Tribhuvan University
Institute of Science and Technology
2067
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Bachelor Level/ Third Year/ Fifth Semester/ Science — Full Marks: 60
Computer Science and Information Technology (CSc. 301) — Pass Marks: 24
(Computer Networks) — Time: 3 hours

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Group A

Long Answer Questions:

Attempt all questions: (2x10=20)

1. Explain the principles of application layer protocols. What do you mean by file transfer?

   OR

   What are the main relationship between transport layer and network layer? What are the transport layer uses in Internet?

2. Explain the congestion control principle and its approaches.

Group B

Short Answer Questions:

Attempt any eight: (8x5=40)

3. Explain the connection oriented and connectionless service.
4. Explain the working principle of DNS.
5. What do you mean by pipelined reliable data transfer protocol?
6. What do you mean by hierarchical routing?
7. Explain the multicasting routine and its applications.
8. Define Data link layer and its services.
9. Mention the types of multimedia networking applications.
10. What are the key components of network management architecture?
11. Explain the Asynchronous transfer mode (ATM).

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Group A

Long Answer Questions:

Attempt all questions: (2x10=20)

1. Explain the OSI reference model?
   OR
   What do you mean by TCP? Explain the TCP structure?

2. Define DNS. Explain the DNS records and DNS messages.

Group B

Short Answer Questions:

Attempt any eight: (8x5=40)

3. What do you mean by Internet Protocol stack?
4. Differentiate between transport layer and network layer.
5. Explain the principle of congestion control.
6. What do you mean by IP datagram fragmentation?
7. Explain the point to point protocol (PPP).
8. What do you mean by multicasting routing?
9. Explain the Internet Control Message Protocol (ICMP).
10. What are the various types of multimedia networking application?
11. What types of intra structure is needed for network management?

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Group A

Long Answer Questions:

Attempt all questions: (2x10=20)

1. What are the seven layers of OSI model? Comparison between these seven layers.
   OR
   What do you mean by routing? Differentiate between Non-adaptive algorithm and adaptive algorithm.

2. Explain the congestion control algorithm with example.

Group B

Short Answer Questions:

Attempt any eight: (8x5=40)

3. What do you mean by internet protocol stack?
4. Differentiate between DNS records and DNS messages.
5. Explain the pipelined reliable data transfer protocol.
6. Explain network service model.
7. Explain IPV4 addressing.
8. What do you mean by network address translator?
9. Explain on ALOHA and slotted ALOHA protocols.
10. What are the various applications of multimedia networking?
11. Explain the network management architecture with suitable diagram.

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Group A

Long Answer Questions:

Attempt all questions: (2x10=20)

1. Explain the functioning of 7 layers of OST model. What is the necessity of using 7 layers concept in OST Model?

   OR

   Explain the various layers of TCP/IP. Also, list the protocols used in each layer.

2. Explain how does CRC detect the errors with multiple bits? Given message is $M(x) = x^7 + x^4 + x^3 + x^2 + 1$ and the generator is $G(x) = x^3 + 1$. Show the actual bit string transmitted, suppose the third bit from the left is inverted during the transmission. Show how the error is detected at the receiver's end.

Group B

Short Answer Questions:

Attempt any eight: (8x5=40)

3. What are sliding window protocol? Explain one-bit sliding window protocol with an appropriate diagram.
4. Explain how slatted Aloha improves the performance of system over pure Aloha.
5. Describe multimedia networking and its various applications.
6. Why routing is important in a computer network? Differentiate between adaptive and non-adaptive routing algorithms.
7. Differentiate between broadband and base band services.
8. How does ATM differ from frame relay? List and briefly define the ATM service classes.
9. Compare and contrast the IPv4 and the IPv_6 header files. Do they have any fields in common?
10. Define multiplexing. Discuss the need for multiplexing in network system.
11. What is meant by "domain name"? How is a domain name translated to an equivalent IP address? Explain with the help of an example.

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Group A

Long Answer Questions:

Attempt all questions: (2x10=20)

1. Define protocol. Why do we need layered protocol architecture? Discuss each layer of TCP/IP protocol architecture in detail.

   OR

   Define transmission media. Differentiate between guided and unguided transmission media. Discuss each guided transmission media in detail.

2. What is routing? Discuss link state routing algorithm in detail.

Group B

Short Answer Questions:

Attempt any eight: (8x5=40)

3. Explain client server system. How is it different from peer to peer system?
4. Discuss HTTP in detail.
5. Discuss the importance of multiplexing in data communication.
6. Assume a class B network and divide it into four subnets. What is the value of new subnet mask?
7. Discuss CRC as an error detection mechanism.
8. Explain the importance of multimedia network.
9. Why is network management an important task?
10. What is congestion control? Why do we need it?
11. Write short note on:
    a. DNS
    b. Streaming audio and video

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Group A

Long Answer Questions:

Attempt all questions: (2x10=20)

1. Discuss the relationship between transport layer and network layer. Discuss TCP as a transport layer protocol along with its segment structure.

   OR

   What is transmission media? Discuss each transmission media in detail.

2. Why do we need routing algorithm? Discuss distance vector routing algorithm in detail.

Group B

Short Answer Questions:

Attempt any eight questions: (8x5=40)

3. What is connection oriented service? Differentiate it with connectionless service.
4. Discuss the working principle of DNS.
5. Why do we need multiplexing in data communication? Discuss.
6. What is subnetting? Assume a class C network and divide it into four subnets. What is the value of new subnet mask?
7. How does the system correct error after error detection?
8. Discuss multimedia networking application.
9. Why is network management a challenging task?
10. Discuss the importance of congestion control in data communication.
11. Write short notes on:
    a. HTTP
    b. Backbone

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Group A

Long Answer Questions:

Attempt all questions: (2x10=20)

1. Explain the seven layers of OST model and compare between them.
   OR
   What do you mean by link state routing algorithm? Differentiate between IPv4 and IPv6.

2. Explain the purpose of subnetting and also explain the subnet mask.

Group B

Short Answer Questions:

Attempt any eight: (8x5=40)

3. Explain the responsibilities of data link layer in the internet model.
4. What do you mean by TCP push operation?
5. Explain the Internet Control Message Protocol (ICMP).
6. Explain the point to point protocol (PPP) with example.
7. Write down the techniques used in the 802.12 protocol for wireless networks?
8. Differentiate between ALOHA and slotted ALOHA protocols.
9. Discuss the idea used in public key encryption system.
10. What are the application of multimedia networking?
11. Mention the intra structure for network management.