

- In a neutral atom, the number of electrons and protons are
  - equal
  - may or may not be equal
  - in 1:2 ratio
  - can't be predicted
- Proton was discovered by
  - J.J.Thomson
  - James Chadwick
  - Goldstein
  - Ernest Rutherford
- Neutron was discovered by
  - J.J.Thomson
  - Goldstein
  - James Chadwick
  - William Crookes
- The number of electrons, protons and neutrons present in  ${}_{13}\text{Al}^{27}$  respectively
  - 13, 13, 13
  - 13, 14, 15
  - 13, 13, 14
  - 13, 13, 27
- Which of the following pairs does not have same number of neutrons?
  - ${}_{7}\text{N}^{14}, {}_{8}\text{O}^{16}$
  - ${}_{9}\text{F}^{19}, {}_{10}\text{Ne}^{20}$
  - ${}_{11}\text{Na}^{23}, {}_{12}\text{Mg}^{24}$
  - ${}_{15}\text{P}^{31}, {}_{16}\text{S}^{32}$
- Which of the following pairs does not represent isobar?
  - ${}_{19}\text{K}^{40}, {}_{18}\text{Ar}^{40}$
  - ${}_{2}\text{He}^3, {}_{10}\text{He}^4$
  - ${}_{12}\text{Mg}^{24}, {}_{12}\text{Mg}^{25}$
  - both 'b' and 'c'
- W, X, Y, Z are 4 elements. Which among them are related to each other as isotopes.
  - ${}_{91}\text{W}^{230}, {}_{92}\text{X}^{235}, {}_{93}\text{Y}^{236}, {}_{92}\text{Z}^{238}$
  - ${}_{92}\text{X}^{235}, {}_{92}\text{Z}^{238}$
  - ${}_{91}\text{W}^{230}, {}_{92}\text{Z}^{238}$
  - ${}_{92}\text{Z}^{238}, {}_{93}\text{Y}^{230}$
  - ${}_{91}\text{W}^{230}, {}_{92}\text{Z}^{238}$
- Electronic configuration of sulphide ion ( $\text{S}^{2-}$ ) is
  - 2 8 6
  - 2 8 4
  - 2 8 8
  - 2 8 10
- Which of the following pairs are not isoelectronic?
  - $\text{CH}_4, \text{N}^{3-}$
  - $\text{O}_2^-, \text{Ar}$
  - $\text{CO}, \text{N}_2$
  - $\text{K}^+, \text{F}^-$
- Element X exist as two natural isotopes  ${}_{35}\text{X}^{79}$  and  ${}_{35}\text{X}^{81}$ . Percentage abundance of X-79 is 10% and X-81 is 90%. Find average mass of X.
  - 80.8
  - 80.1
  - 80
  - 80.3
- Boron exist as two naturally existing isotopes  ${}_{5}\text{B}^{10}$ ,  ${}_{5}\text{B}^{11}$ . The average atomic weight of Boron is 10.6. Calculate the % abundance of the isotopes respectively.
  - 40%, 60%
  - 36%, 64%
  - 36.67%, 63.33%
  - 40.22%, 59.78%
- The atom of an element has four electrons in the M-shell. What will be the name of that element.
  - sodium
  - magnesium
  - aluminium
  - silicon
- A ion  $\text{X}^{2-}$  contains ten electrons and eight neutrons. What is its atomic number and mass numbers?
  - 10, 17
  - 8, 17
  - 8, 16
  - 10, 16
- The number of neutrons present in isotopes of hydrogen Protium ( ${}^1_1\text{H}$ ), Deuterium ( ${}^2_1\text{H}$ ), Tritium ( ${}^3_1\text{H}$ ) are
  - 1, 2, 3
  - 0, 1, 2
  - 1, 1, 1
  - 1, 0, 2
- Naturally occurring chlorine is a mixture of two isotopes with mass numbers 35 and 37 respectively. These are found in 75% chlorine-35 and 25% chlorine-37 isotopes. What is the average atomic mass of chlorine?
  - 36.5
  - 35.5
  - 34.5
  - 33.5
- Which of the following correctly represents the electronic distribution in the Mg atom?
  - 3, 8, 1
  - 2, 8, 2
  - 1, 8, 3
  - 8, 2, 2
- Which of the following are true for an atom?
  - atomic number = number of protons + number of electrons
  - mass number = number of protons + number of neutrons
  - atomic mass = number of protons = number of electrons
  - atomic number = number of protons = number of electrons
  - i and ii
  - i and iii
  - ii and iii
  - ii and iv

