Previous Year JEE Problems

According to Bohr's theory,
E_n = Total energy K_n = Kinetic energy
V_n = Potential energy r^n = Radius of nth orbit
Match the following : **(2006, 6M)**

	Column I		Column II
A.	$V_n/K_n = ?$	p.	0
B.	If radius of nth orbit $\propto E_n^x$, $x = ?$	q.	– 1
C.	Angular momentum in lowest orbital	r.	– 2
D.	$\frac{1}{r^n} \propto Z^y$, $y = ?$	s.	1

Ans :

A. $V_n = -\frac{1}{4\pi\varepsilon_0}\left(\frac{Ze^2}{r}\right)$

$K_n = \frac{1}{8\pi\varepsilon_0}\left(\frac{Ze^2}{r}\right)$

$\Rightarrow \quad \frac{V_n}{K_n} = -2 \text{ — (r)}$

B. $E_n = -\frac{Ze^2}{8\pi\varepsilon_0 r} \propto r^{-1}$

$\Rightarrow \quad x = -1 \text{ — (q)}$

C. Angular momentum $= \sqrt{l(l+1)}\,\frac{h}{2\pi} = 0$ in 1s-orbital — (p).

D. $r_n = \frac{a_0 n^2}{Z} \Rightarrow \frac{1}{r_n} \propto Z$ — (s)