | **(d)** | | | | | | | |
| 52 | **(d)**  The rate of disintegration does not depend upon environmental factors | | | | | | | |
| 53 | **(b)**  If of is 100 min, then  Thus, | | | | | | | |
| 54 | **(c)**  Heavy water works as a moderator to slow down the speed of neutron | | | | | | | |
| 55 | **(a)**  The energy of an electron in Bohr orbits of hydrogen atom is given by the expression  Where takes only integral values. For the first Bohr orbit, , and it is given that  . Hence  Of the given values of energy, only can be obtained by substituting in the above expression | | | | | | | |
| 56 | **(c)**  rays are neutral particles | | | | | | | |
| 59 | **(a)** | | | | | | | |
| 63 | **(c)** | | | | | | | |
| 64 | **(c)**  KE = (Energy of radiation Work function) | | | | | | | |
| 65 | **(b)**    Number of half-life  Au left after 52 days,  Hg formed | | | | | | | |
| 66 | **(b)**  Work function = Threshold energy | | | | | | | |
| 68 | **(c)**  …(i)  …(ii)  Compare equations (i) and (ii), we get | | | | | | | |
| 69 | **(c)**  Proton changes to neutron  has 12 protons  13 neutrons  12 electrons | | | | | | | |
| 71 | **(c)**  Atomic number | | | | | | | |
| 73 | **(d)**  OrThreshold or Work function +KE  Or  ….(i)  Substitute the value of in equation (i) | | | | | | | |
| 74 | **(a)**  2K, 8L, 9M, and 2N  Structure is  Atomic number 21  Total number of unpaired | | | | | | | |
| 75 | **(d)**  **True**.  **True**. See fig (i) below  **True**. See fig (e) below  **False**. See fig (h) below  C:\Users\Whalesoft\Desktop\Untitled-2.jpg | | | | | | | |
| 76 | **(a)** | | | | | | | |
| 78 | **(b)**  In X*;*  In Y*,*  Energy of | | | | | | | |
| 79 | **(b)** | | | | | | | |
| 80 | **(b)**  Where,  Thus, I and III are true | | | | | | | |
| 81 | **(b)**  Isotopes have same atomic number but different mass number | | | | | | | |
| 82 | **(b)**  Emission of an -particle means mass is decreased by 4 units and charge by 2 units. Thus,  Thus, the mass number = 234  Atomic number = 90 | | | | | | | |
| 83 | **(b)**  **True**.  **False**. The expression is that of -component of angular momentum  **True**. The azimuthal quantum number has the value  **True**. The expressions are | | | | | | | |
| 84 | **(c)**  Based on units of (disintegration constant) we conclude that disintegration of follows first-order kinetics and that of follows second-order kinetics  Also, (given)  given  Also,  Thus, (a) and (b) are true | | | | | | | |
| 88 | **(c)**  Half-life | | | | | | | |
| 89 | **(a)**  Angular nodes =1,  Spherical nodes | | | | | | | |
| 90 | **(a)** | | | | | | | |
| 92 | **(c)**  The limiting line of Balmer series refers to the transition from to 2nd orbit | | | | | | | |
| 94 | **(a)**  Neutron | | | | | | | |
| 96 | **(a)** | | | | | | | |
| 97 | **(b)**  According to Aufbau’s principle, filling of electrons in various subshells of an atom takes place in the increasing order of energy, starting with the lower most. The following order is observed:  Filling of orbital cannot start before the completion of the orbital  **Incorrect**:   |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  |   **Correct:**   |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | | | | | | | | |
| 98 | **(c)**  Smaller nuclei fuse to form heavier nuclei in nuclear fusion reaction | | | | | | | |
| 99 | **(a)**  Both belong to series | | | | | | | |
| 102 | **(c)**  is the electronic configuration of a halogen, and halogens are most electronegative | | | | | | | |
| 103 | **(c)**  Hence, 1 microcurie | | | | | | | |
| 106 | **(c)**  **False**. The electronic configuration of (atomic number 30) is . There are no unpaired electrons, hence, it is diamagnetic  **False**. In emission, the atomic number of daughter element is increased by 1, due to the basic conversion of neutron into proton in the nucleus  **True**. An -particle is . Hence, atomic number and mass number of daughter element are decreased by 2 and 4, respectively  **False**. There will occur an increase in atomic number by 2 | | | | | | | |