18. Which of the following statement is always correct?  
 a) a neutral atom has equal number of electrons and protons  
 b) a neutral atom has equal number of electrons and neutrons  
 c) a neutral atom has equal number of protons and neutrons  
 d) a neutral atom has equal number of electrons, protons and neutrons
19. The pair  ${}_{92}^{235}\text{U}$ ,  ${}_{90}^{233}\text{Th}$  are  
 a) isotopes                      b) isobars                      c) isotones                      d) isoelectronic
20. The maximum number of electrons that can be present in M-shell  
 a) 8                      b) 18                      c) 32                      d) 2
21. Two nuclides X and Y are isotonic to each other with mass numbers 70 and 74 respectively. If atomic number of X is 34, then atomic number of Y would be  
 a) 32                      b) 34                      c) 36                      d) 38
22. The ratio between the neutrons in carbon and sulphur with respect to atomic masses 12 and 32 is  
 a) 3 : 4                      b) 3 : 8                      c) 4 : 3                      d) 8 : 3
23. Statement I:  ${}_{9}\text{F}^{19}$  and  ${}_{8}\text{O}^{18}$  are isotones  
 Statement II: The atoms of different elements having same mass number are known as isotones  
 a) both statement-I and II are correct and statement-II is correct explanation of statement-I  
 b) both statement-I and II are correct and statement-II is not correct explanation of statement-I  
 c) statement-I is correct and statement-II is incorrect  
 d) statement-I is incorrect and statement-II is incorrect
24. When does an atom become negatively charge  
 a) when an atom donate electrons                      b) when an atom accepts electrons  
 c) when an atom donates or accepts electrons                      d) none of the above
25. Number of e and p in  $\text{N}_3^-$   
 a) 20e, 21p                      b) 21e, 22p                      c) 22e, 21p                      d) 23e, 24p
26.  $\text{Al}^{3+}$  ion is formed by lose of \_\_\_\_\_ electrons.  
 a) 1                      b) 2                      c) 3                      d) 4
27. Which of the following pair is not isoelectronic  
 a)  $\text{F}^-$ , Ne                      b)  $\text{Fe}^{3+}$ , V                      c) CO, Si                      d)  $\text{N}_2$ , Al
28. Isotopes has different number of \_\_\_\_\_.  
 a) electron                      b) proton                      c) neutron                      d) all
29. The element x has two isotopes  ${}_8\text{X}^{16}$ ,  ${}_8\text{X}^{18}$  its average atomic mass is 16.2. Calculate the percentage of the isotopes of x.  
 a) 20%  $\text{x}^{16}$  80%  $\text{x}^{18}$                       b) 90%  $\text{x}^{16}$  10%  $\text{x}^{18}$                       c) 80%  $\text{x}^{16}$  20%  $\text{x}^{18}$                       d) 10%  $\text{x}^{16}$  90%  $\text{x}^{18}$
30. The mass of proton is the same as that of  
 a) carbon atom                      b) electron                      c) hydrogen ion                      d) oxygen atom
31. Atoms of different elements with same mass number are called  
 a) allotropes                      b) isobars                      c) isotope                      d) isotones
32. Maximum number of electrons that can be accommodated in 7<sup>th</sup> orbit  
 a) 49                      b) 50                      c) 98                      d) 100
33.  $\text{Mg}^{2+}$  ion is isoelectronic with  
 a)  $\text{Na}^+$                       b)  $\text{N}^{3-}$                       c)  $\text{Al}^{3+}$                       d) all of these
34. Number of protons in  ${}_{58}\text{Ce}^{142}$  is  
 a) 58                      b) 84                      c) 26                      d) 142
35. Mass of electron is  
 a)  $9.1094 \times 10^{-31}\text{kg}$                       b)  $1.66 \times 10^{-27}\text{kg}$                       c)  $5.5 \times 10^{-4}\text{amu}$                       d) (a) and (c)
36.  $\text{He}^{2+}$  ion has  
 a) 2 electrons                      b) 2 protons                      c) 2 neutrons                      d) both b and c

