QClass 24/25 QKD Quiz 4

Due Dec 23 at 3:59am **Points** 10 **Questions** 10
Available Dec 16 at 1am - Dec 23 at 3:59am 7 days
Time Limit 60 Minutes **Allowed Attempts** 2

Take the Quiz Again

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	11 minutes	3 out of 10

Last Attempt Details:

Time:	11 minutes
Current Score:	3 out of 10
Kept Score:	3 out of 10

1 More Attempt available

Take the Quiz Again

(Will keep the highest of all your scores)

Answers will be shown after your last attempt

Score for this attempt: **3** out of 10
Submitted Dec 22 at 11:25pm
This attempt took 11 minutes.

Incorrect

Question 1

0 / 1 pts

For quantum correlation, we want to measure $< X \otimes V. >$
We start with EPR pair, where Asja will measure first qubit (*qreg[0]*) and Balvis will measure second qubit (*qreg[1]*).
Asja measures in ***X**-basis*, Balvis measures in ***V**-basis*.
Complete the following code:

```
qreg = QuantumRegister(2)
creg = ClassicalRegister(2)
mycircuit = QuantumCircuit(qreg, creg)

mycircuit.h(qreg[0])
mycircuit.cx(qreg[0], qreg[1])

mycircuit.h(qreg[0])  #Asja measure 1st qubit qreg[0] in
X basis

mycircuit.s(qreg[1])  #Balvis measure 2nd qubit qreg[1] i
n V basis
mycircuit.h(qreg[1])
#YOUR CODE HERE#
mycircuit.h(qreg[1])
```

Make sure to enter the answer as per the correct syntax and avoid unnecessary spaces.

mycircuit.measure(qreg[0],creg[0]) mycircuit.measure(qreg[1],c

Incorrect

Question 2

0 / 1 pts

In E-91 Protocol, Asja and Balvis don't compare bases but the measurement results.

- True
- False

Incorrect

Question 3

0 / 1 pts

For measurement of observables $X,\ Z,\ W = \frac{1}{\sqrt{2}}(X+Z),\ V = \frac{1}{\sqrt{2}}(-X+Z)$ with each having two outcomes $+1$ or -1, and for state $|\phi^-\rangle = \frac{1}{\sqrt{2}}(|00\rangle - |11\rangle)$ $\langle X \otimes V \rangle$ = ?

- $\frac{1}{\sqrt{2}}$
- 1
- 0
- $-\frac{1}{\sqrt{2}}$

Question 4

1 / 1 pts

E-91 protocol has advantage over BB84 as Espian cannot attack it.

- True
-
- False
-

Question 5

1 / 1 pts

For measurement of observable $X, Z, W = \frac{1}{\sqrt{2}}(X+Z), V = \frac{1}{\sqrt{2}}(-X+Z)$ having two outcomes $+1$ or -1, and for state $|\psi^+\rangle = \frac{1}{\sqrt{2}}(|01\rangle + |10\rangle)$ $\langle Z \otimes W \rangle$?

- $-\frac{1}{\sqrt{2}}$
- $\frac{1}{\sqrt{2}}$
- 0

- 1

Question 6

1 / 1 pts

Which pair is not a maximally entangled pair?

- $\frac{1}{\sqrt{2}}(|00\rangle + |11\rangle)$
- $\frac{1}{\sqrt{2}}(|00\rangle - |11\rangle)$
- $\frac{1}{\sqrt{4}}|00\rangle - \sqrt{\frac{3}{4}}|11\rangle$
- $\frac{1}{\sqrt{2}}(|01\rangle - |10\rangle)$

Incorrect

Question 7

0 / 1 pts

In E-91 Protocol, Asja has to assign the qubit state randomly

-
- False
-
- True

Unanswered

Question 8

0 / 1 pts

In E-91 protocol, Asja and Balvis bases match in

- 2/9 cases
- 1/2 cases
- 7/9 cases
- 1/3 cases

Unanswered

Question 9

0 / 1 pts

Asja and Balvis share an entangled state $\frac{1}{\sqrt{2}}(|00\rangle + |11\rangle)$ both measure in Z basis

- Their results will always correlate

- Their results will always anticorrelate
- There is 50% probability that their results will correlate
- There is 25% probability that their results will correlate

Unanswered

Question 10

0 / 1 pts

Asja and Balvis share an entangled state $\frac{1}{\sqrt{2}}(|00\rangle + |11\rangle)$ both measure in X basis

- There is 25% probability that their results will correlate
- Their results will always correlate
- Their results will always anticorrelate
- There is 50% probability that their results will correlate

Quiz Score: **3** out of 10

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