OBE

29150

B.Sc. (Hons.) VI Semester Examination 2019-2020

Computer Science

Paper: CS-204

(Computer Networks)

Time: Four hours] [**Full Marks**: 70

Instructions

1. **The Question Paper contains 08 questions out of which you are required to answer any 04 questions. The question paper is of 70 marks with each question carrying 17.5 marks.**

   प्रश्नपत्र में आठ प्रश्न पूँछे गये हैं जिनमें से 4 प्रश्नों का उत्तर देना है। प्रश्नपत्र 70 अंकों का है, जिसमें प्रत्येक प्रश्न 17.5 अंक का है।

2. The total duration of the examination will be **4 hours** (Four hours), which includes the time for downloading the question paper from the Portal, writing the answers by hand and uploading the hand-written answer sheets on the portal.

   परीक्षा का कुल समय 4 घंटे का है जिसमें प्रश्नपत्र को पोर्टल से डाउनलोड करना, हस्तलिखित प्रश्नों का उत्तर पोर्टल पर अपलोड करना है।

3. For the students with benchmark disability as per Persons with Disability Act, the total duration of examination shall be **6 hours** (six hours) to complete the examination process, which includes the time for downloading the question paper from the Portal, writing the answers by hand and uploading the hand-written answer sheets on the portal. .

   दिव्यांग छात्रों के लिये परीक्षा का समय 6 घंटे निर्धारित हैं जिसमें प्रश्नपत्र को पोर्टल से डाउनलोड करना एवं हस्तलिखित उत्तर को पोर्टल पर अपलोड करना है।

4. Answers should be hand-written on a plain white A4 size paper using black or blue pen. Each question can be answered in upto 350 words on 3 (Three) plain A4 size paper (only one side is to be used).
   हस्तलिखित प्रश्नों का उत्तर एक सादे सफेद A4 साइज के पन्ने पर काले अथवा नीले कलम से लिखा होना चाहिये। प्रत्येक प्रश्न का उत्तर 350 शब्दों अथवा A4 साइज के तीन पृष्ठों का होना चाहिये। प्रश्नों का उत्तर कापी के केवल एक पृष्ठ पर ही लिखना है।

5. Answers to each question should start from a fresh page. All pages are required to be numbered. You should write your Course Name, Semester, Examination Roll Number, Paper Code, Paper title, Date and Time of Examination on the first sheet used for answers.
   प्रत्येक प्रश्न का उत्तर नये पृष्ठ से शुरू करना है। सभी पृष्ठों को पृष्ठांकित करना है। छात्र को प्रथम पृष्ठ पर प्रश्नपत्र का विषय, सेमेस्टर, परीक्षा अनुक्रमांक, प्रश्नपत्र कोड, प्रश्नपत्र का शीर्षक, दिनांक एवं समय लिखना है।

Questions

1.

a. If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer?
(2.5)

b. What is the difference between a port address, a logical address, and a physical address?
(2.5)

c. What is the purpose of cladding in an optical fiber?
(2.5)

d. What is the difference between Manchester and Differential Manchester encoding? (5)

e. Distinguish between Circuit switching and Packet switching approaches. (5)

2.

a. What is the transmission delay of a packet sent by a station if the length of the packet is 1 million bytes and the bandwidth of the channel is 200 Kbps? (2.5)

b. Which of the four digital-to-analog conversion techniques (ASK, FSK, PSK or QAM) is the most susceptible to noise? Defend your answer. (2.5)

c. Ten sources, six with a bit rate of 200 kbps and four with a bit rate of 400 kbps are to be combined using multilevel TDM with no synchronizing bits. Answer the following questions about the final stage of the multiplexing: (6)

i. What is the size of a frame in bits?

ii. What is the frame rate?

iii. What is the duration of a frame?

iv. What is the data rate?

d. What is the Hamming distance? What is the minimum Hamming distance? (2.5)

e. Given the dataword 1010011110 and the divisor 10111, (4)

i. Show the generation of the codeword at the sender site (using polynomial division).

ii. Show the checking of the codeword at the receiver site (assume no error).

3.

a. Compare and contrast byte-stuffing and bit-stuffing. (2.5)

b. Define piggybacking and its usefulness. (2.5)

c. Explain why collision is an issue in a random access protocol but not in controlled access or channelizing protocols. (2.5)

d. What is the difference between non-persistent and p-persistent CSMA? (5)

e. Compare and contrast Go-back-N ARQ protocol with Selective Repeat ARQ. (5)

4.

contd.— 3

a. Why is there no need for CSMA/CD in a full-duplex Ethernet LAN?
(2.5)

b. The address 43:7B:6C:DE: 10:00 has been shown as the source address in an Ethernet Frame. The receiver has discarded the frame. Why?
(2.5)

c. What are the common Fast Ethernet implementations? (5)

d. A bridge uses a filtering table; a router uses a routing table. Can you explain the difference? (5)

e. Why does Ethernet have a minimum frame length of 64 bytes?
(2.5)

5.

a. Explain why most of the addresses in class **A** are wasted. Explain why a medium-size or large-size corporation does not want a block of class **C** addresses.
(2.5)

b. In a block of addresses, we know the IP address of one host is 182.44.82.16/24. What are the first address (network address) and the last address in this block?
(2.5)

c. 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?
(2.5)

d. What do you mean by address depletion? How Classless addressing scheme is used to solve this problem?
(5)

e. What is the need of IP datagram fragmentation at network layer? Describe the fields related to fragmentation in IP header. (5)

6.

a. Compare and contrast the fields in the main headers of IPv4 and IPv6. Make a table that shows the presence or absence of each field. (5)

b. How ICMP protocol support IP protocol? Explain various error reporting messages generated by ICMP. (5)

c. In an IPv4 packet HLEN is 1000 in binary. How many bytes of options are being carried by this packet?
(1.5)

d. List three transition strategies to move from IPv4 to IPv6. Explain the difference between *tunnelling* and *dual stack* strategies during the transition period. When is each strategy used? (6)

7.

contd.-4

a. Why is an ARP query sent within a broadcast frame?
(1.5)

b. Explain the difference between BOOTP and DHCP protocols? (5)

c. Explain the concept of three-way handshaking for TCP connection termination. (5)

d. In cases where reliability is not of primary importance, UDP would make a good transport protocol. Give examples of specific cases.
(2.5)

e. List the fields in the TCP header that are missing from UDP header. Give the reason for their absence. (3.5)

8.

a. Explain different steps of Link State routing algorithm. (6)

b. Define network congestion. How it affects network performance? (4)

c. How does recursive resolution differ from iterative resolution in DNS? (5)

d. How is HTTP related to WWW?
(2.5)