37. The maximum number of electrons that can be present in nth orbit is given by  
 a) n                                      b)  $n^2$                                       c)  $2n^2$                                       d)  $3n^2$
38. Electronic configuration of potassium ion is  
 a) 2, 8, 8, 1                              b) 2, 8, 8, 2                              c) 2, 8, 8                                      d) 2, 8
39. The ratio between the number of neutrons in C-12, C-13, C-14 is:  
 a) 6:7:8                                      b) 6:8:7                                      c) 7:8:6                                      d) 8:6:7
40. The number of neutrons in protium is  
 a) 0                                              b) 1                                              c) 2                                              d) 3
41. The number of neutrons in  ${}_1\text{H}^1$   ${}_{17}\text{Cl}^{35}$  is  
 a) 19                                              b) 18                                              c) 17                                              d) 36
42. Identify the pair of isotons  
 a)  ${}_7\text{N}^{15}$ ,  ${}_7\text{N}^{14}$                               b)  ${}_{10}\text{Ne}^{20}$ ,  ${}_{11}\text{Na}^{23}$                               c)  ${}_{18}\text{Ar}^{40}$ ,  ${}_{20}\text{Ca}^{40}$                               d)  ${}_5\text{B}^{11}$ ,  ${}_6\text{C}^{12}$
43. Mass number of an atom is equal to  
 a) number of proton                      b) number of neutrons                      c) number of electrons                      d) number of nucleons
44. Find the odd one out  
 a) protium                                      b) deuterium                                      c) natrium                                      d) tritium
45. X and Y are isobars. Atomic number of X is 18 and mass number is 40. Atomic number of Y is 20. Calculate the number of neutrons in Y.  
 a) 22                                              b) 21                                              c) 20                                              d) 18
46. Which of the following species are isoelectronic?  
 i)  $\text{N}^{3-}$ ,  $\text{Al}^{3+}$ ,  $\text{O}^{2-}$                       ii)  $\text{N}^{3-}$ ,  $\text{O}_2^-$ ,  $\text{Al}^{3+}$                       iii)  $\text{H}_2^+$ ,  $\text{Li}^{+2}$ ,  $\text{Be}^{3+}$                       iv)  $\text{CN}^-$ ,  $\text{CO}$ ,  $\text{N}_2$   
 a) i, ii, iii                                      b) i, iii, iv                                      c) iii, ii, iv                                      d) i, ii, iv
47. Maximum number of electron can be present in the 5<sup>th</sup> orbit is  
 a) 8                                                  b) 18                                                  c) 32                                                  d) 50
48. The atomic mass of Lead is 208 and its atomic number is 82. The atomic mass of bismuth is 209 and its atomic number is 83. The ratio of neutron/protons number in the atom.  
 a) higher of Pb                              b) higher of Bi                              c) same                                          d) none of these
49. If three neutrons are added to the nuclei of  ${}_{92}\text{U}^{235}$  the new particle have an atomic number of  
 a) 89                                                  b) 95                                                  c) 90                                                  d) 92
50. Nitrogen has atomic number 7 and oxygen has atomic number 8. The total number of electrons in  $\text{NO}_3^-$  ion  
 a) 15                                                  b) 32                                                  c) 31                                                  d) 46
51. What is the ratio between the number of neutrons of  ${}_6\text{C}^{12}$  &  ${}_{14}\text{Si}^{28}$   
 a) 1 : 2                                                  b) 3 : 7                                                  c) 4 : 3                                                  d) 6 : 7
52. How many electrons and protons are present in  $\text{ClO}_3^-$  ion. Atomic number of Cl = 17 and O = 8  
 a) 15p 16e                                      b) 21p 22e                                      c) 41p 42e                                      d) 31p 32 e
53. Write the symbols for the following atoms  
 a) 5 protons, 6 neutrons                                                                                      b) 17 electrons, 18 neutrons  
 c) 7 protons, 7 neutrons                                                                                      d) 25 protons, 30 neutrons  
 e) 27 electrons, 32 neutrons
54. Silicon has three naturally existing isotopes  $\text{Si}^{28}$ ,  $\text{Si}^{29}$ ,  $\text{Si}^{30}$ . The percentage of  $\text{Si}^{29}$  is 4.5%. If average atomic mass of Si is 28.6. What is the percentage of other two isotopes.
- 55.
- |                     | X  | Y  | Z  |
|---------------------|----|----|----|
| Number of electrons | 5  | 6  | 6  |
| Protons             | 5  | 6  | 6  |
| Mass number         | 11 | 12 | 13 |
- Find the relationship between these atoms.
56. Bromine exists naturally as two isotopes Br – 79(20%) and  $\text{Br}^{81}$  (80%) . Calculate the average atomic mass of bromine.

57. A and B are two atoms such that A has 17-protons and 18-neutrons. B has 17 protons and 20 neutrons. How many electrons should be added or removed from each A and B to be isoelectronic with argon.

58. MATCH THE FOLLOWING

Column I		Column II	
1) Isotopes	[     ]	A)	$1.675 \times 10^{27} \text{ Kg}$
2) Isobars	[     ]	B)	${}_{19}\text{K}^{39}, {}_{20}\text{Ca}^{40}$
3) Isotones	[     ]	C)	${}_{14}\text{Si}^{28}, {}_{14}\text{Si}^{29}, {}_{14}\text{Si}^{30}$
4) Charge of electron	[     ]	D)	${}_{18}\text{Ar}^{40}, {}_{20}\text{Ca}^{40}$
5) Mass of neutron	[     ]	E)	$-1.602 \times 10^{19} \text{ C}$

**KEY**

1. A	2. C	3. C	4. C	5. A
6. D	7. A	8. C	9. D	10. A
11. C	12. B	13. C	14. B	15. B
16. B	17. D	18. A	19. D	20. B
21. D	22. B	23. C	24. B	25. C
26. C	27. D	28. C	29. B	30. C
31. B	32. C	33. D	34. A	35. D
36. D	37. C	38. C	39. A	40. A
41. B	42. D	43. D	44. C	45. C
46. B	47. D	48. A	49. D	50. B
51. B	52. C			

53. (a)  ${}_5\text{B}^{11}$ , (b)  ${}_{17}\text{Cl}^{35}$ , (c)  ${}_7\text{N}^{14}$ , (d)  ${}_{25}\text{Mn}^{55}$ , (e)  ${}_{27}\text{Co}^{59}$

54.  $\text{Si}^{28}$  – 67.25%,  $\text{Si}^{29}$  – 4.5%,  $\text{Si}^{30}$  – 27.25%

55. x,y-isotones; y,z-isotopes; x,z-isodiaphers

56. 80.6

57. one

58. 1-C, 2-D, 3-B, 4-E, 5-A