

No. of Printed Pages : 4

MCS-042

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

Term-End Examination

June, 2020

**MCS-042 : DATA COMMUNICATION AND
COMPUTER NETWORKS**

Time : 3 Hours

Maximum Marks : 100

Note : (i) Question No. 1 is compulsory.

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

1. (a) What is CSMA/CD ? What is the need of back-off in CSMA/CD ? Explain back-off algorithm with the help of an example. 10
- (b) What is multiplexing ? How are the frames synchronized in synchronous TDM ? 5
- (c) What are the main issues in routing ? Illustrate good and bad routing using a plot. 5

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- (d) Find the maximum achievable channel capacity of a binary signal which is sent over a 3 kHz and whose signal to noise ratio is 20 dB. 5
- (e) Explain congestion detection and congestion avoidance phases in slow start algorithm in TCP. 10
- (f) What is Pulse Code Modulation (PCM) ? Explain how quantization levels are chosen in PCM. 5
2. (a) What are the advantages of multistage switching over a single-stage circuit switching ? Explain the role of time-slot-interchange (TSI) in time-division switching. 10
- (b) Explain how Nagel's algorithm improves the efficiency of TCP/IP network, with the help of an example. 10

3. (a) Why is stop-and-wait ARQ inefficient ? How does this inefficiency overcome in Go-Back-N ARQ ? Compare Go-Back-N with Selective Repeat ARQ. 10
- (b) What is pure ALOHA protocol ? Explain how is throughput of a system computed. Also explain the relationship plot between throughput and load. 10
4. (a) What is Hidden Station problem in wireless networks ? How is it overcome using RTS, CTS packets ? Illustrate using a diagram. 10
- (b) What is symmetric key cryptography ? Explain block ciphers and stream ciphers with the help of suitable diagrams. 10
5. (a) What is count to infinity problem in IP networks ? How is this problem overcome by the exterior gateway routing protocol ?

- (b) Consider the following network with the indicated link cost. Use Dijkstra's shortest path algorithm to compute the shortest path from source node A to the network node F :

10

