





IZ.

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## 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

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### Attempt History

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

(!) 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:

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.

### Last Attempt Details:

Time: 11 minutes

Current 3 out of Score: 10

**Kept Score**: 3 out of 10

1 More Attempt

available

Take the Quiz Again

(Will keep the highest of all your scores)

True		
○ False		

Incorrect

### Question 3

0 / 1 pts

For measurement of observables

$$X,~Z,~W=rac{1}{\sqrt{2}}(X+Z),~V=rac{1}{\sqrt{2}}$$
 ( , with each having two outcomes  $+1$  or  $-1$ , and for state  $|\phi^-\rangle=rac{1}{\sqrt{2}}(|00\rangle-|1)$ 

$$\langle X \otimes V 
angle$$
= ?

4

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

0 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

$$X,Z,W=rac{1}{\sqrt{2}}(X+Z),V=rac{1}{\sqrt{2}}($$
 -w/Kh-lea/Zh) having two outcomes  $+1$ or  $-1$ , and for state  $|\psi^+\rangle=rac{1}{\sqrt{2}}(|01\rangle+|10\rangle)$ 

 $\langle Z \otimes W = \rangle$ ?

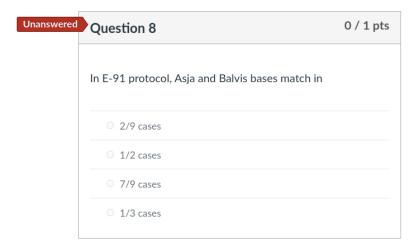
$$-\frac{1}{\sqrt{2}}$$

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

0

Question 6	1 / 1 pts
Which pair is not a maximally entangled pair?	
$\odot \; rac{1}{\sqrt{2}}(\ket{00}+\ket{11})$	
$\odot \; rac{1}{\sqrt{2}}(\ket{00}-\ket{11})$	
$\odot \; rac{1}{\sqrt{4}}  00 angle - \sqrt{rac{3}{4}}   11 angle$	
$\odot \; rac{1}{\sqrt{2}}(\ket{01}-\ket{10})$	

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



# 

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

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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