

Quiz - DFT, QFT Results for Prateek Jain

❗ Correct answers are hidden.

Score for this attempt: **10** out of 10

Submitted May 23 at 6:57pm

This attempt took 2 minutes.

Question 1

2 / 2 pts

Use pen and paper to compute DFT of $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$.

☐ $\begin{pmatrix} \frac{3}{\sqrt{2}} \\ \frac{4}{\sqrt{2}} \end{pmatrix}$

☒ $\begin{pmatrix} \frac{7}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} \end{pmatrix}$

☐ $\begin{pmatrix} \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} \end{pmatrix}$

☐ $\begin{pmatrix} \frac{3}{\sqrt{2}} \\ -\frac{4}{\sqrt{2}} \end{pmatrix}$

Question 2

2 / 2 pts

What is the QFT of the state $|01\rangle$?

☐ $\frac{1}{2}(|00\rangle + |01\rangle + |10\rangle + |11\rangle)$

☐ $\frac{1}{2}(i|00\rangle - |01\rangle + i|10\rangle - |11\rangle)$

☐ $\frac{1}{2}(|00\rangle - |01\rangle + |10\rangle - |11\rangle)$

☐ $\frac{1}{2}(|00\rangle + i|01\rangle - |10\rangle - i|11\rangle)$

Question 3

2 / 2 pts

What happens if we apply the operation CR_2 to the quantum state $\frac{|01\rangle + |11\rangle}{\sqrt{2}}$?

☐ $\frac{|01\rangle + e^{2\pi} |11\rangle}{\sqrt{2}}$

☒ $\frac{|01\rangle + e^{\frac{\pi i}{2}} |11\rangle}{\sqrt{2}}$

☐ $\frac{e^{\frac{\pi i}{2}} |01\rangle + e^{\frac{\pi i}{2}} |11\rangle}{\sqrt{2}}$

☐ $\frac{e^{\pi i 2^{-1}}}{\sqrt{2}} |11\rangle$

Question 4

2 / 2 pts

Select the gates which are used in the QFT circuit.

☒ H

☐ X

☒ CZPowGate

☐ Y

☒ SWAP

☐ Z

Question 5**2 / 2 pts**

How do we create the CR_k operation in Cirq?

- ☐ `crk = CZPowGate(exponent = k)`
- ☐ `crk = CR(exponent = k)`
- ☒ `crk = CZPowGate(exponent = 2/2**(k))`
- ☐ `crk = CRk(exponent = 2/2**(k))`

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