Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 50961

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Fourth Semester

Electronics and Communication Engineering

EC 3401 – NETWORKS AND SECURITY

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   How can you represent the number – 6 in one's complement arithmetic using only four bits?

2.   Write a note on IEEE 802.11.

3.   Differentiate between IPv4 addresses and IPv6 addresses.

4.   What is the difference between the delivery of a frame in the data link layer and the delivery of a packet in the network layer?

5.   Why do we need a DNS system when we can directly use an IP address?

6.   Compare the TCP header and the UDP header. List the fields in the TCP header that are missing from UDP header. Give the reason for their absence.

7.   What is security service and its categories?

8.   Which type of algorithms does a digital signature consist of?

9.   What is probe attack in network security?

10. Differentiate between a virus and a trojan.

PART B — (5 × 13 = 65 marks)

11. (a) In CRC, show the relationship between the following entities. (Here, size means the number of bits) :

   (i) The size of the dataword and the size of the codeword (3)

   (ii) The size of the divisor and the remainder (3)

   (iii) The degree of the polynomial generator and the size of the divisor (3)

   (iv) The degree of the polynomial generator and the size of the remainder (4)

Or

   (b) Explain in detail about the seven layers of the OSI architecture model with neat diagram.

12. (a) (i) Compare and contrast between unicast and multicast routing. (6)

   (ii) Compare and contrast between interdomain and intradomain routing protocols. (7)

Or

   (b) An IPv4 datagram has arrived with the following information in the header (in hexadecimal) :

   O × 45 00 00 54 00 03 58 50 20 06 00 00 7C 4E 03 02 B4 OE OF 02

   (i) Is the packet corrupted? (2)

   (ii) Is the packet fragmented? (2)

   (iii) What is the size of the data? (2)

   (iv) How many more routers can the packet travel to? (2)

   (v) What is the identification number of the packet? (2)

   (vi) What is the type of service? (3)

13. (a) Illustrate in detail about congestion control and its avoidance techniques.

Or

   (b) (i) Exemplify in detail about Domain Name System. (6)

   (ii) Describe in depth about WWW and HTTP protocol. (7)

2   50961

14. (a) (i) Explain in detail about RSA algorithm with an example. (7)

(ii) Exemplify in detail about Advanced Encryption Standard (AES). (6)

Or

(b) (i) Describe the working nature of Secure Hash Algorithm (SHA). (6)

(ii) Illustrate about hash functions in cryptography. (7)

15. (a) Explain in detail about blockchain technology and its features.

Or

(b) (i) Exemplify in detail about side channel attack in hardware security. (7)

(ii) Illustrate in detail about hardware security best practices and counter measures. (6)

PART C — (1 × 15 = 15 marks)

16. (a) Design two algorithms for byte-stuffing. The first adds bytes at the sender; the second removes bytes at the receiver.

Or

(b) An organization is granted the block 16.0.0.0/8. The administrator wants to create 500 fixed-length subnets.

(i) Find the subnet mask. (3)

(ii) Find the number of addresses in each subnet. (4)

(iii) Find the first and last addresses in subnet 1. (4)

(iv) Find the first and last addresses in subnet 500. (4)