No. of Printed Pages : 5

BCS-041

BACHELOR OF COMPUTER APPLICATIONS (BCA) (Revised)

Term-End Examination

00791

June, 2017

BCS-041 : FUNDAMENTALS OF COMPUTER NETWORKS

Time : 3 hours *Maximum Marks : 100*

Note : *Question no. **1** is **compulsory**. Answer any **three** questions from the rest.*

1. (a) Find the CRC for the data polynomial

$$x^9 + x^7 + x^5 + x^2 + 1$$

with the generator polynomial $x^3 + x + 1$. *7*

(b) Match the following to one or more layers of the OSI model (write the name of layer(s)) : *4*

(i) Error correction and Detection

(ii) Running an e-mail application

(iii) Modulation and Encoding

(iv) Routing of packets

(c) What is a problem with PSK ? Explain what are 4-QPSK and 8-QPSK. *5*

(d) Suppose a class B network uses 20 bits out of 30 bits to define a network address. How many class B networks are possible in this case ? *3*

(e) What is the reserved bit pattern of the first byte of a class D address class ? 3

(f) The following Figure 1(a) is a subnet with A, B, C, D and E router nodes :

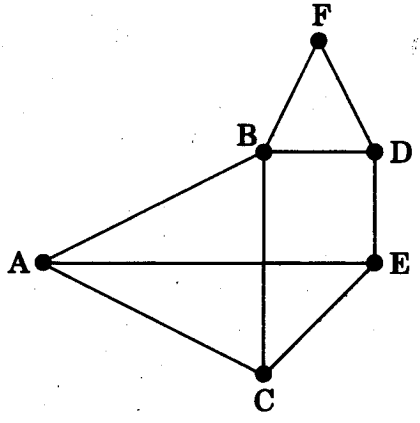

Figure 1(a) : Subnet

In Figure 1(b), the first three columns show the delay vectors received from the neighbours of E(A, C, D).

	A	C	D	E	link
A	0	5	7	10	A
B	10	8	14	–	
C	15	0	21	8	C
D	20	14	0	7	D
E	25	19	28	0	
F	20	25	10	–	

Figure 1(b) : Delay vector

Suppose E has measured its delay to A, C, D as 10, 8, 7 msec respectively. Show how E calculates the delay to B and F routers and through which link. *10*

(g) If p = 7 and q = 11, calculate the encryption key 'e' and the decryption key 'd' using RSA algorithm. *8*

2. (a) State *True/False* for the following statements with respect to packet switching : *5*

(i) Bandwidth is allocated dynamically.

(ii) Useful for delay sensitive applications.

(iii) Not economical as it needs a dedicated circuit.

(iv) Packet needs to be re-transmitted every time it gets lost.

(v) Overhead is more because every packet is required to carry address.

(b) Compare Bus topology and Star topology with respect to the following parameters : *6*

(i) Central point of failure

(ii) Cable size

(iii) Maintenance and installation cost

(iv) Performance of a system by adding extra cost

(c) Briefly describe the following major access technologies in LAN : 6

(i) CSMA

(ii) Token Passing

(d) Give any two reasons for using a layered protocol. 3

3. (a) How does HTTP protocol work ? 4

(b) Write the throughput expression of Aloha and Slotted Aloha. Also plot load vs throughput graph of the above protocol. 6

(c) Explain hierarchical routing with the help of an example. 6

(d) How does TCP manage loss and duplication of packets ? 4

4. (a) Explain the slow start process to manage congestion control at transport layer. 5

(b) What is QoS ? Describe any technique to improve QoS. 4

(c) Compare Frame relay and X.25 with respect to the following parameters : 6

- Data rate
- Flow control and error control mechanisms
- Data link layer feature

(d) State *True/False*. 5

(i) Bluetooth can support up to 8 devices simultaneously in master/slave mode.

(ii) IEEE 802·3 is a standard of WLAN.

(iii) Every cell in a wireless cellular network has one base station.

(iv) First generation wireless network was intended for voice as well as data.

(v) GSM is used all over the world.

5. (a) What are the two modes of wireless communication system ? Discuss. 6

(b) Draw the GSM architecture and explain the components which manage database. 4

(c) How is block cipher different from stream cipher ? Explain with the help of example. 6

(d) Explain the following terms with the help of examples : 4

- Non-repudiation
- Encryption