Angular Wave Function

Course on Atomic Structure for Class XI

akhilesh • Lesson 15 • Sept 22, 2021

(1) $R = R_0 (A)^{1/3}$

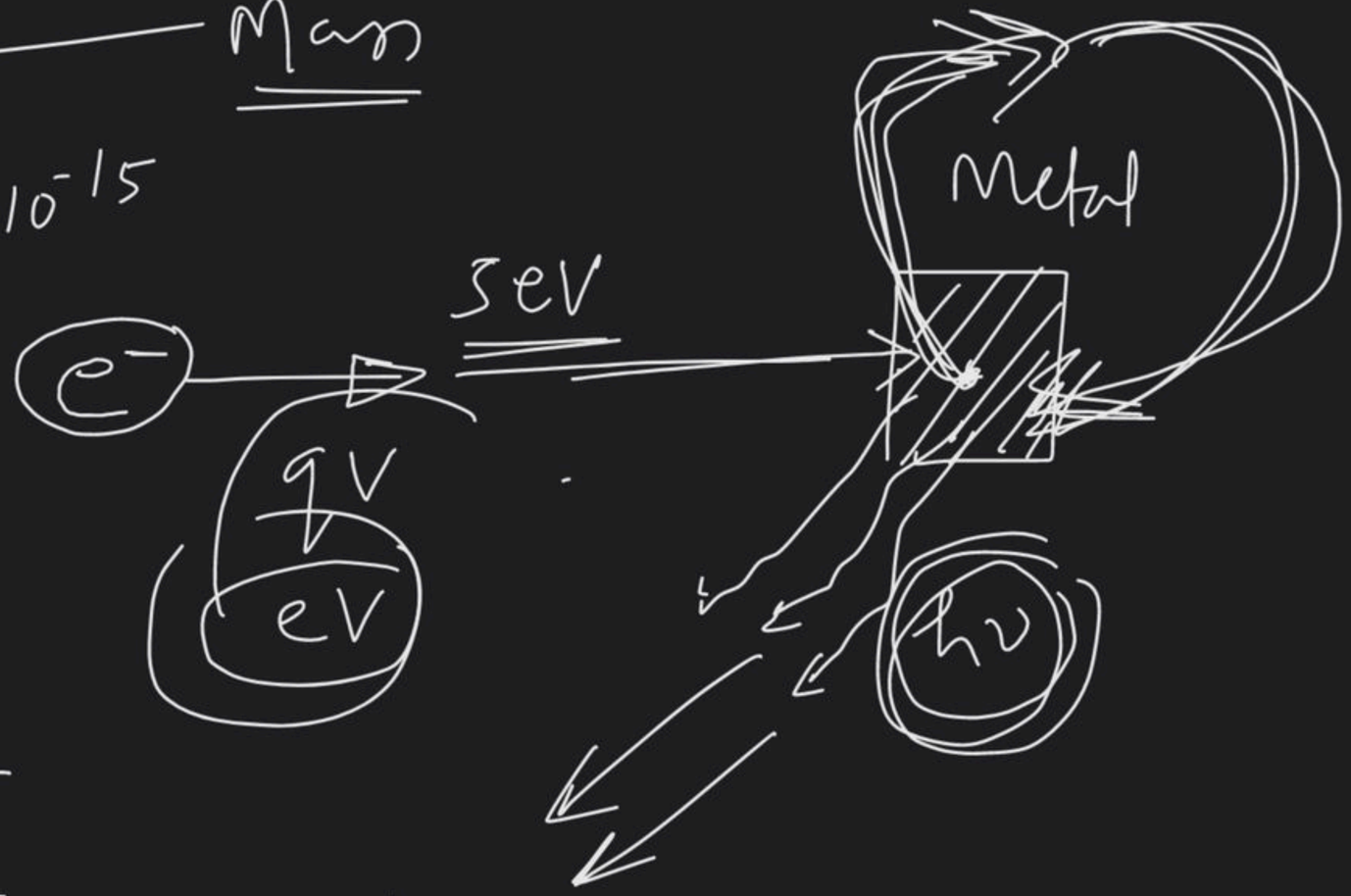
R ← Radius of Nucleus

R_0 ← 1.33×10^{-15}

A ← Mass

(11)

(4)



2000 volt

2000 eV $= \frac{hc}{\lambda} = \frac{1240 \text{ nm}}{\lambda}$

(13) $5080 = \lambda_2$

$\lambda_1 = 4530\,A^\circ$

$$\left(\frac{hc}{\lambda_2} \times \eta_2\right) = \left(\frac{hc}{\lambda_1}\right) \times \eta_1 \times 0.47$$

↳ photon

20%

Quantum yield = $\frac{\text{no. of } e^- \text{ ejected}}{\text{no. of photon striked}} \times 100$