| 107 | **(d)**  Nucleon consists of protons and neutrons | | | | | | | |
| 108 | **(b)**  Bohr can explain hydrogen-like elements | | | | | | | |
| 114 | **(d)**  Hence, has ratio greater than 1. It emits particles to have Thus, neutron changes to proton by emission of particles | | | | | | | |
| 115 | **(b)**  particles have low penetrating power. It is positively charged helium nucleus | | | | | | | |
| 117 | **(d)**  When there are 3, 3 and 3-orbital’s. If all these orbitals are completely occupied as    Total 18 electrons, 9 electrons with and 9 with | | | | | | | |
| 119 | **(b)** | | | | | | | |
| 120 | **(b)**  In hydrogen bomb, nuclear fusion takes place | | | | | | | |
| 121 | **(a)**  Atomic number =24  Structure is  Total spin =  Magnetic moment = BM | | | | | | | |
| 122 | **(d)**  at equilibrium  and are half-lives  If then  If then  Since,  Hence, if  Then | | | | | | | |
| 126 | **(c)**  Hund’s rule | | | | | | | |
| 127 | **(b)**  For disintegration | | | | | | | |
| 129 | **(c)**  For the last electron:  or | | | | | | | |
| 130 | **(a)** | | | | | | | |
| 131 | **(c)**  Neutron is absorbed  Proton is released | | | | | | | |
| 132 | **(a)**  According to Rutherford’s model of atom, an atom consists of a positively chargedheavy part called nucleus where most of the mass of the atom is concentrated. Protons and neutrons are present in the nucleus. Size of the nucleus is very small compared to the size of the atom  Around the nucleus, there is extranuclear part in which there are electrons  Electrons revolve around the nucleus in circular orbit like planets around the sun and they are called planetary electrons | | | | | | | |
| 136 | **(d)** | | | | | | | |
| 138 | **(a)**  Atoms having same number of protons are called isotopes | | | | | | | |
| 141 | **(c)**  Radius of orbit ()=  In it are constants, so after substituting these values, we get    The transition from in H-atom will have the same wavelength as the transition from in ion. | | | | | | | |
| 143 | **(a)**  For , for H atom,  Other values cannot be obtained for etc | | | | | | | |
| 144 | **(b)**  particles are neutral, hence they do not get repelled by the electrostatic force of nuclei | | | | | | | |
| 145 | **(d)** | | | | | | | |
| 146 | **(b)**  Due to mass defect some energy is lost as heat energy | | | | | | | |
| 148 | **(a)**  Radioactive disintegration is a nuclear process | | | | | | | |
| 149 | **(b)**  unpaired electron=0  unpaired electron=2  unpaired electron=0  If Hund’s rule is not followed | | | | | | | |
| 150 | **(c)**  It capture neutrons and emits particle  Thus, | | | | | | | |
| 151 | **(a)**  Artificial series is | | | | | | | |
| 152 | **(c)**  Radioactive disintegration is a nuclear process | | | | | | | |
| 153 | **(d)**  The nucleus is unstable, if | | | | | | | |
| 154 | **(b)**  This is the ground state electronic configuration for chromium. There is only one electron in the orbital because is a more stable half-filled configuration. Reasons for the stability of the half-filled and fully filled orbitals are symmetry and exchange energy | | | | | | | |
| 158 | **(d)**  for  for  for | | | | | | | |
| 159 | **(b)**  Let particles are emitted  Equating the atomic mass of both sides  Therefore, one particle is emitted | | | | | | | |
| 160 | **(b)**  Energy of photon  For photoelectric effect to occur, energy of incident photons, must be greater than work functions of metal. Hence, only Li, Na, K and Mg have work functions less than 4.14 V. | | | | | | | |
| 162 | **(b)**  OH of acid is lost in esterification of acid | | | | | | | |
| 164 | **(b)**  **False**. See fig.(e) below  **True**. See fig (g) below  **True**. See fig (i) below  **False**. Bosons does not follow Pauli exclusion principle  C:\Users\Whalesoft\Desktop\Untitled-2.jpg | | | | | | | |
| 165 | **(b)**  Let the reaction emits -particles and -particles  Equating atomic mass number of both sides  -particle emitted = 6  Equating atomic number of both sides  -particle emitted = 4 | | | | | | | |
| 166 | **(d)**  **Note** Element with atomic number 88 belongs to IIA | | | | | | | |
