Quiz - Complex numbers II Results for Prateek Jain

(!) Correct answers are hidden.

Score for this attempt: **18** out of 20 Submitted May 20 at 4pm This attempt took 3 minutes.

Question 1

2 / 2 pts

Which states are equivalent to the state $|\psi\rangle=cos\frac{\pi}{3}|0\rangle+e^{i\pi}sin\frac{\pi}{3}|1\rangle$ from the physical point of view (i.e., are equal up to a global phase)?

$$-\cos\frac{\pi}{3}|0
angle - e^{i\pi}\sin\frac{\pi}{3}|1
angle$$

$$\bigcirc cos\frac{\pi}{3}|0\rangle + e^{i\frac{\pi}{2}}sin\frac{\pi}{3}|1\rangle$$

$$\blacksquare \ e^{irac{\pi}{2}}cosrac{\pi}{3}|0
angle + e^{irac{3\pi}{2}}sinrac{\pi}{3}|1
angle$$

$$\bigcirc cos\frac{\pi}{6}|0\rangle + e^{i\pi}sin\frac{\pi}{6}|1\rangle$$

Question 2

2 / 2 pts

What is the probability to observe state $|0\rangle$ when we measure the following quantum state: $|\psi\rangle=cos\frac{\pi}{4}|0\rangle+e^{i\pi}sin\frac{\pi}{4}|1\rangle$



0.5

Question 3

2 / 2 pts

Which of the states corresponds to the following state:

 $|\psi
angle = cosrac{\pi}{4}|0
angle + e^{i\pi}sinrac{\pi}{4}|1
angle$?



- $|1\rangle$
- $\bigcirc \; rac{1}{\sqrt{2}}|0
 angle + rac{1}{\sqrt{2}}|1
 angle$
- $\bigcirc |0\rangle$
- $igotimes rac{1}{\sqrt{2}}|0
 angle rac{1}{\sqrt{2}}|1
 angle$
- $\bigcirc \ rac{1}{\sqrt{2}}|0
 angle + rac{1}{\sqrt{2}}i|1
 angle$

Question 4

2 / 2 pts

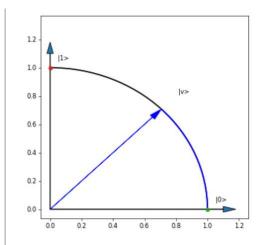
Which of the states corresponds to the following state: $|\psi\rangle=\frac{\sqrt{3}}{2}|0\rangle-\frac{i}{2}|1\rangle$?

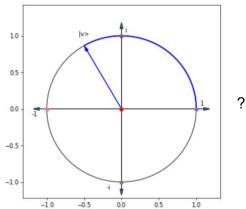
- $\bigcirc \; cosrac{\pi}{3}|0
 angle + e^{irac{3\pi}{2}}sinrac{\pi}{3}|1
 angle$
 - $cosrac{\pi}{3}|0
 angle+e^{irac{\pi}{2}}sinrac{\pi}{3}|1
 angle$
- $\bigcirc \cos \frac{\pi}{6} |0\rangle + e^{i\frac{\pi}{2}} sin \frac{\pi}{6} |1\rangle$
- $\bigcirc \; cosrac{\pi}{6}|0
 angle + e^{irac{3\pi}{2}}sinrac{\pi}{6}|1
 angle$

Question 5

2 / 2 pts

Which of the states is demonstrated on the following images:





$$\bigcirc \ |\psi
angle = cosrac{\pi}{8}|0
angle + e^{irac{\pi}{3}}sinrac{\pi}{8}|1
angle$$

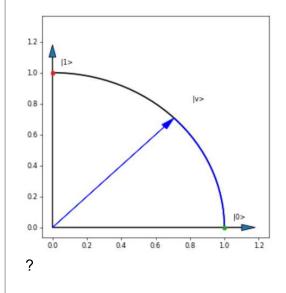
$$\bigcirc \ |\psi
angle = cosrac{\pi}{2}|0
angle + e^{irac{3\pi}{4}}sinrac{\pi}{2}|2
angle$$

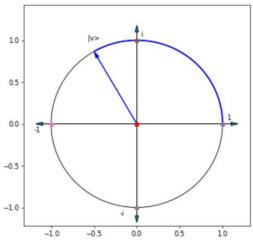
$$\bigcirc \ |\psi
angle = cosrac{\pi}{4}|0
angle + e^{irac{2\pi}{3}}sinrac{\pi}{4}|1
angle$$

$$\bigcirc \ |\psi\rangle = cos\frac{\pi}{4}|0\rangle + e^{i\frac{\pi}{3}}sin\frac{\pi}{4}|1\rangle$$