0.2%

H—I

0.01 mol

0.05 mol photons

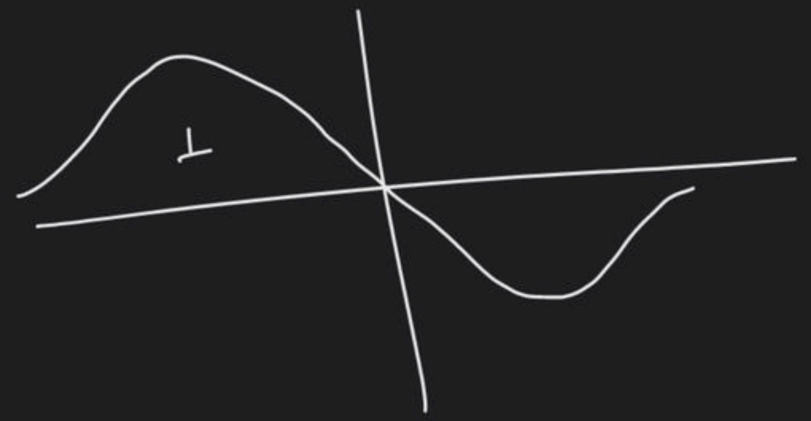
$$\sigma^2 - 6\sigma + 6 = 0$$

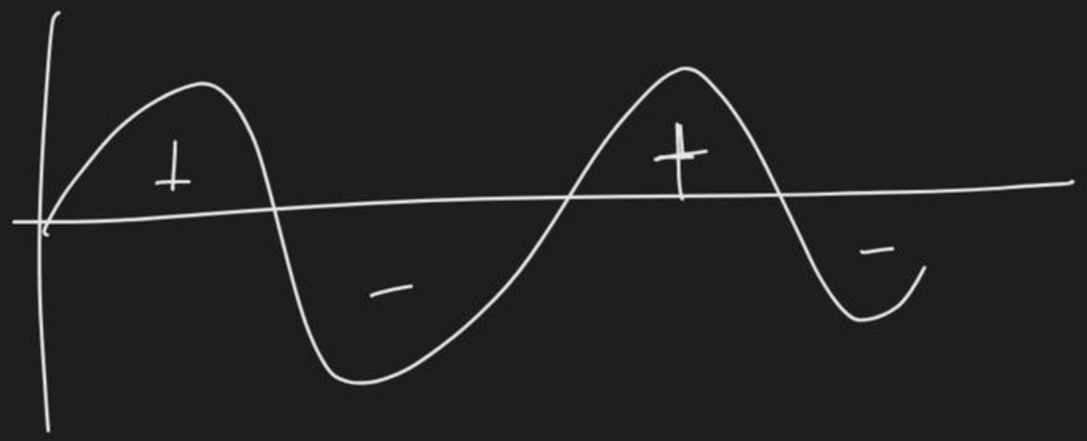
$$\sigma = \frac{6 \pm \sqrt{36 - 24}}{2}$$