| 171 | **(d)** | | | | | | | |
| 173 | **(b)**  According to Rutherford’s model of atom, an atom consists of a positively charged heavy part called nucleus where most of the mass of the atom is concentrated. Protons and neutrons are present in the nucleus  Size of the nucleus is very small compared to the size of the atom  Around the nucleus, there is extranuclear part in which there are electrons  Electrons revolve around the nucleus in circular orbits, like planets around the sun, and they are called plantary electrons | | | | | | | |
| 174 | **(b)** | | | | | | | |
| 177 | **(a)**  1 curie | | | | | | | |
| 179 | **(c)**  In the given reaction, conservation of atomic mass and atomic number is violated | | | | | | | |
| 180 | **(b)**  2K, 8L, 9M, and 2N  Structure is  Atomic number 21  The total number of | | | | | | | |
| 181 | **(a)**  Isotonic means having the same number of neutrons   |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | | Neutrons | 8 | 8 | 8 | | | | | | | | |
| 182 | **(d)**  In all cases daughter elements change to stable nuclei | | | | | | | |
| 183 | **(b)**  cm | | | | | | | |
| 190 | **(c)**  Longest or shortest  Lowest value of or highest value of or lowest is in (c) | | | | | | | |
| 192 | **(c)**  Let ofand ofbe present in  Solve for ,  of  of  Ratio is 1:3 | | | | | | | |
| 193 | **(c)**  When nm | | | | | | | |
| 194 | **(c)**  Average life half-life | | | | | | | |
| 195 | **(c)**  For transient equilibrium  and are disintegration constant and are the number of atoms  Also, and  Thus,  or | | | | | | | |
| 197 | **(c)**  particle  Elements with atomic number 90 to 103 form series and are called actinides. They are placed in group IIIB | | | | | | | |
| 198 | **(d)**  Three neutrons are released due to attack of one neutron. Additional two electrons further attack U-nucleus and thus a chain reaction starts | | | | | | | |
| 199 | **(d)**  with even neutrons are even protons are satble | | | | | | | |
| 200 | **(d)** | | | | | | | |
| 201 | **(a)**  Shortest means shortest and vice versa  When,  Longest means longest  When | | | | | | | |
| 203 | **(d)**  Mass number is a whole number | | | | | | | |
| 204 | **(c)**  Equating mass number of both sides  Equating atomic number of both sides  Particle is | | | | | | | |
| 205 | **(c)**  number of half-life | | | | | | | |
| 206 | **(c)**  X-rays are not having any charge, therefore they are not deflected by electric and magnetic fields | | | | | | | |
| 207 | **(d)**  **True**. It is true to the fact that the electron interacts in different manner with the external magnetic field  **True**. This splitting is known as Zeeman effect  **True**.  **False**. It decreases with increase in the value of atomic number as is evident from the expression  C:\Users\Whalesoft\Desktop\Untitled-2.jpg | | | | | | | |
| 209 | **(a)**  2K, 8L, 9M, and 2N  Structure is  Atomic number 21  The total number of | | | | | | | |
| 210 | **(a)**  If Aufbau rule is not followed, electronic configuration is . Last electron is in (instead of ), hence block (but it is of block) | | | | | | | |
| 211 | **(c)**  Equating mass number of both sides  Equating atomic number of both sides  The particle is | | | | | | | |
| 213 | **(b)**  or | | | | | | | |
| 215 | **(d)** | | | | | | | |
| 217 | **(a)**  Vapour density  Molecular weight  So, compound is  Total number of  Total number of in 1 mole | | | | | | | |
| 219 | **(b)**  When both neutron and protons are even the nucleus is most stable | | | | | | | |
| 220 | **(c)** | | | | | | | |
| 221 | **(c)**  **False**. The half-filled and fully-filled electronic configurations are more stable. It is due to the larger exchange energy  **False**. The symbol stands for sharp-a term used in the characterization of spectral lines. The symbols and stand for principal, diffuse, and fundamental, respectively  **True**.  **False**. The expression is  Hence, energy and wavelength are inversely related | | | | | | | |
| 223 | **(d)**  Equating the mass number of both sides  Similarly, equating atomic number of both sides | | | | | | | |
