

**MASTER OF COMPUTER
APPLICATIONS (MCA) (NEW)**

Term-End Examination

December, 2022

**MCS-218 : DATA COMMUNICATION AND
COMPUTER NETWORKS**

Time : 3 Hours

Maximum Marks : 100

Note : (i) *Question No. 1 is compulsory and carries
40 marks.*

(ii) *Attempt any **three** questions from the
rest.*

1. (a) Why bit stuffing is advantageous over character stuffing ? Write the bit sequence after bit stuffing for the data stream "110001111111100001111100". 2+3

- (b) Differentiate between simplex, half duplex and full duplex modes of data transmission. 5
- (c) What is data encoding ? Explain *three* different ways in which encoding of analog signal with analog information is performed. 2+3
- (d) What is Pipelining ? Explain selective repeat ARQ. 2+3
- (e) Write short notes on hidden station and exposed station problem. 5
- (f) Explain shortest path routing algorithm with a suitable example. 5
- (g) What is remote procedure call ? Mention some important features of UDP. 2+3
- (h) Define a cyber threat. List some common threats in a user's system. 2+3
2. (a) What are synchronous, asynchronous and isochronous communication techniques ? 5

- (b) What is Phase Modulation ? Why is Amplitude Modulation (AM) the most susceptible to noise ? 2+3
- (c) Define multiplexing and switching. What are the differences between ADSL and cable ? 3+2
- (d) What is Internetworking ? Differentiate between star and ring topologies of networking. 2+3
3. (a) Find the CRC for the data polynomial $x^4 + x^2 + x + 1$, where generator polynomial is $x^3 + 1$. 5
- (b) Explain stop and wait ARQ in normal operation and when frame is lost. 5
- (c) What is slotted ALOHA protocol ? Explain its throughput calculation. 5
- (d) Explain 802.11 protocol stack. What are source routing bridges ? 3+2
4. (a) Compute the end to end delay for circuit switching for a network having 5 hops to switch a message of 1200 bits. Here all the

links have a data rate of 4800 bps. Size of packet is 1024 bits with a header of 32 bits. Assume 0.5 sec as a call setup time and hop delay as 0.2 sec and there is no processing delay. 8

- (b) What is distance vector routing ? Explain the count to infinity problem. 3+3
 - (c) Differentiate between congestion control and flow control. Explain congestion control in packet switched networks. 3+3
5. (a) Explain the connectionless and connection oriented services provided by the transport layer. 5
- (b) What are important features of UDP ? Why is it not considered as a reliable service ? 5
 - (c) What is a digital signature algorithm ? Explain the basis of ElGamal public key cryptosystem. 5
 - (d) What is a Firewall ? Explain the working of intrusion detection system. 5