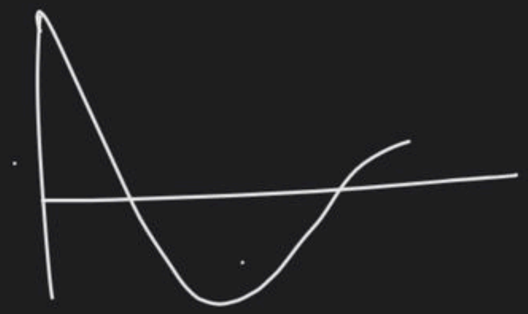
$$\frac{2r}{3a_0} = 3 \pm \sqrt{3}$$

$$r = \frac{3}{2}(3 \pm \sqrt{3})\, a_0$$

(63) $\hbar = \frac{h}{2\pi}$







14

$\frac{n(n-1)}{2}$

4s — 1s

4p — 1s

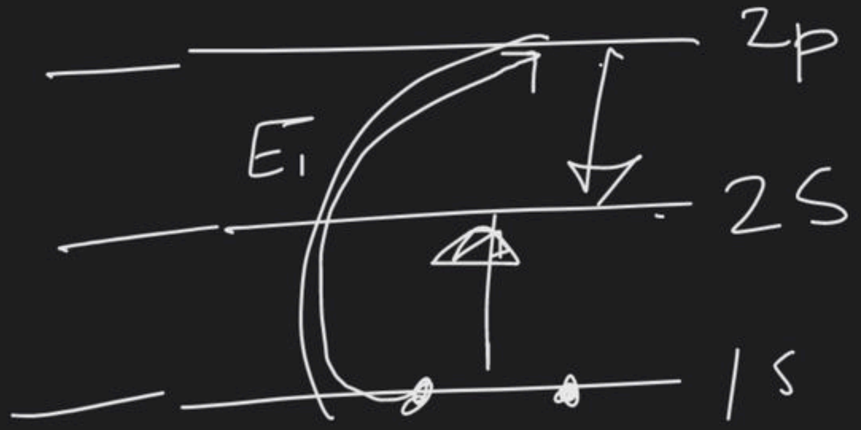
4s → 1s

l

1s

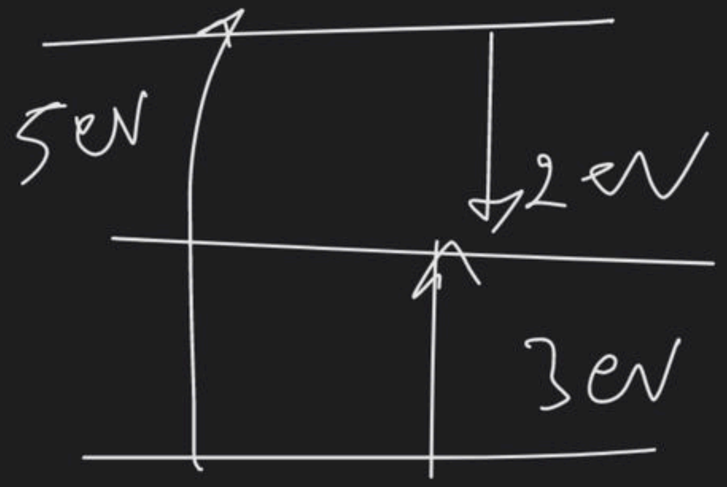
4 → 2

$\lambda = 58.44\,nm = E_1$



$4857\,cm^{-1} = \frac{1}{\lambda}$

$\frac{hc}{\lambda}$



(15) x^0 (____) (3S)

A = 3

B = 0

C = 0

D = 3

$(n+s^-)s$ to $(n+s^-)p$

8s 8p

→ 4s 3d 4p

→ 5s 4d 5p

→ 6s 5d 4f 6p

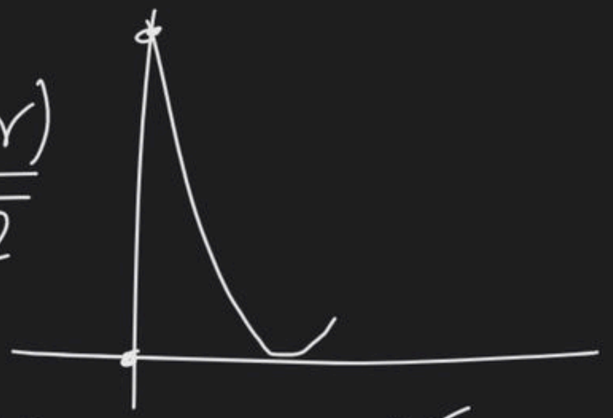
8s 7d 6f 5g 8p

ns , (n-1) d , (n-2) f , (n-3) g ---- np

s1 , s-n , o-r

for 's' orbital

$\frac{R^2(r)}{} = \psi^2$



10^{-15}

Probability density at nucleus is maximum.

Probability = $\psi^2 dv$

at nucleus is negligible (or zero) because of small size of nucleus

Orbital angular momentum $= \frac{h}{2\pi}\sqrt{l(l+1)}$ l, m

Spin angular momentum $= \frac{h}{2\pi}\sqrt{s(s+1)}$

$s = 1/2$ $\quad -1/2$

orbit angular momentum $= n\frac{h}{2\pi}$

3p, 4d, 5f

Paragraph for questions 14 to 16

1s, 2s, 3s

$S_1 = 2s$

The hydrogen-like species Li^{2+} is in a spherically symmetric state S_1 with one radial node. Upon absorbing light the ion undergoes transition to a state S_2. The state S_2 has one radial node and its energy is equal to the ground state energy of the hydrogen atom. **[JEE 2010]**

9. The state S_1 is :-

(A) 1s (B) 2s (C) 2p (D) 3s

3p

10. Energy of the state S_1 in units of the hydrogen atom ground state energy is :-

2s

9/4

(A) 0.75 (B) 1.50 (C) 2.25 (D) 4.50

11. The orbital angular momentum quantum number of the state S_2 is :-

(A) 0 (B) 1 (C) 2 (D) 3

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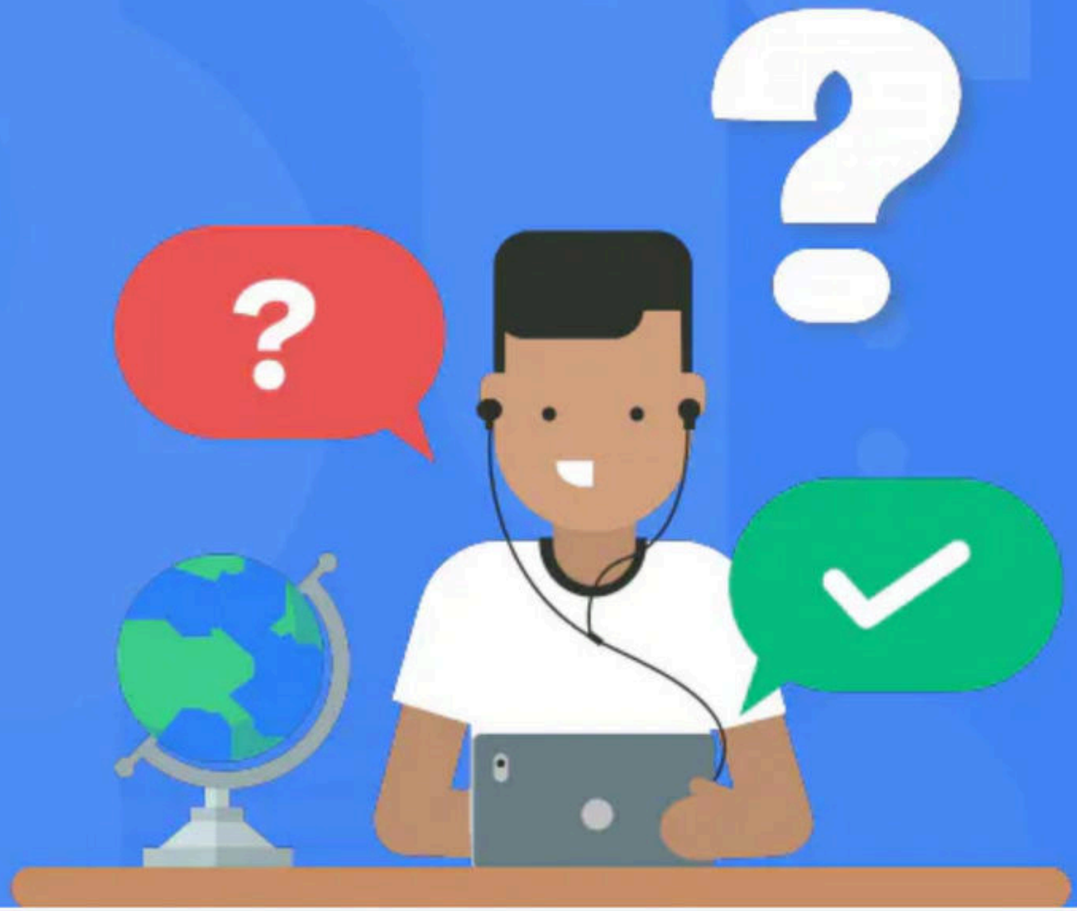
Ask a Doubt