| 224 | **(c)**    and have same atomic number and are thus isotopes. Thus, emission of one and two particles result in the formation of an isotope | | | | | | | |
| 226 | **(c)**  The de Broglie wavelength is | | | | | | | |
| 227 | **(c)**  **True**. The number of orbitals for a given value is equal to the permitted value of which can take values *,* at total of values  **True**.  **False**. A diamagnetic atom has no unpaired electrons  **True**. | | | | | | | |
| 228 | **(c)**  or orbital | | | | | | | |
| 229 | **(d)**  number of half-life  Amount left  Amount decayed | | | | | | | |
| 230 | **(b)** | | | | | | | |
| 231 | **(c)**  According to the conclusions of Rutherford’s -scattering experiment,most of the atom is empty. So, the -particles go across undeflected. The positive charge is concentrated in a very small space in the atom, which deflected the positively charged -particles. This small and positively charged heavy centre is called the nucleus. -particles that happen to travel in line with the nucleus get deflected by | | | | | | | |
| 233 | **(a)**  thus  and  thus, is | | | | | | | |
| 234 | **(b)**  **False**. The correct statement is as under:  No two electrons in an atom can have the same values of all the four quantum numbers and  **True**. The expressions are  **False**. The expression of velocity is (constant)  **False**. The expression of velocity is (constant) | | | | | | | |
| 235 | **(a)**  If proton increases, then neutron/proton ratio decreases. When neutron changes to proton, a particle (electron) is emitted  Thus, (neutron) decreases and (proton) increases. Thus, neutron/proton decreases | | | | | | | |
| 236 | **(a)**  The magnitude of the charge should be smallest and other charges should be integral multiple of that smallest charge, so, in this problem, smallest charge is , but, other charges are not integral multiple of this charge  So, smallest charge is because other charges are integral multiple of this charge | | | | | | | |
| 237 | **(a)**  min, T = 6400 min  Number of half lines  We know that  Or | | | | | | | |
| 238 | **(a)**  The larger the value of the principle quantum number, larger the size of the shell and hence the orbital | | | | | | | |
| 239 | **(c)**  and  The wavelength of a spectral line for an electronic transition is inversely related to the difference in the energy of the energy levels involved in the transition | | | | | | | |
| 240 | **(b)**  -plane  C:\Users\Whalesoft\Desktop\Untitled-2.jpg   |  |  |  |  | | --- | --- | --- | --- | | **Orbital** |  | **Shape** | **Nodal plane** | |  |  | Dumb-bell |  | |  |  | Dumb-bell |  | |  | 0 | Dumb-bell |  | | | | | | | | |
| 242 | **(a)**  with atomic number 17 is  Thus, | | | | | | | |
| 243 | **(d)**  orbitals are independent of angular wave function. Thus, they do not have any angular node. They have only spherical node. The number of spherical nodes in orbitals are given by , where is the principal quantum number | | | | | | | |
| 244 | **(b)**  **False**. The neutrino has zero charge and seems to have rest mass equal to zero. It is emitted along with the emission of a position (positive charge of +1e and mass equal to electron). For example  Antineutrino is emitted along with the emission of -particle  **True**. The expression of magnetic moment is  **False**  **False**. The correct expression is | | | | | | | |
| 245 | **(b)**  with atomic number – 15 is isotope of phosphorus | | | | | | | |
| 247 | **(b)**   |  |  | | --- | --- | | **Name** | **Wavelength** | | Radiowave |  | | Infrared (IR) |  | | Ultraviolet (UV) |  | | X-rays |  | | | | | | | | |
| 248 | **(c)**  Binding energy per nucleon | | | | | | | |
| 250 | **(b)**  Number of spectral lines from to | | | | | | | |
| 251 | **(c)**  For every value of can be from to through 0(zero). For cannot be | | | | | | | |
| 252 | **(a)** | | | | | | | |
| 253 | **(d)**  Shortest will be produced in the ion, which has high value  forfor | | | | | | | |
| 255 | **(a)**  Meson | | | | | | | |
