MCA 4th Semester Examination, 2012

COMPUTER NETWORKS

PAPER – MCA-404

Full Marks : 100

Time : 3 hours

Answer **Q.No.1** and any **four** from the rest

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

1. Answer any *five* questions : 2 × 5

(*a*) Differentiate between half duplex and full duplex transmission modes.

(*b*) A line has a signal to noise ratio (SNR) of 1000 and a bandwidth of 4000 kHz. What is the maximum data rate supported by the line ?

(*c*) What do you mean by analog to analog transmission ?

(*d*) What is bit padding ?

(*e*) What do you mean by a low-pass channel ?

(*f*) Given IP address 18.250.31.14 and the subnet mask 255.240.0.0. What is the subnet address ?

(*g*) What are the causes that create congestion in a subnet ?

2. (*a*) What is ISO/OSI reference model ? Explain the functionalitics of any four layers of this model. 2 + (4 × 2)

(*b*) What is the difference among a port address, a logical address and a physical address ? 3

(*c*) What do you mean by message switching ? 2

3. (*a*) Differentiate between bit-interval and bit rate of a digital signal. 3

(*b*) How will you measure data rate of a channel for both a noiseless and a noisy channel. 3 + 3

(*c*) What do you mean by transmission impairments ? Explain any one of them. 2 + 4

4. (*a*) What do you mean by line coding ? What is the difference between signal level and data level ? Explain with proper diagrams. 2 + 3

(*b*) In a digital transmission, the receiver clock is 0·1 percent faster than the sender clock. How many extra bits per second does the receiver receive if the data rate is 1·5 Mbps ? 2

(*c*) With proper diagram briefly discuss Manchester line encoding technique. How does it differ from differential Manchester technique ? 5 + 3

5. (*a*) What do you mean by Frequency Shift Keying (FSK) ? Establish the relationship between band rate and bandwidth in FSK. Use proper diagram to do so. 4 + 4

(*b*) Find the bandwidth for a 4-PSK signal transmitting at 2000 bps. Assume that transmission is in half-duplex mode. 3

(*c*) Draw only the schematic diagrams of any three 16 - QAM configurations varying phase & amplitudes. 4

6. (*a*) Explain the concept of time-slots and frames in Time Division Multiplexing (TDM) technique. Also define 'Interleaving' in this concern. 2 + 2 + 2

(*b*) Suppose the following block of data is to be sent using CRC data 1010110. If a polynomial of the form $x^3 + x^2 + 1$ is used, determine the pattern to be sent. 4

(*c*) In GO-BACK-N-ARQ, the header of the frame allows m bits for the sequence number. Show that the size of the sender window must be less than 2^m. 5

7. (*a*) What do you mean by adaptive routing? Explain Hierarchical routing with suitable diagrams. 2 + 5

(*b*) Describe leaky bucket algorithm for congestion control. 6

(*c*) What is virtual circuit subnet? 2

8. Write short notes on any *three* : 15

(*i*) Gateway

(*ii*) TCP

(*iii*) Subnetting

(*iv*) Quality of service (QOS).

[*Internal Assessment* – 30 Marks]