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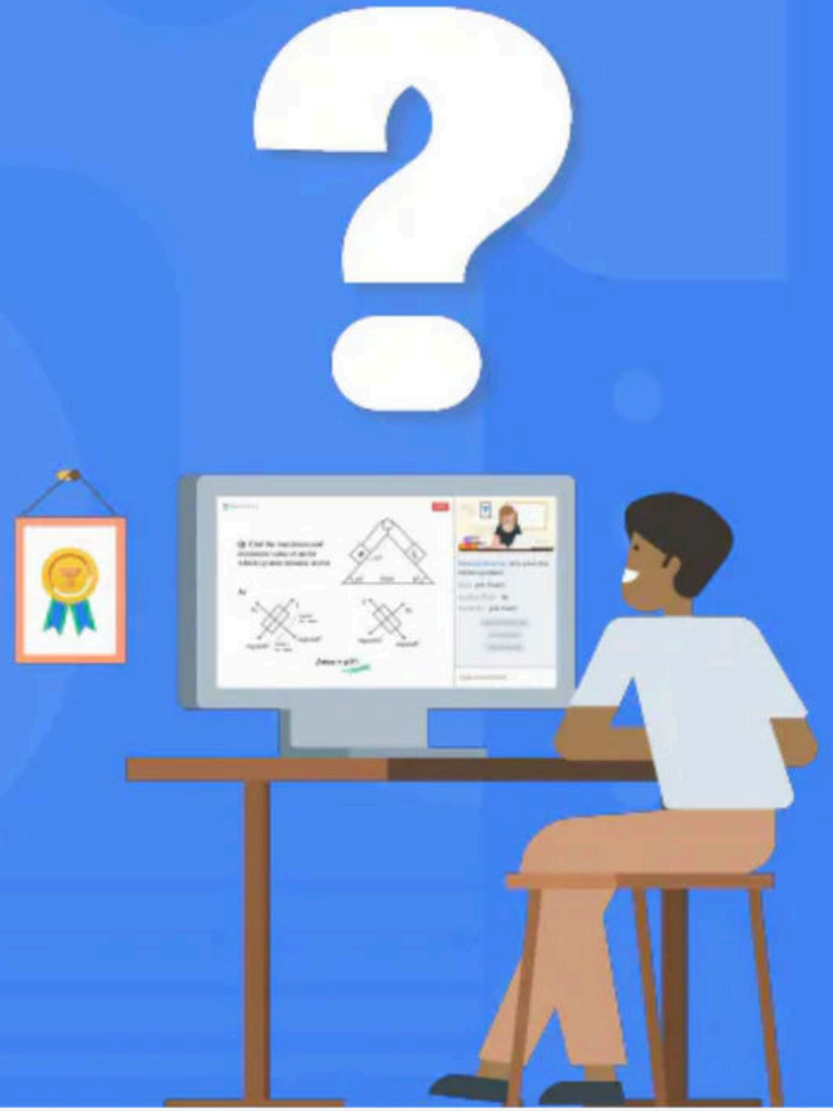
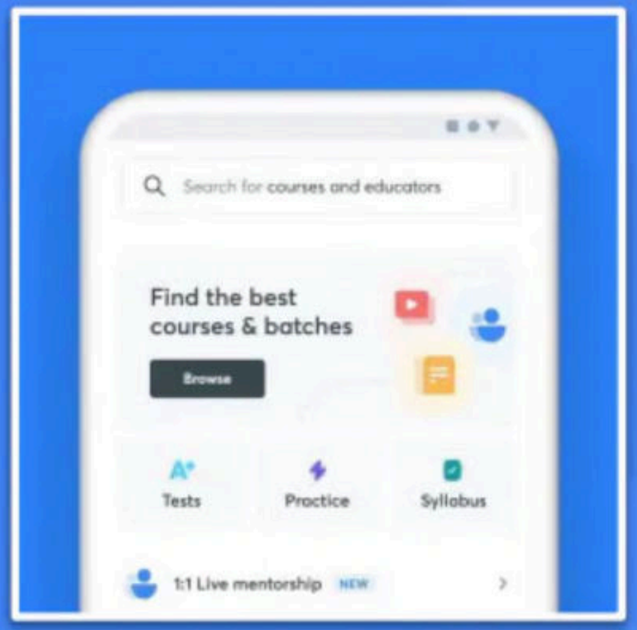
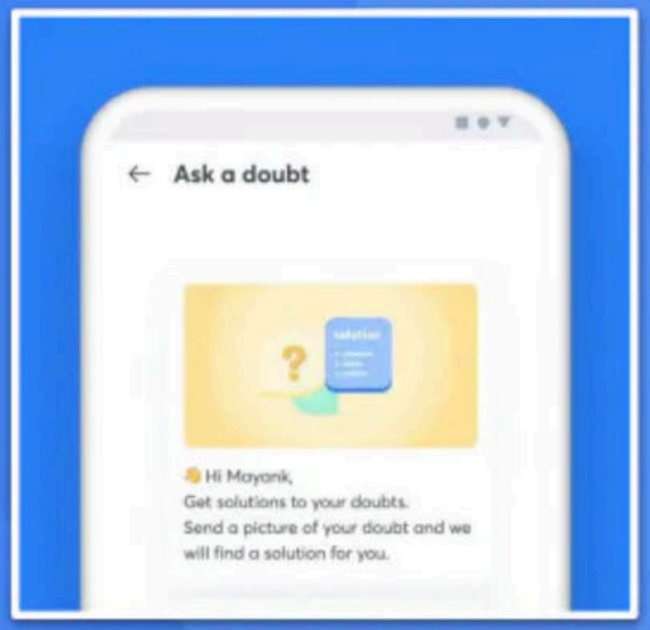


