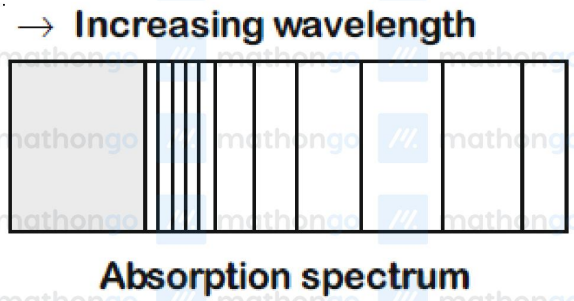
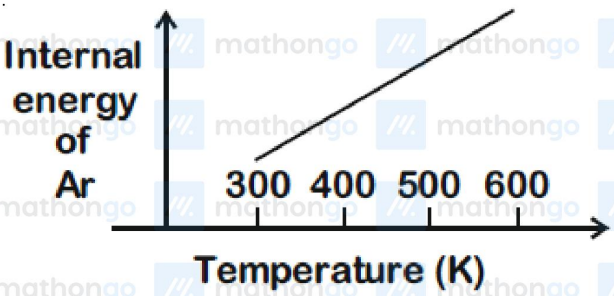
Q1 JEE Main 2020 - 2 September (Morning)

The figure that is not a direct manifestation of the quantum nature of atoms is

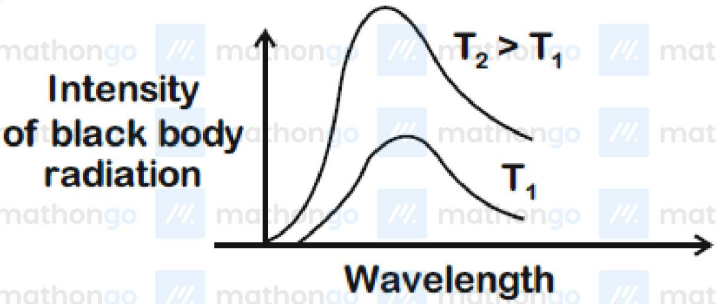
(A)



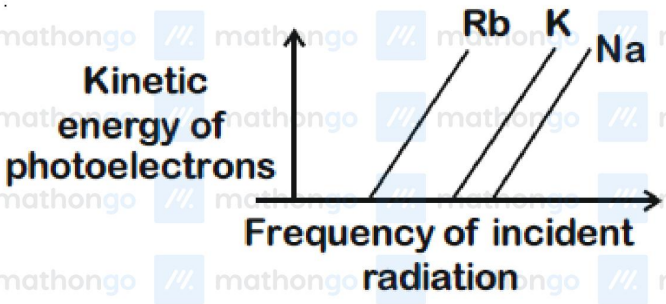
(B)



(C)



(D)



Q2 JEE Main 2020 - 2 September (Evening)

The number of subshells associated with $\mathrm{n}=4$ and $\mathrm{m}=-2$ quantum numbers is

(A) 2
(B) 8
(C) 4
(D) 16

Q3 JEE Main 2020 - 2 September (Evening)

The work function of sodium metal is $4.41 \times 10^{-19} \mathrm{J}$. If photons of wavelength $300 \mathrm{nm}$ are incident on the metal, the kinetic energy of the ejected electrons will be $\left(h=6.63 \times 10^{-34} \mathrm{Js}; c=3 \times 10^{8} \mathrm{m/s}\right)$ _____ $\times 10^{-21} \mathrm{J}$

Q4 JEE Main 2020 - 3 September (Evening)

Consider the hypothetical situation where the azimuthal quantum number, l, takes value 0,1 , $2, \ldots \mathrm{n}+1$, where n is the principal quantum number. Then, the element with atomic number

(A) 9 is the first alkali metal
(B) 6 has a $2p$ -valence subshell
(C) 8 is the first noble gas
(D) 13 has a half-filled valence subshell

Q5 JEE Main 2020 - 4 September (Morning)

The region in the electromagnetic spectrum where the Balmar series lines appear is

