QClass24/25 Quiz4

Due Dec 9 at 3:59am **Points** 20 **Questions** 10
Available Nov 19 at 11:45pm - Dec 9 at 3:59am 19 days
Time Limit 60 Minutes **Allowed Attempts** 2

Instructions

We use the **conventions in the QBook101**.

The default programming language for coding is **Python.**

The default quantum programming framework is **Cirq**.

You may write pieces of code during this quiz.

Take the Quiz Again

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	5 minutes	8 out of 20

Last Attempt Details:

Time:	5 minutes
Current Score:	8 out of 20
Kept Score:	8 out of 20

1 More Attempt available

Take the Quiz Again

(Will keep the highest of all your scores)

Correct answers are hidden.

Score for this attempt: **8** out of 20
Submitted Dec 9 at 1:16am
This attempt took 5 minutes.

Question 1

2 / 2 pts

If $\frac{1-xi}{2} = e^{i\theta}$, what is the value of x ?

- ◉ $\sqrt{3}$
- ○ 2
- ○ 3
- ○ $\sqrt{2}$

Question 2

2 / 2 pts

$$H \cdot \begin{pmatrix} 1 & 0 \\ 0 & e^{i\frac{\pi}{6}} \end{pmatrix}^9 \cdot H \cdot X \cdot |0\rangle$$

- ○ $|0\rangle$
- ◉ $\frac{(1+i)}{2}|0\rangle + \frac{(1-i)}{2}|1\rangle$

- $|1\rangle$
- $\frac{(1-i)}{2}|0\rangle + \frac{(1+i)}{2}|1\rangle$

Incorrect

Question 3

0 / 2 pts

By taking all values in $[0, 2\pi)$,

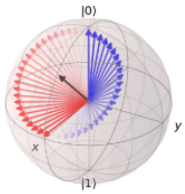
which one of the following quantum states has the largest relative phase angle?

- $\left(\frac{1}{2}+\frac{1}{2}i\right)|0\rangle - \frac{1}{\sqrt{2}}i|1\rangle$
- $\left(\frac{1}{2}+\frac{1}{2}i\right)|0\rangle + \left(\frac{1}{2}-\frac{1}{2}i\right)|1\rangle$
- $\frac{1}{\sqrt{2}}|0\rangle + \frac{1}{\sqrt{2}}i|1\rangle$
- $\left(\frac{1}{2}+\frac{1}{2}i\right)|0\rangle - \frac{1}{\sqrt{2}}|1\rangle$

Question 4

2 / 2 pts

Here is the rotation axis of Hadamard operator.



Which state will not change after applying Hadamard operator?

- $cos\frac{\pi}{2}|0\rangle + sin\frac{\pi}{2}|1\rangle$
- $cos\frac{\pi}{8}|0\rangle + sin\frac{\pi}{8}|1\rangle$
- $cos\frac{\pi}{6}|0\rangle + sin\frac{\pi}{6}|1\rangle$
- $cos\frac{\pi}{4}|0\rangle + sin\frac{\pi}{4}|1\rangle$

Question 5

2 / 2 pts

If a qubit in state $|v\rangle = cos\frac{5\pi}{7}|0\rangle + e^{i\pi/6}sin\frac{5\pi}{7}|1\rangle$,

what are the probabilities of measuring states $|0\rangle$ and $|1\rangle$?

- 0.389 and 0.611

- 0.049 and 0.951
- 0.812 and 0.188
- −0.623 and 0.782

Unanswered

Question 6

0 / 2 pts

We have a qubit in state $|-\rangle$.

We apply **five** T-gate .

We apply **three** S-gate .

We apply **seven** $T^\dagger$-gate .

We apply **five** $S^\dagger$-gate .

Which one of the following gates can be applied to end up in state $|+\rangle$ on the Bloch sphere?

- a single S-gate
- a single T-gate
- a single $T^\dagger$-gate
- a single $S^\dagger$-gate

Unanswered

Question 7

0 / 2 pts

If we execute the following circuit 1000 times, which one the following outcomes is more likely?

```
0: ──Ry(0.333π)──Rz(0.2π)──Rx(-0.333π)──Ry(-0.2π)──Rz(-0.143π)──M('result')──
```

- {'0': 615, '1': 385}
- {'0': 371, '1': 629}
- {'0': 4, '1': 996}
- {'0': 996, '1': 4}

Unanswered

Question 8

0 / 2 pts

Let $S = \begin{pmatrix} 1 & 0 \\ 0 & i \end{pmatrix}$ be the quantum gate in cirq then $S^2 = ?$

- $S^\dagger$ - gate
- S-gate

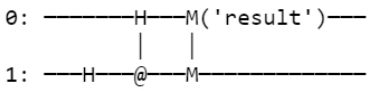
- Z -gate
- T -gate

Unanswered

Question 9

0 / 2 pts

If we execute the following circuit 1000 times, which one the following binary outcomes is more likely?



- {'00': 479, '01': 284, '11': 237}
- {'00': 254, '01': 284, '10': 237, '11': 225}
- {'11': 511, '01': 241, '10': 248}
- {'00': 515, '11': 485}

Unanswered

Question 10

0 / 2 pts

We have a qubit in state $|0\rangle$.

We apply the following gate:

```
U3(π/5,π/7,π/11)
```

What is the probability of observing $|1\rangle$?

- 0.095
- 0.866
- 0.500
- 0.250

Quiz Score: **8** out of 20

◂ Previous

Next ▸