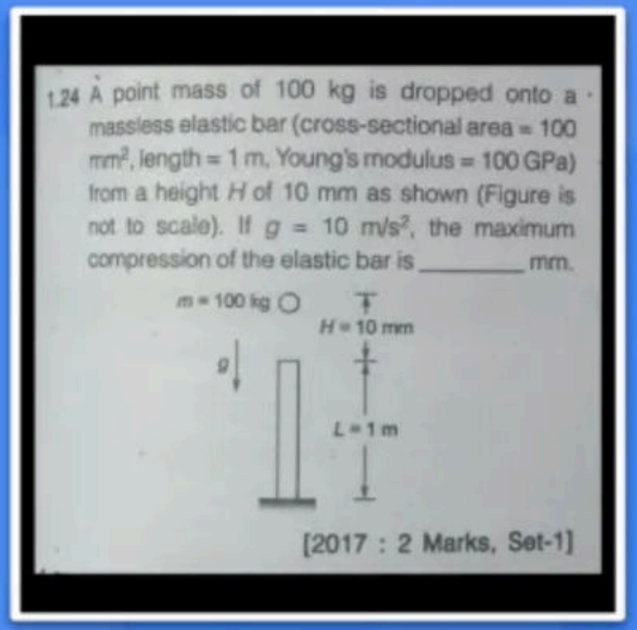
How to Ask a Doubt



Step 1
Click on 'Doubts & solutions'

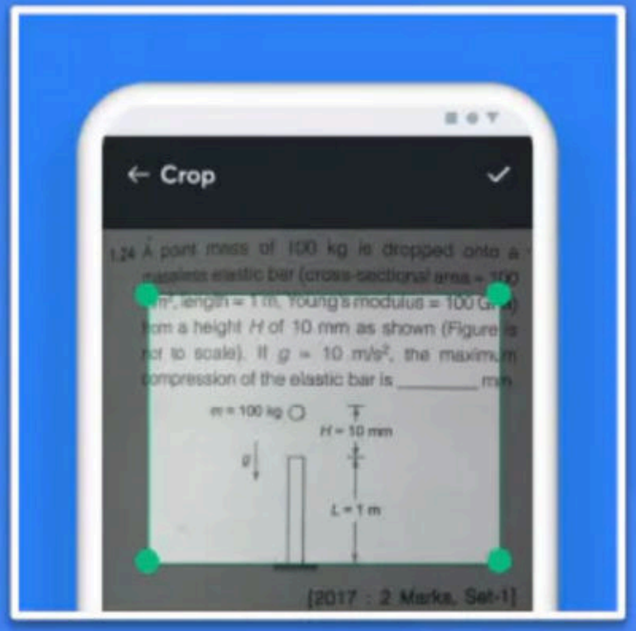


Step 2
Select 'Take a picture' or 'Choose from Gallery'



