

This question paper contains 3 printed pages]

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S. No. of Question Paper : 2048

Unique Paper Code : 32341303

GC-3

Name of the Paper : Computer Networks

Name of the Course : B.Sc. (H) Computer Science (CBCS)

Semester : III

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Part A is compulsory and carries 35 marks.

Attempt any *four* questions from Part B.

Part A

1. (a) Name and state the two types of line configuration. 3
- (b) Assume five devices are arranged in a mesh topology. How many ports are needed for each device ? How many cables are needed in this topology ? 2
- (c) What is the difference between data element and signal element ? 2
- (d) What are the parts of a URL ? Give an example. 2
- (e) State optimality principle. 2
- (f) What is the use of Urgent Pointer in a TCP header ? 2
- (g) What is the purpose of options field in an IP Header ? Explain any *two* options. 3

P.T.O.

- (h) State count to infinity problem. Give an example. 3
- (i) What is QAM ? Give the constellation diagram for 64 QAM. 3
- (j) What is the purpose of using Guard Bands in multiplexed channels ? 2
- (k) What is the significance of twisting in twisted-pair cables ? 2
- (l) What is Discrete Multitone technique ? 3
- (m) What is flow control ? How is it handled at data link layer ? 3
- (n) Which layer in the OSI model perform the following services ? 3
- (i) Translation
- (ii) Network virtual terminal
- (iii) Synchronization.

Part B

2. (a) Explain layered OSI model, stating the functionality of each layer. 5
- (b) Explain the concept of self-synchronization in reference to digital signals. 2
- (c) Explain the basic difference between a hub, bridge and a switch. 3
3. (a) What is subnetting ? A network on the internet has a subnet mask of 255.255.240.0.
What is the maximum number of hosts it can handle ? 3
- (b) Give the structure of TCP Header. Discuss the purpose of six one-bit flags. 2+3
- (c) Why is header checksum of an IP packet computed at every hop from source to destination ? 2

4. (a) Describe the binary exponential back off algorithm. 3
- (b) Explain the multimode technique used for propagation of light in optical fibres. 2
- (c) What are the differences between Packet switching and circuit switching ? 5
5. (a) What is the Nyquist sampling rate for a bandpass signal with bandwidth of 300 kHz with lowest frequency as 100 kHz. 2
- (b) A bit string needs to be transmitted at the data link layer. What is the string transmitted after bit stuffing if the original bit string is 011110111110111110. 2
- (c) Explain the *two* basic approaches that use the concept of pipelining at data link layer. 6
6. (a) What is the result of applying the following schemes on sequence 11100000000000 ? Assume that before arrival of this signal, the non-zero signal level has been positive. 4
- (i) B8ZS
- (ii) HDB3
- (b) 16 bit messages are transmitted using a hamming code. How many check bits are needed to ensure that the receiver can detect and correct single bit errors ? Show the bit pattern transmitted for the message 1101001100110101. 4
- (c) Write a short note on any *one* of the following : 2
- (i) WWW
- (ii) DNS.