Duration: 3hrs **[Max Marks: 80]**

NOTE: 1. Question no. 1 is compulsory.
2. Attempt any 3 questions out of 5 questions.
3. Each question carries 20 marks.

Q.1 Attempt any four questions out of six questions. **20**
a. Compare switch, hub, and router.
b. Explain design challenges in Network layer of OSI reference model.
c. Distinguish between Inter-domain and Intra-domain routing.
d. Explain seven steps of OSPF routing protocol operation.
e. Draw and explain UDP Header.

Q.2 a. Explain connection establishment, data transfer and connection termination using three-way handshaking. **10**
b. Explain need of layered protocol architecture, advantages and limitations of OSI reference model. **10**

Q.3 a. The following is part of a TCP header dump (content) in hexadecimal format
E293 0017 00000001 00000000 5002 07FF…… **05**
i. What is source port number?
ii. What is the destination port number?
iii. What is the sequence number?
iv. What is the acknowledgment number?
v. What is the window size?
b. The following is the dump of the UDP header in hexadecimal format.
0045DF0000500000 **05**
1. What is the source port number?
2. What is the destination port number?
3. Is the packet directed from the client to the server or vice versa?
4. State which transport layer protocols would be necessary for each of the following applications DNS, DHCP, FTP, HTTP, and TELNET.
c. Explain why IP uses ICMP? State ICMP message types and explain with neat diagrams. **10**

Q.4 a. Draw IPv4 datagram header and explain each field. **10**
b. Explain Pure and Slotted ALOHA with neat diagrams.
Write at least four points of comparison between them **10**

Q.5 a. Compare twisted pair, coaxial and optical fibre cables. State at least one advantage and drawback of each cable. **10**
b. Analyze CSMA/CA over CSMA/CD in medium access control protocol. **10**

Q.6 Write a short note on any four of the following: **20**
a. ARP and RARP.
b. Framing: Data link service
c. Flow control in transport layer
d. RIP routing protocol
e. Unguided transmission media.