Step 3
Click/select a picture of your question

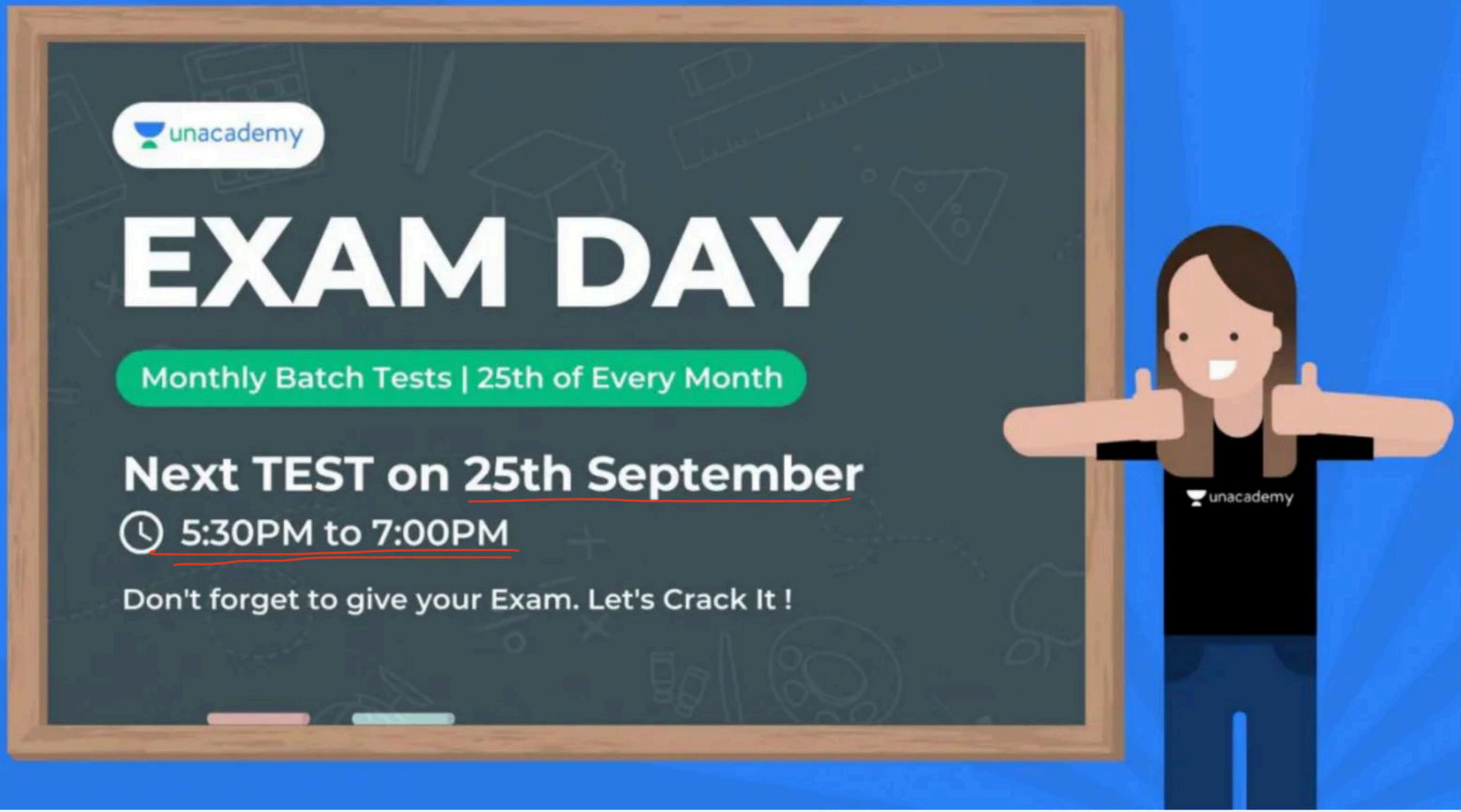
How to Ask a Doubt



Step 4
Crop to highlight one specific question

Step 5
Choose the subject that the question falls under

Step 6
Sit tight, you'll receive the solution soon!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▲ 2 • Asked by Aditya