| 256 | **(b)**  Lyman series | | | | | | | |
| 257 | **(d)** | | | | | | | |
| 258 | **(a)**  Electronic configuration of fluorine and neon are 2,7 and 2, 8, respectively | | | | | | | |
| 259 | **(c)** | | | | | | | |
| 260 | **(d)**  Isobars have same atomic mass number | | | | | | | |
| 262 | **(b)**  Catalyst has no effect on nucleus reactions | | | | | | | |
| 264 | **(b)**  Radioactive element has atomic number > 83 | | | | | | | |
| 267 | **(d)**  Now, g | | | | | | | |
| 268 | **(b)**  The orbital angular momentum is:  The orbital angular momentum for an electron in orbital is 0 | | | | | | | |
| 270 | **(d)**  Any orbital can have a maximum of two electrons and with opposite spins. This is according to Pauli’s exclusion principle | | | | | | | |
| 271 | **(b)**  Unknown species is  Thus, is | | | | | | | |
| 272 | **(c)**  Rate of disintegration does not depend upon the environmental factor | | | | | | | |
| 274 | **(d)**  I, II and III are true | | | | | | | |
| 275 | **(d)**  KE = | | | | | | | |
| 277 | **(a)**    …(ii)  Comparing equations (i) and (ii) | | | | | | | |
| 279 | **(c)**  Average life | | | | | | | |
| 280 | **(a)**  Therefore, velocity of in the third orbit of is the same velocity of an in the first orbit of H atom, i.e., | | | | | | | |
| 281 | **(d)**  According to the group displacement law | | | | | | | |
| 283 | **(b)**  The first use of quantum theory to explain the structure of atom was made by Bohr | | | | | | | |
| 284 | **(c)**  **False**. The configuration is  **False**. The wavelength of gamma rays is of the order of m  **True**. In hydrogen atom, the energy of an electron depends only on the principal quantum number of the orbital which it occupies  **False**. In -plane, there is no electron density if an electron occupies orbital | | | | | | | |
| 285 | **(d)**   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  | |  | 0 | 2 | 1 | 1 | |  | 1 | 4 | 1 |  | |  | 0 | 0.5 | 1 | 1837 | | | | | | | | |
| 286 | **(d)**  For photon, (in form of particle and wave) | | | | | | | |
| 287 | **(a)**  2K, 8L, 9M, and 2N  Structure is  Atomic number 21  Total number of unpaired | | | | | | | |
| 289 | **(a)** | | | | | | | |
| 292 | **(a)**  **True**. For ionization, *.* Hence  **False**. The ionization energy increases in proportion to the square of the positive charge in the nucleus as is evident from the expression  **False**. The correct expression is  **False**. For a multi-electron atom, the energy of an orbital depends on both principal and azimuthal quantum numbers. The larger the value of , the larger the energy. For the same value of the larger the value of , the larger the energy | | | | | | | |
| 293 | **(d)**    Thus, | | | | | | | |
| 294 | **(b)**  Bohr’s model is only applicable to a single electron species | | | | | | | |
| 297 | **(c)**  Number of half lives = 3  We know that  (Number of atom left after) disintegration)  atoms | | | | | | | |
| 298 | **(a)**  The orbital angular momentum is:  The orbital angular momentum for an electron in orbital is | | | | | | | |
| 299 | **(d)**   |  |  |  | | --- | --- | --- | | **Ion** | **Electronic configuration** | **Unpaired electrons** | |  |  | 0 | |  |  | 1 | |  |  | 2 | |  |  | 4 | | | | | | | | |
| 300 | **(b)** | | | | | | | |
| 301 | **(c)**  , therefore orbitals | | | | | | | |
| 303 | **(a)**  (Pauli’s exclusion principle) | | | | | | | |
| 305 | **(b)**  Given,  Amount left  We know hr | | | | | | | |
| 307 | **(c)**  Hence, ratio is 1:4:9 | | | | | | | |
| 309 | **(b)**  Atomic number of inert gas atom = 20  Atomic mass of inert gas atom = 40 (isobaric to )  Number of neutron = | | | | | | | |
| 311 | **(b)**  line of Balmer series means first line of Balmer series  line of Balmer series means, second line of Balmer series,  When  Then | | | | | | | |
| 314 | **(b)**    particles are negatively charged hence attracted towards positive plate | | | | | | | |
| 316 | **(c)** | | | | | | | |
| 317 | **(c)**  Isotones have same number of neutrons  So answer is (c) | | | | | | | |
| 318 | **(b)**  Based on rock-dating | | | | | | | |
