(42) J-Mains

$$\frac{1}{2}\frac{m^2v^2}{m} = \frac{1}{2}\frac{p^2}{m} = \frac{hc}{\lambda} - \phi$$

$$\frac{1}{2}\frac{(1.5p)^2}{m} = \frac{hc}{\lambda_2} - \phi$$

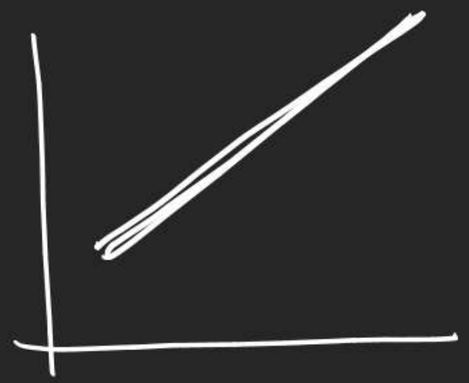
(41) $n+\ell$ rule

(43) ——→

$$h\nu = 13.6\, z^2\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$$

(B)

(42)



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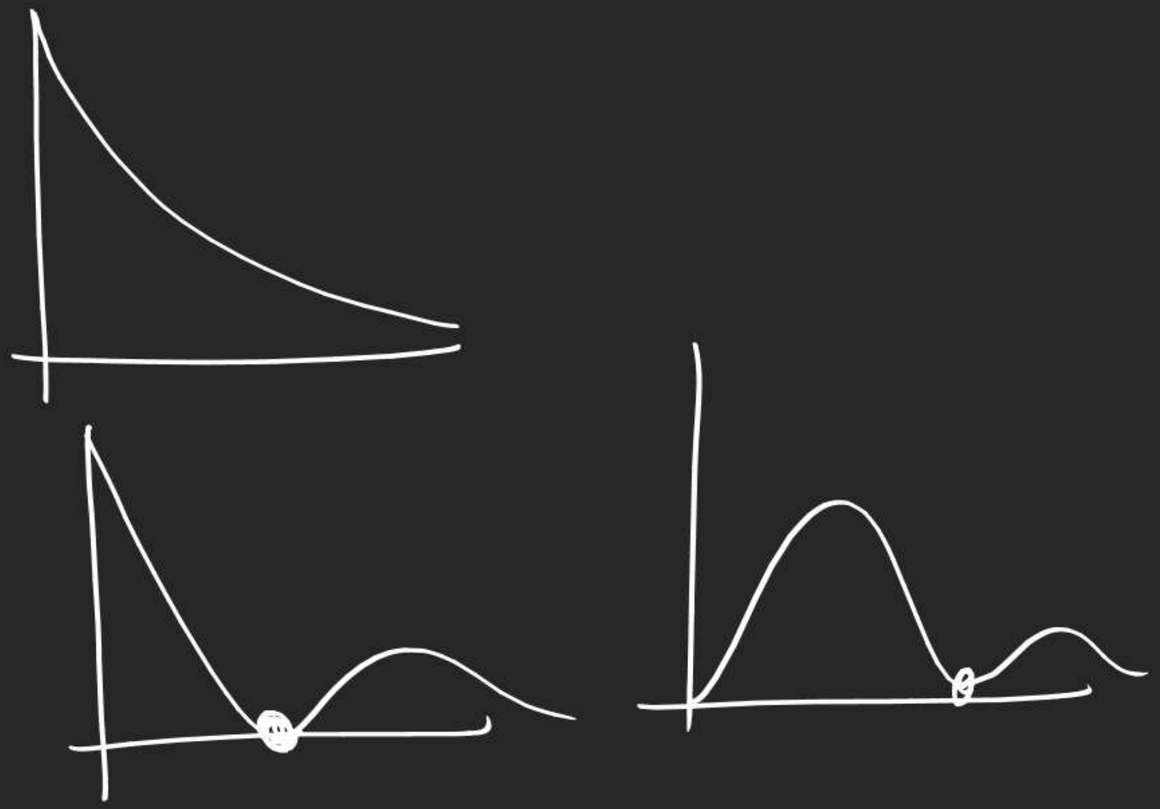

