Node	Neighbour – set
A	B
B	A, C
C	B, D
D	C

Explain (i) The concept of a “hidden station” and an “exposed station” ,(ii) The problems such stations creat toward efficient communication between two neighbouring nodes and (iii) how these problems have been taken care of in the protocol used in the IEEE 802.11 wireless LAN. 3+3+6

7. a) Discuss about the different kinds of security capabilities needed in a network. 10

   b) Briefly explain the broad principle of symmetric key everyption and public key everyption. 6

   c) Explain what is message digest and how it is used. 4.

8. Write short notes on ***any four*** : 4x5

   a) Connectionless and connection - oriented services.

   b) Multidestination routing.

   c) Role of PREAMBLE and PAD field in an ethernet frame.

   d) “Frequency rense” and “Handover” in a cellular network.

   e) MANET and Sensor Networks.

   f) Digital Signature.

————————x————————

BACHELOR OF COMPUTER SC. ENGG. EXAMINATION, 2010

(3rd Year, 2nd Semester)

COMPUTER NETWORKS

Time : Three hours Full Marks : 100

Answer ***any five*** questions.

1. a) Describe the simplex STOP – AND – WAIT protocol (SAWP) for data communication between two computers carried out over a dadicated link, clearly explaining the roles of various timers, bufferes, sequence numbers, etc. 10

   b) Point out the angmentations needed in the above simplex SAWP to meke it a duplex SAWP. 3

   c) A 1000 Km noiseless communications link has a data rate of 20 Kbps. 900 - bit frames, each including a 50 bit header are sent over this link using a SAWP where 40 - bit acknowledgement frames are used (for flow control). The average frame processing delay at each end is 1.5 m sec. Determine the channel utilization assuming the velocity of signal propagation to be 2.0×10^5 Km / sec. 7

2. a) What is a computer network ? Why is a computer network not built by using a “flat architecture” where each computer is directly connected by a dedicated link to every other computer ? 5

b) Explain how the 2 – level hierarchical architecture of a computer network removes the fundamental shortcomings of the flat architecture. 4

c) Explain the concepts of “service” and “protocol” that are used in the design of a layerek hierarchical architecture (e.g., the OSI) for a computer network. 5

d) In the context of the OSI architectural reference model, identify the service received and the service provided by each layer within the communication subnet. 6

3. a) Briefly discuss some possible topologies (international graphs of links and switches) for building a communication subnet and broadly compare them in terms of cost, delay and reliability. 10

b) Among the above topologies, which one is considered the most attractive one for building a relatively large wide area communication subnet and why ? 3

c) Which switching technique is generally considered the best for efficiency transporting the large number of user messages (these come from the transport layer of each communication host) accross the communication subnet and why ? 7

4. a) How is a vertual connection or virtual circuit (VC) different from a physical connection or physical circuit ? 5

b) Show the structure of a V.C. Table and explain how it is

built and used in a V.C. subnet. 8

c) Explain the principle of distance vector routing (DVR). 7

5. a) Why do collisions occur in the etherrek ? 4

b) What is the problem of a “circulating frame” in a Token Ring LAN and how is it taken care of ? 4

c) Explain the rules of AMP, SMP and BEACON frames. 6

d) Consider a 4 Mbps token ring LAN having 50 stations with the neighbouring stations being located 40 metres apart. The maximum token holding time is 10 m sec and each station avails of the token 30% of the time, on the average. Determine the walk time and the average scan time. 6

6. a) Why were the techniques of polling and concentration not considered suitable for building a satellite - based network ? 2

b) Explain the salient points about the PURE ALOHA and the SLOTTED ALOHA protocols. 6

c) Consider 4 uncoordinated mobile nodes A, B, C and D staring a single wireless channel with each having a low - power half - duplex ratio transceiver. The neighbourhood of the four nodes may be described as followes :