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20MCA13

First Semester MCA Degree Examination, July/August 2022 Computer Networks

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain OSI network architecture with a neat diagram. (10 Marks)
- b. Describe the network requirements of application programmer, network operator and network designer with an example. (06 Marks)
- c. Briefly explain applications of computer networks. (04 Marks)

OR

- 2 a. Explain following ideas with respect to network architecture : layering, protocol, encapsulation, multiplexing and demultiplexing. (10 Marks)
- b. Consider a point-to-point link 4 km in length. At what bandwidth would propagation delay (at a speed of 2×10^8 m/s) equal transmit delay for 100-byte packets? (04 Marks)
- c. Explain circuit switched and packet switched networks with a neat diagram. (06 Marks)

Module-2

- 3 a. Apply NRZ, NRZI, Manchester encoding to the following bit stream :
0 0 1 0 1 1 1 1 0 1 0 0 0 0 1 0 (06 Marks)
- b. Briefly explain Byte oriented protocols. (06 Marks)
- c. Discuss briefly about wifi and Bluetooth. (08 Marks)

OR

- 4 a. Explain the concept of stop and wait protocol with necessary diagrams for different scenario. (10 Marks)
- b. A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is $x^3 + 1$.
 - (i) What is the actual bit string transmitted?
 - (ii) Suppose the third bit from the left is inverted during transmission. How will receiver detect this error? (10 Marks)

Module-3

- 5 a. Define virtual circuit identifier? Explain virtual circuit network and VC table entry for switches with a neat diagram. (10 Marks)
- b. Define spanning tree algorithm and explain how it works. (10 Marks)

OR

- 6 a. Explain IPV₄ packet headers format with a neat diagram. (10 Marks)
- b. Briefly discuss about,
 - (i) ARP
 - (ii) ICMP
 - (iii) DHCP
 - (iv) Border Gateway Protocol (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Explain three-way hand shakes algorithm for connection establishment and termination respectively for TCP with diagram. (10 Marks)
b. Explain UDP header format. (06 Marks)
c. What are the key characteristics of UDP? (04 Marks)

OR

- 8 a. Explain congestion avoidance mechanisms in brief. (10 Marks)
b. Briefly explain the mechanisms used for TCP congestion control. (10 Marks)

Module-5

- 9 a. Write a brief note on Domain Name System (DNS). (10 Marks)
b. Explain the following cryptographic building blocks :
(i) Symmetric-key ciphers
(ii) Public-key ciphers
(iii) Authenticators
(iv) Ciphers (10 Marks)

OR

- 10 a. What are firewalls? Explain strengths and weaknesses of firewalls. (10 Marks)
b. Explain the following protocols :
(i) SMTP
(ii) HTTP
(iii) SNMP
(iv) IMAP (10 Marks)
