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BIELE-009

B.TECH. IN ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

01170

Term-End Examination

June, 2013

BIELE-009 : QUANTUM COMMUNICATION

Time : 3 hours *Maximum Marks : 70*

Note : *(i)* *Attempt **any seven** questions.*

(ii) *All questions carry **equal** marks.*

1. (a) What are the fundamental concept of quantum communication ? 2x5=10

   (b) What are the problems that can be solved by quantum computers more quickly than classical computers ?

2. (a) Discuss the major challenges of quantum communication. 2x5=10

   (b) What is quantum bit ? How it is different from classical bit ?

3. (a) What is quantum information theory ? 2x5=10

   (b) Describe the most significant discovery yet made in quantum communication.

4. (a) Describe the Heisenberg uncertainty principle's role in quantum communication.

   (b) Explain the properties of the density operator. **2x5=10**

5. (a) Discuss the criteria to decide a given state is mixed or pure.

   (b) State Kraus representation theorem for open system quantum evolution. **2x5=10**

6. (a) State the application of Holevo bound in quantum information theory. **2x5=10**

   (b) State and prove Fano inequality.

7. (a) Discuss the performance of noisy quantum channel. **2x5=10**

   (b) Explain stabilizer code construction technique in brief.

8. (a) Discuss the quantum error correction cycle.

   (b) Discuss the role of entanglement in quantum channel capacity. **2x5=10**

9. Describe the analogues term of classical information theory to quantum information theory in all possible aspects. **10**

10. Write short notes on ***any two*** of the following : **2x5=10**

(a) Quantum cryptography

(b) Holevo's theorem

(c) Hilbert space