Sir orbital angular momentum bata dijiye plzz

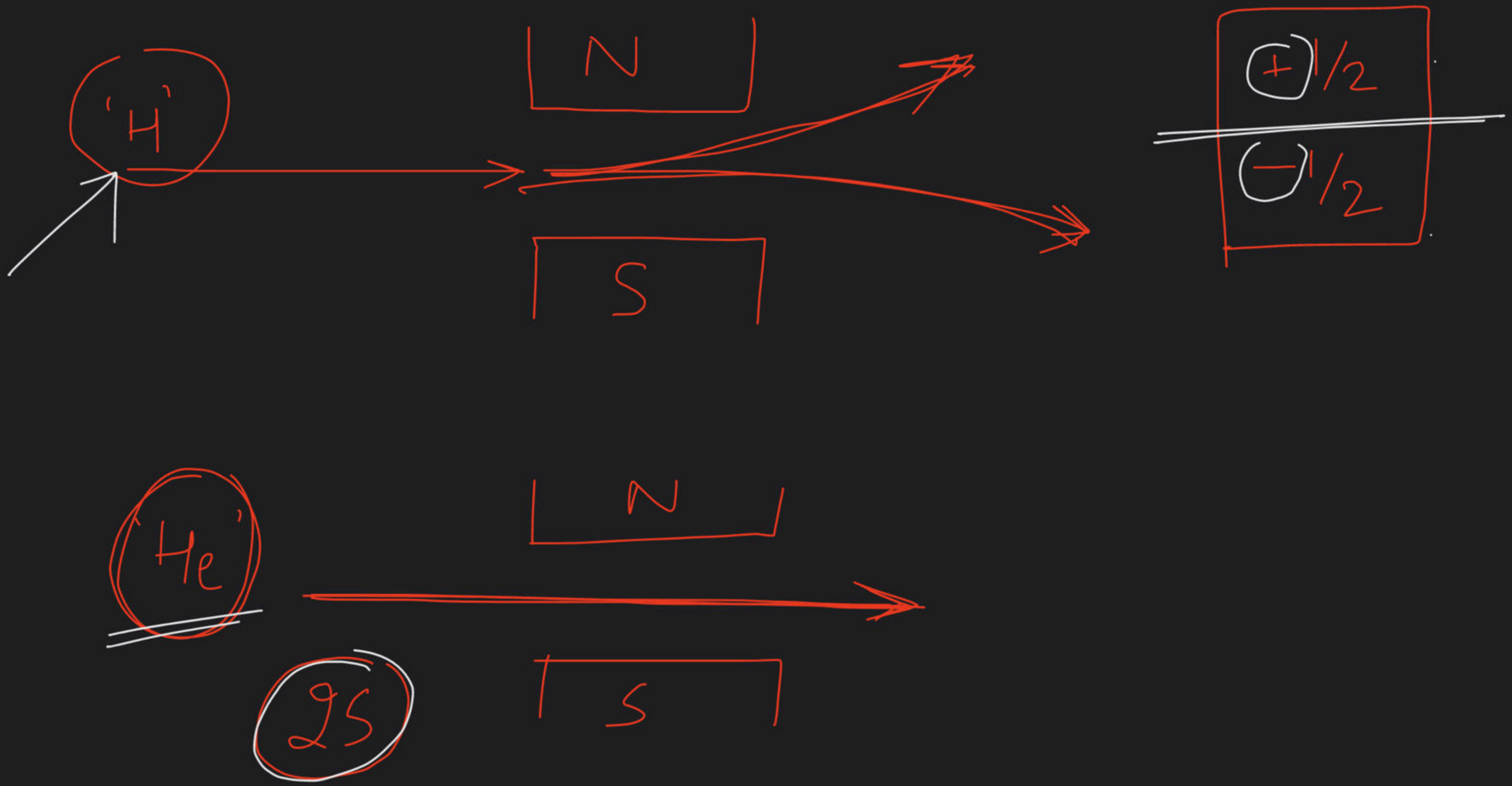
Magnetic moment = $\sqrt{n(n+2)}$ B.M

↑ Bohr Magneton

↑

$n_b \cdot 9$

unpaired e⁻


'H'
N
S
+ 1/2
- 1/2
'He'
N
2S
S

1. The quantum numbers +1/2 and –1/2 for the electron spin represent: **[JEE 2001]**

(A) rotation of the electron in clockwise and anticlockwise direction respectively.

(B) rotation of the electron in anticlockwise and clockwise direction respectively.

(C) magnetic moment of the electron pointing up and down respectively.

(D) two quantum mechanical spin states which have no classical analogue

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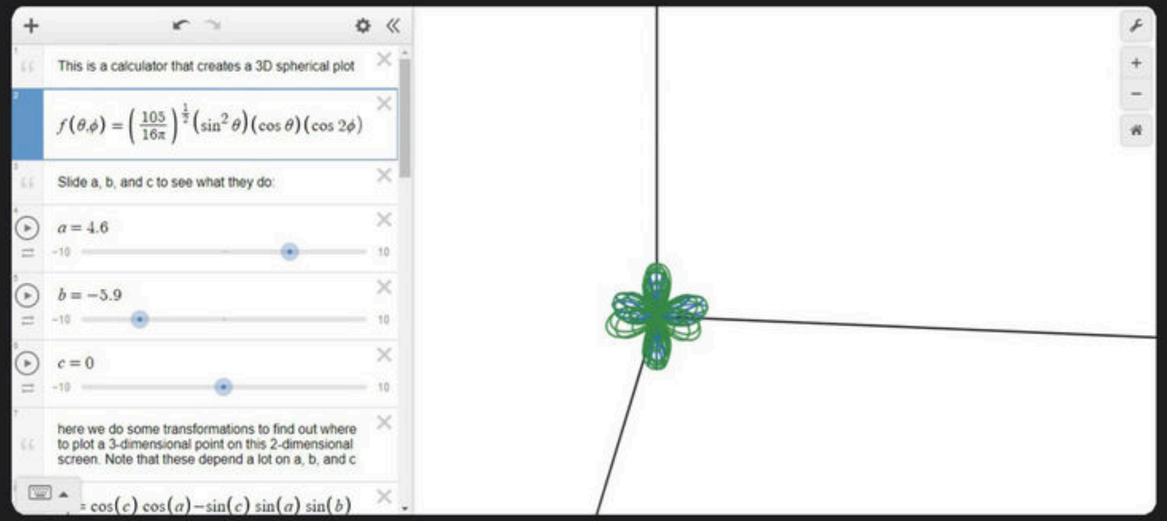
▲ 5 • Asked by Aaditya Ag...

