PG/IVS/MCA-404/16

MCA 4th Semester Examination, 2016

NETWORKING

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*) The loss in a cable is measured as – 0·3 dB per kilometer. If the signal at the beginning of the cable has a power of 2 mW, what is the power of the signal at 5 km ?

(*b*) What is the main disadvantage of Return to Zero (RZ) encoding technique ?

(*c*) Find the maximum bit rate for an FSK signal if the bandwidth of the medium is 12,000 Hz and the difference between the two carriers is 2,000 Hz. Transmission is in full duplex mode.

(*d*) Using Checksum error detection method find if the following received data is erroneous or not :

10101111 11111001 00011101

(*e*) Using 5-bit sequence numbers, determine the maximum size of the sender and receiver windows for each of the following protocols : Stop-and-Wait-ARQ, Go-Back-N-ARQ.

(*f*) Given the IP address 18.250.31.14 and the subnet mask 255.240.0.0, what is the subnet address ?

(*g*) What is the difference between a unicast and a multicast address ?

2. (*a*) Briefly describe the functions of Data link, Network and Transport layers of ISO/OSI reference model.

   (*b*) What do you understand by network topology ? What are the advantages and disadvantages of star topology ?

   (*c*) Nine devices are arranged in mesh topology. How many cables are needed ? How many ports are needed for each device ?

$(3 \times 3) + (2 + 2) + 2$

3. (*a*) What do you mean by transmission impairments ? Describe attenuation, distortion and noise in this context.

   (*b*) "NRZ-L encoding technique does not provide strong synchronization". – Explain.

   (*c*) Differentiate between synchronous and asynchronous transmissions.

$(1 + 2 + 2 + 2) + 5 + 3$

4. (*a*) How baud rate is related to transmission bandwidth in QAM ? Draw a 16-QAM constellation diagram using three amplitude levels and eight phases.

(*b*) Why analog to analog modulation is required ? Which of the three analog to analog conversion techniques is most susceptible to noise ? Explain.

(*c*) Compare FM bandwidth with AM bandwidth in terms of the modulated signal.

(3 + 3) + (2 + 3) + 4

5. (*a*) Construct the Hamming code for the bit sequence : 10110101.

(*b*) With suitable diagram, briefly explain how delayed acknowledgement is handled in Stop-and-Wait ARQ.

(*c*) Describe the frame format of HDLC Supervisory frame. 5 + 5 + 5

6. (*a*) Briefly describe hierarchical routing technique with a suitable example.

(*b*) Which protocols have been designed to perform dynamic mapping of IP address and MAC address ? Explain the mechanism of any one of them.

(*c*) "ICMP is a companion to the IP." – Explain. 5 + (1 + 5) + 4

7. Write short notes (any *five*) : 3 × 5

(*i*) Bitpadding

(*ii*) CSMA/CD

(*iii*) Bridge

(*iv*) UDP

(*v*) Connectionless services

(*vi*) SMTP

(*vii*) DNS.

[*Internal Assessment* : 30 Marks]