| 320 | **(b)**  The radius of an atomic nucleus is of the order of cm | | | | | | | |
| 322 | **(d)**  distance travelled in one second by velocity | | | | | | | |
| 323 | **(c)**  2K, 8L, 9M, and 2N  Structure is  Atomic number 21  Valency of element in  Structure is  So, can be excited form and both (since energy difference between and is very very small)  So, valency is +2 and +3 both | | | | | | | |
| 324 | **(c)** | | | | | | | |
| 325 | **(d)**  **True**.  **True**.  **True**.  **False**. Lyman spectral series lies in the ultraviolet region | | | | | | | |
| 327 | **(a)**  Number of spectral lines from the ground state | | | | | | | |
| 328 | **(d)**  The lowest energy state is . It is not possible from this state to lose energy | | | | | | | |
| 329 | **(a)**  Smaller the half-life, larger the number of atoms thus, | | | | | | | |
| 331 | **(b)**  The species (number of neutrons = 16) contains more neutrons than the isotope (number of neutrons = 14). Neutrons on decomposition show -emission  particle | | | | | | | |
| 333 | **(d)**  Hund’s rule | | | | | | | |
| 335 | **(a)** | | | | | | | |
| 336 | **(a)**  Mass defect | | | | | | | |
| 337 | **(b)**  2K, 8L, 9M, and 2N  Structure is  Atomic number21 | | | | | | | |
| 339 | **(c)**  Atomic number =7  Structure is  ,  Total spin  Magnetic moment =  BM | | | | | | | |
| 342 | **(b)**  Fororbital,, here  But | | | | | | | |
| 344 | **(c)**  Half life is independent to the initial amount of substance | | | | | | | |
| 346 | **(b)**  The element is chromium atom in the ground state | | | | | | | |
| 348 | **(c)**  If particles are emitted, difference in atomic mass should be in multiple of 4 units  (a) 235-231 = 4 units Yes  (b) 235-227 = 8 units Yes  (c) 235-225 = 10 units No  (d) 235-207 = 28 units Yes | | | | | | | |
| 350 | **(a)**  Binding energy  Binding energy/nucleon = 6.4  number of nucleon | | | | | | | |
| 351 | **(b)** | | | | | | | |
| 352 | **(d)**  In the chain reaction.   |  |  |  | | --- | --- | --- | |  | Energy | Neutrons | | First step |  | 3 | | Second step |  | 9 | | Third step |  | 27 | | th step |  |  | | | | | | | | |
| 353 | **(c)**  Due to emission, neutron changes to proton  Neutron decreases by 1 unit and proton increases by 1 unit  Thus, new ratio is | | | | | | | |
| 355 | **(a,b,c)**  In i.e., 3 but | | | | | | | |
| 357 | **(c)**  When -particles are sent through a thin metal foil, most of them go straight the foil because most part of the atom is an empty space | | | | | | | |
| 358 | **(a,c)**  Most of the elements are found in nature as a mixture of isotopes which have different atomic masses. Therefore, the atomic mass of any element is the average of the atomic masses of isotopes of that element  **Example:**  Given that the abundance of isotopes and is 5%, 90% and 5% respectively, the atomic mass of is calculated as follows:  Atomic mass of iron = | | | | | | | |
| 359 | **(b,d)**  Species having the same number of neutrons are called isotones   |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | | Neutrons | 34 | 34 | 34 | | | | | | | | |
| 363 | **(b,c)**  Heisenberg principle is only for microscopic particles which are moving with very high speed | | | | | | | |
| 364 | **(a)**  Excited state is given as = | | | | | | | |
| 366 | **(a,d)**  Both (a) and (d) are correct because each orbital has one electron with parallel spin. This is correct in accordance with Hund’s rule of maximum multiplicity | | | | | | | |
| 372 | **(b,c)**  particle is neutral while in K-capture electrical neutrality is maintained by capturing an electron fron K-shell | | | | | | | |
| 373 | **(b,d)**  Angular quantum number may have value less than the principal quantum number  i.e.  **a**.  **c**. | | | | | | | |
| 374 | **(c)**  Number of nodes | | | | | | | |
| 377 | **(b,c)**  (atomic number = 25)  Electronic configuration   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  |   Electronic configuration   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  | | | | | | | | |
