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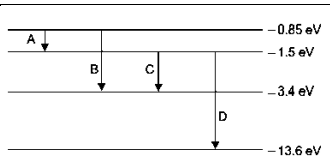
SUB:-PHYSICS CLASS XII 2022-23
REVISION PAPER UNIT- XII–ATOMS

Note: Q. No. 1-4 is of 01 mark each, Q. 5-6 is of 02 marks each, Q.No.7 is of 03 marks, Q. No. 8 is a case study based and is of 04 marks, Q. No. 11 is of 5 marks.

SN	Question	MM
1	When an electron in an atom goes from a lower to a higher orbit, its (a) kinetic energy (KE) increases, potential energy (PE) decreases (b) KE increases, PE increases (c) KE decreases, PE increases (d) KE decreases, PE decreases	1
2	**Assertion (A):** Bohr postulated that the electrons in stationary orbits around the nucleus do not radiate. **Reason (R):** According to classical Physics, all moving electrons radiate. a- Both assertion and reason are correct and the reason is the correct explanation of assertion. b- Both assertion and reason are correct and reason is not a correct explanation of assertion. c- Assertion is correct but the reason is incorrect. d- Assertion is incorrect but the reason is correct.	1
3	A set of atoms in an excited state decay. (a) in general, to any of the states with lower energy. (b) into a lower state only when excited by an external electric field. (c) all together simultaneously into a lower state. (d) to emit photons only when they collide.	1
4	The simple Bohr model cannot be directly applied to calculate the energy levels of an atom with many electrons. This is because (a) of the electrons not being subject to a central force (b) of the electrons colliding with each other (c) of screening effects (d) the force between the nucleus and an electron will no longer be given by Coulomb's law	1
5	Write two important limitations of Rutherford nuclear model of the atom.	2
6	Find out the wavelength of the electron orbiting in the ground state of hydrogen atom.	2
7	The energy level diagram of an element is given below. Identify, by doing necessary calculations, which transition corresponds to the emission of a spectral line of wavelength 102.7 nm. 	3
	Case study-based questions (questions no 8- 11) Line Spectra of the Hydrogen Atom The spectral series of hydrogen atom were accounted for by Bohr using the relation $\vec{\nu} = R\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$ where R = Rydberg constant = 1.097×10^7 m^{-1} Lyman series is obtained when an electron jumps to first orbit from any subsequent orbit. Similarly, Balmer series is obtained when an electron jumps to 2nd orbit from any subsequent orbit, Paschen series is obtained when an electron jumps to 3rd orbit from any subsequent orbit. Whereas Lyman series lies in U.V. region, Balmer series is in visible region and Paschen series lies in infrared region. Series limit is obtained when $n_2 = \infty$ 8. Find the wavelength of first spectral line of Lyman series. 1 9. Name the region in which Paschen series found. 1	4

	10. What is the ratio of maximum to minimum wavelength in Lyman series? 2 OR 10. What is the ratio of maximum to minimum wavelength in Balmer series? 2	
11	Using Rutherford model of the atom, derive the expression for the total energy of the electron in hydrogen atom. What is the significance of total negative energy possessed by the electron?	5