

MCA (Revised)
Term-End Examination
December, 2006

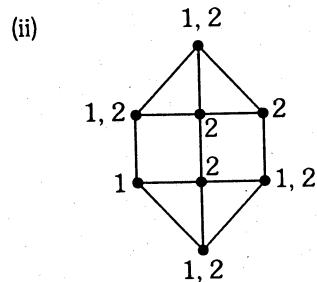
**MCS-042 : DATA COMMUNICATION AND
 COMPUTER NETWORKS**

Time : 3 hours

Maximum Marks : 100

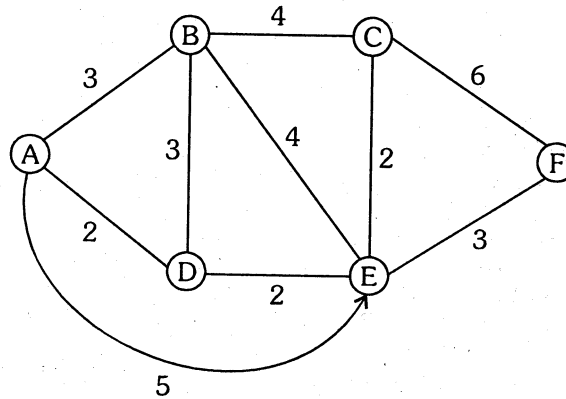
Note : Question number 1 is **compulsory**. Attempt any **three** questions from the rest.

1. (i) Why can CSMA/CD not be used in wireless networks ? How does the problem of hidden and exposed station get resolved ? Explain the above with the help of diagrams. Can there be any collision further ? 10



Draw a spanning tree, a multicast tree for group 1 and for group 2 of the above network. 3

- (iii) Draw a three stage switch. There are 18 inputs and 20 outputs. Stage 1 has three switches, stage 2 has two switches and stage 3 has four switches. How many cross points are needed? Compare it with a system using just one crossbar switch. 5
- (iv) Consider the following network with the indicated link cost. Use Dijkstra's shortest-path algorithm to compute the shortest paths from A to C and F. 10



- (v) Suppose pure Aloha protocol is used to share a 56 kbps satellite channel. Assume that packets are 1000 bits long. Find the maximum throughput of the system in packets/second. 7
- (vi) Using the RSA public key cryptosystem, if $p = 5$, $q = 13$, list five legal values for d . 5
2. (i) State the concept of channel capacity. State the Nyquist and Shannon theorems and their uses with appropriate examples. 10

- (ii) What is count to infinity problem ? Explain your answer with the help of an example. 5
- (iii) With reference to the transport layer, outline the connection set-up operation of 3-way handshaking through a diagram. What are its advantages ? 5
3. (i) Explain the operation of OSPF with the help of a diagram showing appropriate routers. 10
- (ii) What is the Silly window syndrome ? What is the Clark's solution to overcome it ? 5
- (iii) Obtain an expression for average number of the unsuccessful transmission attempts/frame for slotted ALOHA. 5
4. (i) What are the problems with the following algorithm ? Explain with the help of examples. 10
- Double DES
 - Diffie – Hellman key exchange algorithm
- (ii) Sketch the Manchester, Differential Manchester, Binary encoding, RZ and NRZ-I for the bit stream : 5
- 11111000101010
- (iii) Differentiate between upward and downward multiplexing with the help of a diagram. 5

5. (i) Explain with the help of a diagram operation of the flow control mechanism in TCP. 10
- (ii) What are the reasons for a minimum length frame in IEEE 802.3 ? 5
- (iii) What are the two conditions for the polynomials used by CRC generators ? Explain. 5