

**TRIBHUVAN UNIVERSITY**  
**FACULTY OF MANAGEMENT**

Office of the Dean

**2005**

**Full Marks: 40**

**Time: 2 hrs.**

<b>BIM/ Second Semester/ITC 214: Data Communication and Computer Network</b>
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*candidates are required to answer the questions in their own words as far as practicable*

**Group 'A'**

**1. Answer ALL questions.**

**[10×1=10]**

- i. The time period of a sinusoidal waveform is 20 ms. What is its frequency?
- ii. Which component of a communication model is required to generate a signal waveform that can be efficiently and effectively carried by the transmission medium.
- iii. Which layer in the OSI reference model is responsible for routing?
- iv. What is done to avoid the repetition of a flag in the data field of a frame?
- v. Which MAC protocol avoids collision?
- vi. In which switching technique data rate conversion (i.e. different data rates for the source and the receiver) is possible?
- vii. Which property of a good routing algorithm ensures that all the end-stations get equal chances without being biased to anyone?
- viii. For an IP address, if the subnet mask is 255.255.255.224, how many hosts per subset are possible?
- ix. Which transport layer protocol is used for the file transport application?
- x. What is the function of DNS?

**Group 'B'**

**Attempt any FIVE questions.**

2. a. You would like to send an e-mail to your friend from a computer at your residence. Draw and explain one of the possible models of a communication system that can support your requirement. [3]
- b. What is the maximum theoretical data rate a system can support if it has a bandwidth of 4 kHz and SNR of 40dB [3]
3. a. Compare OSI and TCP/IP reference models for computer communications. [3]
- b. What do you mean by framing? List the different framing techniques and illustrate bit stuffing with an example. [3]

4. a. Compare IEEE 802.3 and IEEE 802.5 LAN standards. [3]  
b. List the features supported by data gram packet switching. [3]
5. a. Explain with a diagram how do you find the shortest path between two nodes in a network? [3]  
b. Draw the IP datagram header and answer the following questions: [3]
  - i. What is the maximum size of IP datagram header?
  - ii. What is the significance of TTL field?
  - iii. What is the maximum size of the IP datagram?
6. a. Explain the architecture and working of an e-mail system. [3]  
b. Compare TCP and UDP. [3]
7. a. What error control technique is used by data link layer? Explain the major differences between GO-back-N ARQ and selective-Repeat-AEQ. [3]  
b. Represent bit sequence 1011 by the following waveform: [3]
  - i. ASK
  - ii. FSK
  - iii. PSK
  - iv. NRZ-L
  - v. Manchester
  - vi. AMI