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| **A close-up of a sign  Description automatically generated** | | | |
| **PT2/CHAK/1123/B 25-SEP-2023** | | | |
| **PERIODIC TEST 2 (2023-24)** | | | |
| **Subject: CHEMISTRY (ANSWER KEY)**  **Grade: XI** | | Max. Marks:35Time:1Hr15mts | |
|  | **SECTION A** | | |
| 1 | (c) Orientation of orbitals | | 1 |
| 2 | (c) Spin quantum number | | 1 |
| 3 | (d) The position and velocity of the electrons in the orbit cannot be determined simultaneously. | | 1 |
| 4 | C: A is true but R is false | |  |
| 5 | (a) Electron > hydrogen > helium > neon | | 1 |
|  | **SECTION B** | |  |
| 6. |  | | 2 |
| 7 | i)n =3, l= 2, m=+1, =3d=n+l=3+2=5  ii) n =4, l =0, m= 0 =4s=4+0=4  3d has more energy then 4s | | 2 |
| 8 |  | | 2 |
| 9 | Frequency =     ∴ Wavelength  = 3X108 / 5X 1016  Wave number =   Wave number = 1.6 X 108 m-1 | | 2 |
| 10. | a) Cu =1s2 2s2 2p6 3s2 3p6 3d10 4s1   1. Mn +2 =1s2 2s2 2p6 3s2 3p6 3d5 | | 2 |
| 11 | a)  Draw the resonating structure of C6H5NO2 and C6H5OH .  b)  -OH- , --Cl- Nucleophile  --CH3 + , --BF3 , Electrophile | | 2  1 |
| 12 | A math equations and formulas  Description automatically generated | | 3 |
| 13 | ii) Balmer series | | 2  1 |
| 14 | a) Electronic configuration of Cr is [Ar]3d5 4s1, instead of the expected [Ar]3d4 4s2. This is so because half filled d orbitals have extra stability. So in case of Cr, one electron from the 4s orbital goes to the 3d orbital to make it half filled, and Cr attains extra stable state.  b)4s orbital is filled first because it has lower energy. The energies of the orbitals can be compared by their n + l values. For 4s orbital, n +l(4 + 0) value is 4 while for 3d orbital, n + l (3 + 3) value is 5. Therefore 4s orbital is filled before 3d orbital.  c)According to Hund's rule, electron pairing in p,d, and f subshells cannot occur unit each orbital of a given subshell contains one electron each or is singly occupied. or if two or more orbitals of equal energy are available, electrons will occupy them singly before filling them | | 3 |
| 15 | a) A nodal surface is an area of space where the probability of finding an electron are zero.  b)  c) (i) 1s (ii) 3p | | 3 |
|  |  | |  |
| 16 | 1. **Heisenberg’s uncertainty principle** states that it is impossible to measure or calculate exactly both the position and the momentum of an object. This principle is based on the wave-particle duality of matter. 2. Hunds rule-pairing of electrons in the orbitals belonging to the same subshell does not occur unless each orbital belonging to that subshell has got one electron each. | | 1  1  1  1  1 |

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