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reviewer2@nptel.iitm.ac.in ▼

Courses » Quantum Information and Computing

Announcements Course Ask a Question Progress

Unit 9 - Week-8

Week 8 - Assignment 8

The due date for submitting this assignment has passed. **Due on 2017-09-20, 23:59 IST.**
As per our records you have not submitted this assignment.

In the following questions, ONLY ONE answer is correct. Choose the most appropriate one. (1X10=10 Marks)

1) Euler's Totient function Φ(1200) is *1 point*

- 280
- 300
- 320
- 380

No, the answer is incorrect.
Score: 0

Accepted Answers:
320

2) Inverse of 5 modulo 101 is *1 point*

- $5^{99}\ (mod\ 101)$
- $5^{100}\ (mod\ 101)$
- $5^{102}\ (mod\ 101)$
- *none*

No, the answer is incorrect.
Score: 0

Accepted Answers:
$5^{99}\ (mod\ 101)$

3) Solution of 5x=31 mod 101 is *1 point*

- 27
- 42
- 68
- 87

No, the answer is incorrect.
Score: 0

Accepted Answers:
87

4) The set of equations 2x=5 (mod 7) and 3x=4 mod 8 has the solution *1 point*

- 24 mod 56
- 20 mod 56
- both (A) and (B)
- none

No, the answer is incorrect.
Score: 0

Accepted Answers:
20 mod 56

5) In RSA algorithm with N=323, which of the following is acceptable as an encryption key e? ***1 point***

- 18
- 16
- 13
- 9

No, the answer is incorrect.
Score: 0

Accepted Answers:
13

6) In an RSA encryption with the public key (N=187, e=7), what is the private key d for decrypting the message? ***1 point***

- 80
- 23
- 17
- 11

No, the answer is incorrect.
Score: 0

Accepted Answers:
23

7) Let p and q be two prime numbers p=137 and q=131 so that the number N=pq=17947. If RSA encryption we choose e= 3, the decryption key d is ***1 point***

- 5893
- 5982
- 11787
- 11965

No, the answer is incorrect.
Score: 0

Accepted Answers:
11787

8) In BB-84 protocol, assuming the presence of Eve in the channel and further assuming that Alice, Bob and Eve randomly select a horizontal/vertical or diagonal basis for their measurements, the fraction of cases (on an average) where Alice's and Bob's bits would agree, before they have compared their bases is ***1 point***

- 5/8
- 1/2
- 3/8
- 3/16

No, the answer is incorrect.
Score: 0

Accepted Answers:
5/8

9) In an NMR quantum computer the molecule used has nuclei of ***1 point***

- 2 Flourine, 5 Carbon
- 2 Fluorine, 5 protons
- 5 Carbon, 2 protons
- 5 Fluorine, 2 Carbon

No, the answer is incorrect.
Score: 0

Accepted Answers:
5 Fluorine, 2 Carbon

10) Alice and Bob are using B-92 protocol for communication. Alice encodes her bit 0 as $|0\rangle$ and bit 1 as $|+\rangle=(|0\rangle+|1\rangle)/\sqrt{2}$. The two bases that Alice uses are designated as basis number 0 and 1 respectively. Bob tosses a coin and if he gets a head, he measures the received state in the computational basis (labelled basis 0) and if he gets a tail he measures it in the diagonal basis (labelled basis 1). The result of Bob's measurement is publicly announced as $|+\rangle|-\rangle|1\rangle|0\rangle$ -- $|1\rangle|+\rangle|-\rangle|+\rangle$ -- $|1\rangle|+\rangle|+\rangle|1\rangle$ -- $|-\rangle|-\rangle|0\rangle|+\rangle$ (the dashes in the above string are for reading clarity only). The secret code they establish in the process is *1 point*

- 10100011
- 10100011
- 01011000
- 01101100

No, the answer is incorrect.
Score: 0

Accepted Answers:
01101100

In the following questions, ONE or MORE answer(s) is (are correct). Choose all the appropriate ones. (2X2=4 Marks)

11) In BB-84 protocol *2 points*

- Alice sends original bit string to Bob over a public (classical) channel.
- Alice sends original bit string to Bob over a quantum channel
- Comparison of bases of Alice and Bob occurs over a quantum channel
- Comparison of bases of Alice and Bob occurs over a public channel

No, the answer is incorrect.
Score: 0

Accepted Answers:
Alice sends original bit string to Bob over a quantum channel
Comparison of bases of Alice and Bob occurs over a public channel

12) Which of the following statements is (are) true about practical realization of a quantum computer? *2 points*

- Trapping of ions is done by application of electrostatic field only
- For an quantum computer to be realized, a set of single qubit and two qubit gates must be implemented
- In an NMR computer, the initial state is thermally populated
- According to Di Vincenzo's additional criterion, flying qubits must be faithfully transmitted between specified locations

No, the answer is incorrect.
Score: 0

Accepted Answers:
For an quantum computer to be realized, a set of single qubit and two qubit gates must be implemented
In an NMR computer, the initial state is thermally populated
According to Di Vincenzo's additional criterion, flying qubits must be faithfully transmitted between specifie locations

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