

1. True or False: In the quantum state $\alpha|0\rangle + \beta|1\rangle$, $|\alpha|^2 + |\beta|^2$ is equal to 1.

A quantum state is represented in bra-ket notation as $\alpha|0\rangle + \beta|1\rangle$.

2. What is the probability that the measurement will be $|0\rangle$?
   a. α
   b. β
   c. $|\alpha|^2$
   d. $|\beta|^2$

3. What is the probability that the measurement will be $|1\rangle$?
   a. α
   b. β
   c. $|\alpha|^2$
   d. $|\beta|^2$

4. Assign values to α and β in the quantum state $\alpha|0\rangle + \beta|1\rangle$ such that it is more likely that a $|1\rangle$ will be measured than $|0\rangle$.
   a. $\alpha = 0.6$ and $\beta = 0.8$
   b. $\alpha = 0.8$ and $\beta = 0.6$
   c. $\alpha = 0.4$ and $\beta = 0.6$
   d. $\alpha = 0.6$ and $\beta = 0.4$

5. What is bra-ket notation for a black ball? (choose all that apply)
   a. |0>
   b. |1>
   c. 0|0> + 1|1>
   d. 1|0> + 0|1>

6. What is bra-ket notation for a white ball? (choose all that apply)
   a. |0>
   b. |1>
   c. 0|0> + 1|1>
   d. 1|0> + 0|1>

7. If the qubit state is $0.8|0\rangle + 0.6|1\rangle$, what is the probability that the measurement will be |0>?
   a. 0.36
   b. 0.6
   c. 0.64
   d. 0.8