55 D

$$F = \frac{kZe^2}{r^2}$$

$$= \frac{kZe^2}{n^4/Z^2}$$

55

$$f = \frac{v}{2\pi r} \frac{Z/n}{n^2/2}$$

Z^2/n^3

$$\overset{0}{Cl_2} \longrightarrow \overset{-1}{Cl^-} + \overset{+5}{ClO_3^-}$$

$$\overset{-1}{H_2O_2} \longrightarrow \overset{-2}{H_2O} + \overset{0}{O_2}$$

(13) $$\overset{-3}{(NH_4)_2}\overset{6}{Cr_2O_7} \longrightarrow \overset{0}{N_2} + \overset{+3}{Cr_2O_3} + 4H_2O$$

(11 A) $$\overset{-1}{H_2O_2} + \overset{-2}{KOH}$$

$$KH\overset{-1}{O_2} \qquad \overset{-2}{H_2O}$$

(15) $$Cl_2 + \underline{H_2O_2} \rightarrow HCl + O_2$$

Type-1 Redox Rxn :→ Only one element undergoes oxidⁿ and one other element in other compound undergoes redⁿ

$$\overset{+1}{K}\overset{+7}{Mn}O_4 + \overset{+3}{H_2C_2O_4} + \overset{-1}{HCl} \rightarrow \overset{+2}{MnCl_2} + \overset{+4}{CO_2} + \overset{+1}{K}\overset{-1}{Cl} + H_2O$$

$$\left[\overset{+7}{KMnO_4} \longrightarrow \overset{+2}{MnCl_2}\right]_{\text{change } 5} \times 2 \qquad \left[\overset{+3}{H_2C_2O_4} \longrightarrow 2\overset{+4}{CO_2}\right]_{\text{change } 2} \times 5$$

$$2KMnO_4 + 5H_2C_2O_4 + 6HCl \longrightarrow 2MnCl_2 + 10CO_2 + 2KCl + 8H_2O$$

Step-1 Identify the elements undergoing oxidⁿ or redⁿ.

Step-2 Write separate half rxn

Step-3 Balance the element undergoing oxidⁿ or redⁿ.

Step-4 Calculate change in O.No.

Step-5 Multiply each rxn by suitable factor so that change in O.No becomes equals in each half rxn. and again combine them.

Step-6 Balance the elements other than 'H' & 'O'.

Step-7 Add required no H_2O to the side deficient in 'O' atom

Step-8 Add H^+ to the side deficient in H-atom.

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Q. $\overset{+6}{Cr_2O_7^{2-}} + \overset{+8/3}{Fe_3O_4} + H^+ \longrightarrow \overset{+3}{Cr^{3+}} + \overset{+3}{Fe_2O_3} + H_2O$

$Cr_2O_7^{2-} \longrightarrow 2Cr^{3+}$ (+6 → +6, change 6)