(A) Microwave
(B) Ultraviolet
(C) Visible
(D) Infrared

Q6 JEE Main 2020 - 4 September (Evening)

The shortest wavelength of H atom in the Lyman series is λ_1. The longest wavelength in the Balmar series of He^{+} is

(A) $\frac{5\lambda_1}{9}$
(B) $\frac{36\lambda_1}{5}$
(C) $\frac{27\lambda_1}{5}$
(D) $\frac{9\lambda_1}{5}$

Q7 JEE Main 2020 - 5 September (Morning)

In the sixth period, the orbitals that are filled are

(A) $6\mathrm{s}, 4\mathrm{f}, 5\mathrm{d}, 6\mathrm{p}$
(B) $6\mathrm{s}, 5\mathrm{d}, 5\mathrm{f}, 6\mathrm{p}$
(C) $6\mathrm{s}, 6\mathrm{p}, 6\mathrm{d}, 6\mathrm{f}$
(D) $6\mathrm{s}, 5\mathrm{f}, 6\mathrm{d}, 6\mathrm{p}$

Q8 JEE Main 2020 - 5 September (Evening)

The correct statement about probability density (except at infinite distance from nucleus) is

(A) It can never be zero for $2\mathrm{s}$ orbital
(B) It can be zero for $3p$ orbital
(C) It can be zero for 1 s orbital
(D) It can be negative for $2p$ orbital

Q9 JEE Main 2020 - 7 January (Morning)

The number of oribtals associated with quantum number $n = 5,\ m_s = +\frac{1}{2}$

(A) 25
(B) 30
(C) 50
(D) 35

Q10 JEE Main 2020 - 7 January (Morning)

Amongst the following which is not a postulate of Dalton's atomic theory

(A) Matter is formed of indivisible atoms

(B) When gases combine or reproduced in a chemical reaction they do so in a simple ratio by volume provided all gases are at the same T & P.
(C) During chemical reactions atoms remains conserved and only pass through rearrangement
(D) Some atoms have same properties including atomic mass

Q11 JEE Main 2020 - 8 January (Morning)

For the Balmer series in the spectrum of for H-atom $\bar{v} = R_H \left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$
Select the correct options regarding this formula for Balmer series.

(a) The integer n_1 is equal to $= 2$

(b) Ionization energy of H atom can be calculated from wave number of these lines.

(c) The lines of longest wavelength corresponds to $n_2 = 3$.

(d) If λ decreases then spectrum lines will converse.

(A) $A,\ B$
(B) $C,\ D$
(C) A & C & B
(D) $A,\ B,\ C$ & D

Q12 JEE Main 2020 - 8 January (Evening)

The radius of the second Bohr orbit, in terms of the Bohr radius, a_0, in Li^{2+} is

(A) $\frac{3a_0}{4}$
(B) $\frac{4a_0}{3}$
(C) $\frac{a_0}{3}$
(D) $\frac{16a_0}{9}$

Q13 JEE Main 2020 - 9 January (Morning)

The de Broglie wavelength of an electron in the 4^{th} Bohr orbit is

(A) $4\pi a_0$
(B) $2\pi a_0$
(C) $8\pi a_0$
(D) $6\pi a_0$

Q14 JEE Main 2020 - 9 January (Evening)

The correct order of the spin-only magnetic moments of the following complexes is :

(I) $\left[Cr(H_2O)_6\right]Br_2$
(II) $Na_4\left[Fe(CN)_6\right]$
(III) $Na_3\left[Fe(C_2O_4)_3\right]\ (\Delta_0 > P)$
(IV) $(Et_4N)_2\left[CoCl_4\right]$

(A) $(III) > (I) > (IV) > (II)$
(B) $(III) > (I) > (II) > (IV)$
(C) $(I) > (IV) > (III) > (II)$
(D) $(II) \approx (I) > (IV) > (III)$

Answer Key

Q1 (B) **Q2** (B) **Q3** (222) **Q4** (D)
Q5 (C) **Q6** (D) **Q7** (A) **Q8** (B)
Q9 (A) **Q10** (B) **Q11** (C) **Q12** (B)
Q13 (C) **Q14** (C)