F z (x^2-y^2) orbital



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▲ 3 • Asked by Krishna Xi

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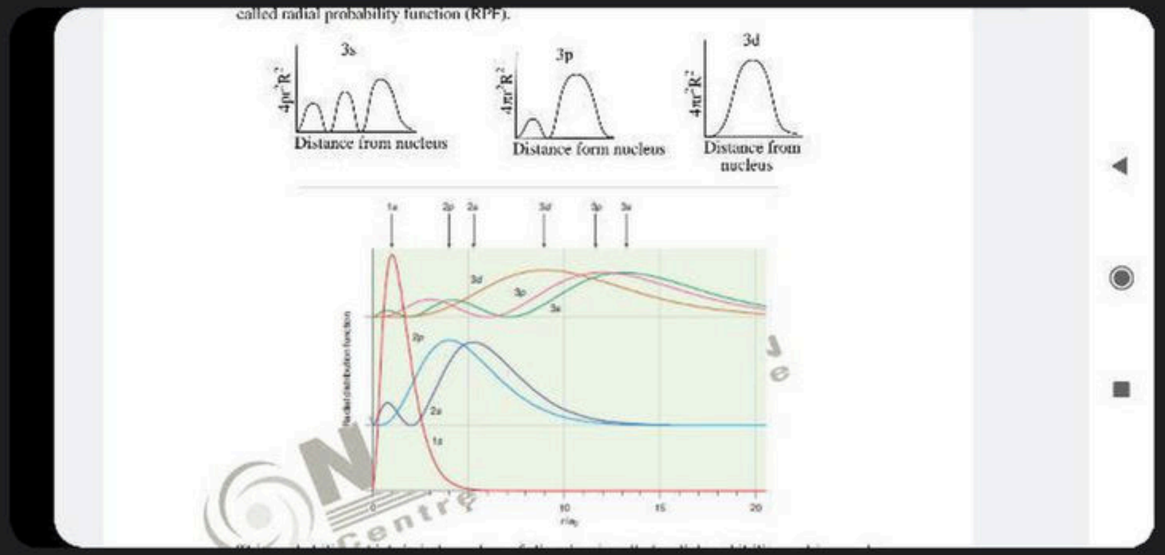

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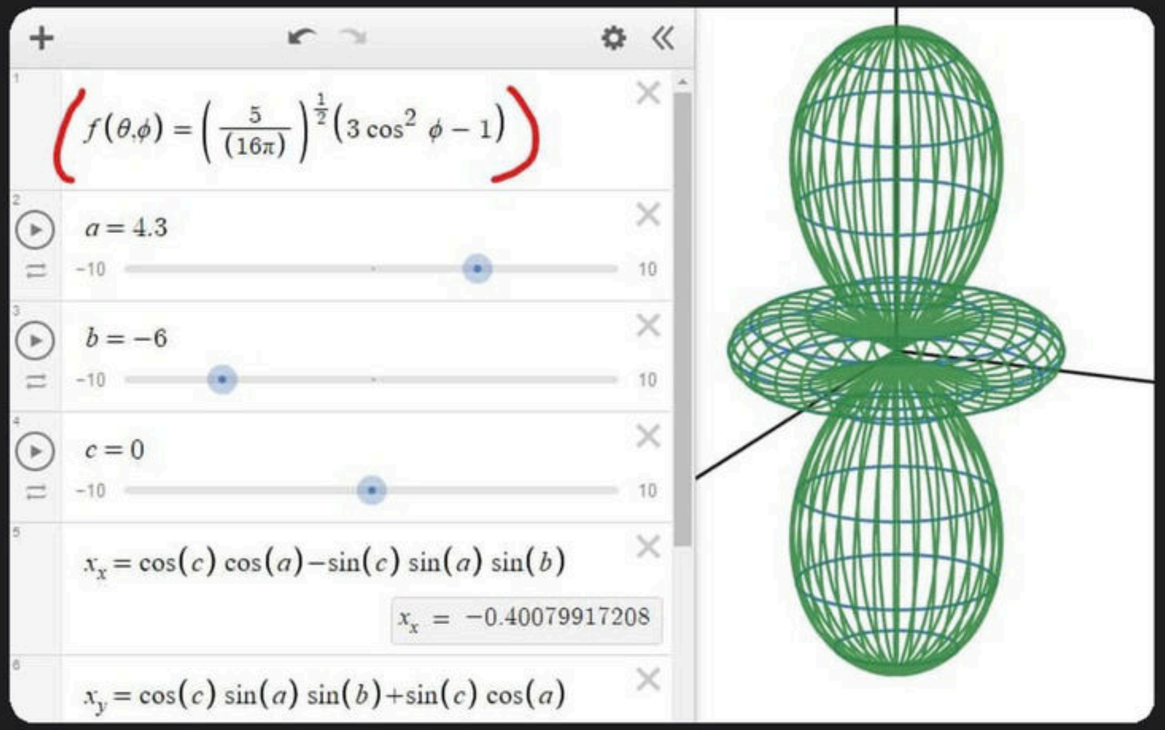
▲ 19 • Asked by Animesh Ku...

sir ye kuch accha laga to bhej diya, angular wave func for dz^2 orbital , i promise mene zyada tym waste nhi kiya :)



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▲ 8 • Asked by Yugam

Graph jo last class mein discuss kar rahe the sir