$2Fe_3O_4 \longrightarrow 3Fe_2O_3$ (8/3 × 6 = 16 → 18, change 2) × 3

$Cr_2O_7^{2-} + 6Fe_3O_4 \longrightarrow 2Cr^{3+} + 9Fe_2O_3 + 4H_2O$

~~$8H_2O$~~ ~~$+ 8H^+ + 8OH^-$~~ $4H_2O$ $+ 8OH^-$

$$Cr_2O_7^{2-} + 6Fe_3O_4 + 4H_2O \longrightarrow 2Cr^{3+} + 9Fe_2O_3 + 8OH^-$$

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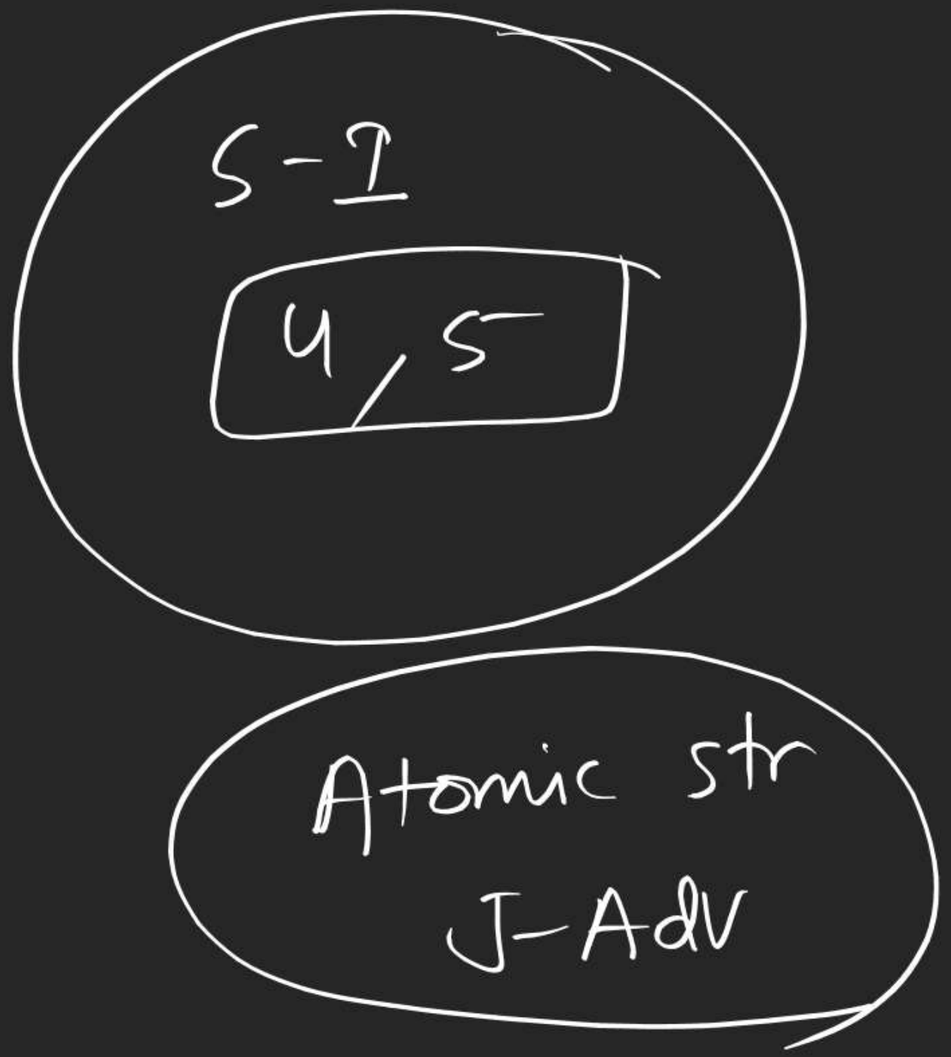

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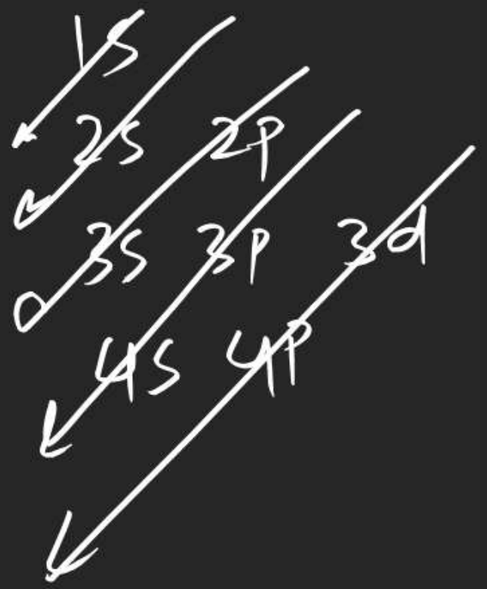
I 6

II 5

III 5

IV 4



$(IV) < II < III < I$

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