| 380 | **(b,d)**  The possible energy values of the excited state for an electron must be integral, multiple to the ground state energy. In other words, energy absorbed or emitted must be integral multiple (Planck’s theory) | | | | | | | |
| 382 | **(a)**  According to rule  For  Similarly for  is lower in energy | | | | | | | |
| 383 | **(a,c)**  The maximum kinetic energy of photoelectrons is directly proportional to wave number and frequency of the incident radiation because energy of photon is given by the relation | | | | | | | |
| 384 | **(b,c)**  Angular momentum =  For electron,  Angular momentum =  Or  Angular momentum | | | | | | | |
| 385 | **(a,c,d)**  -emission)  -emission)  (positron –emision)  (electron capture) | | | | | | | |
| 388 | **(c)**  Third highest energy between : and | | | | | | | |
| 389 | **(b,c)**  Both have even number of neutrons and protons and ratio of Mg = 1 and Cd | | | | | | | |
| 391 | **(a,b,c)**  **Isotopes**: Elements that contain same atomic number | | | | | | | |
| 395 | **(a,b)**  The atomic nucleus contains protons and neutrons | | | | | | | |
| 396 | **(d)**  It corresponds to | | | | | | | |
| 400 | **(d)**  Tritium is an isotope of hydrogen which has one proton and two neutrons. So, the total is 3 | | | | | | | |
| 403 | **(a,d)** | | | | | | | |
| 407 | **(b,d)**  (principal shell) | | | | | | | |
| 410 | **(a,d)**  In singly filled orbital electrons must align in one direction or they all must be spin-up or spin-down | | | | | | | |
| 416 | **(a)** | | | | | | | |
| 422 | **(c)**  unpaired electrons  unpaired electrons  5 unpaired electrons | | | | | | | |
| 424 | **(a,b,c)**  Refer to Rutherford’s atomic experiment | | | | | | | |
| 425 | **(a,b)**  Both and belong to series | | | | | | | |
| 429 | **(b)**  For H atom, first Balmar linein series is  For ion | | | | | | | |
| 434 | **(a,b,c)**  This is because is a more stable half-filled configuration. Reasons for the stability of half-filled and fully filled orbitals are symmetry and exchange energy  For every value of can be from to through 0  23 electrons have a spin of one type and 24 of the opposite type  The oxidation state of in is not but | | | | | | | |
| 438 | **(a,d)**  Therefore, is always constant and independent of initial concentration | | | | | | | |
| 439 | **(a,b)**  Order of energies of different orbital is | | | | | | | |
| 440 | **(b)**  ( for )  orbital electrons  orbital electrons | | | | | | | |
| 441 | **(b,c,d)**  Both neutron and proton are magic numbers | | | | | | | |
| 442 | **(b,c)**  Spin angular momentum | | | | | | | |
| 444 | **(b,c,d)**  The choice (a) is incorrect as the oxidation state of nitrogen in is and not | | | | | | | |
| 446 | **(a,b,c)**  **Isotones:**Elements that contain same number of neutrons | | | | | | | |
| 448 | **(a,b)**  **Exp**: Number of dark lines (in absorption), i.e., excitation = Number of bright lines (in emission), i.e., -excitation  It is possible only when the is excited to from ground state  Clearly, andare possible | | | | | | | |
| 450 | **(c,d)**  Nuclear isomers have same atomic number and atomic mass number. The decay constant depends upon initial amount of substance, | | | | | | | |
| 453 | **(a,b,c)**  Polonium is a radioactive element | | | | | | | |
| 457 | **(a,b,c,d)**  In all reactions, an artificial disintegration of a stable nuclei leads to a radioactive isotope | | | | | | | |
| 463 | **(b,d)**  2 hours = 4 half lives, therefore, amount left = 6.25% of original. Loss of one -particles does not change the atomic number | | | | | | | |
| 465 | **(a,d)**  Only the configuration of (a) and (d) follow Hund’s rule | | | | | | | |
| 466 | **(a,b,c)**  IE of hydrogen like species IE(H)  Radius of orbits in hydrogen like species is given by the relation | | | | | | | |
| 470 | **(a,c)**  Energy of electrons in th state eV  eV  For negative value of , will be, negative and for positive value of , it will also be positive | | | | | | | |
| 475 | **(a,b)**  Angular momentum =  For electron,  Angular momentum =  Or  Angular momentum | | | | | | | |