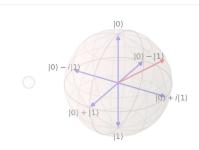
Question 6

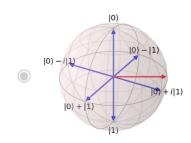
Which state on the Bloch sphere corresponds to this state:

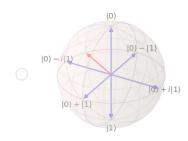


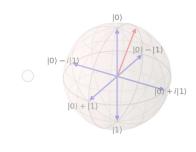


2 / 2 pts



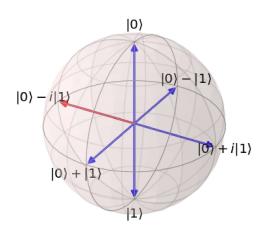






Question 7 2 / 2 pts

Which state is depicted on the following Bloch sphere?



$$\bigcirc \ |\psi\rangle = cos\frac{\pi}{8}|0\rangle + e^{i\frac{\pi}{3}}sin\frac{\pi}{8}|1\rangle$$

$$\bigcirc \ |\psi
angle = cosrac{\pi}{2}|0
angle + e^{irac{2\pi}{3}}sinrac{\pi}{2}|1
angle$$

$$\bigcirc \ |\psi
angle = cosrac{\pi}{4}|0
angle + e^{irac{2\pi}{3}}sinrac{\pi}{4}|1
angle$$

$$0 \mid \psi
angle = cosrac{\pi}{4} |0
angle + e^{irac{3\pi}{2}} sinrac{\pi}{4} |1
angle$$

Question 8

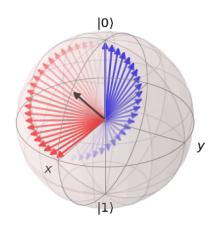
2 / 2 pts

Gates X, Y and Z perform rotations on a Bloch sphere around x-, y- and z-axis, respectively. By which angle are these rotations performed?

- \circ π
- $\frac{\pi}{2}$
- 2π
 - $\frac{37}{2}$

Question 9

2 / 2 pts



Here is the rotation axis of Hadamard

operator. Which state will not change after applying Hadamard operator?

$$\bigcirc \ \ \tfrac{\sqrt{3}}{2}|0\rangle + \tfrac{1}{2}|1\rangle$$

$$\bigcirc \ \, \frac{1}{\sqrt{2}}|0\rangle + \frac{1}{\sqrt{2}}|1\rangle$$

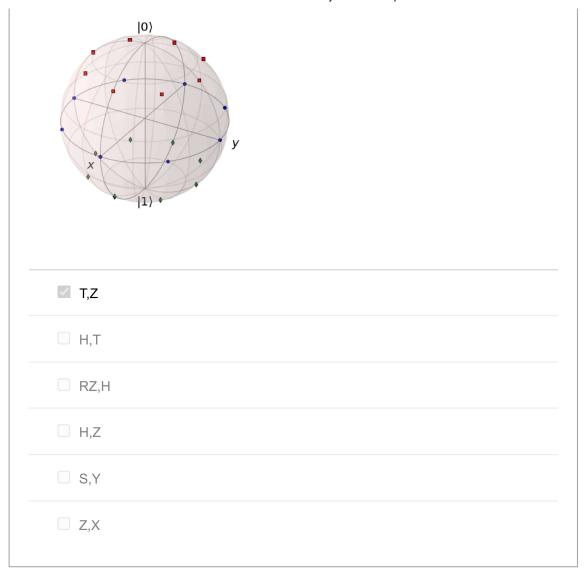
$$\bigcirc \; cosrac{\pi}{8}|0
angle + sinrac{\pi}{8}|1
angle$$

$$\bigcirc \cos \frac{\pi}{4} |0
angle + \sin \frac{\pi}{4} |1
angle$$

Incorrect

Question 10 0 / 2 pts

Suppose that we begin from the state |1⟩. Mark the set(s) of gates on the list below that allow us to reach all the states depicted on the following Block sphere



Quiz Score: 18 out of 20