No. of Printed Pages : 2

BIELE-009

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

00436

Term-End Examination

December, 2014

BIELE-009 : QUANTUM COMMUNICATION

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Missing data, if any, may be suitably assumed.*

1. Define the following terms : $4 \times 2\frac{1}{2} = 10$

(a) Observability

(b) Commutivity

(c) Pure State

(d) Open System Dynamics

2. Explain the significance of the following theorems in quantum mechanics : *5+5=10*

(i) Heisenberg uncertainty principle

(ii) Quantum state preparation

3. How can the classical information over a quantum channel be encoded and decoded using quantum states ? *10*

4. Give the statement of Holevo's theorem and explain its usefulness in Quantum information theory. *3+7=10*

5. Distinguish between Entanglement and Quantum channel capacity. How can they be used for compression of quantum states ? *5+5=10*

6. Explain the notion of quantum communication over quantum channels. *10*

7. Explain the stabilizer code construction technique in detail. *10*

8. What are the basic requirements of an open and a closed system quantum maps ? Also distinguish between them. *10*

9. Explain the connections between compression ideas and communication channel capacities. *10*

10. Establish the relation of pure state ensemble compression with Von Neumann Entropy. *10*