

4E1307

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**4E1307**

**B.Tech. IV-Sem. ( Main/Back ) Exam. - 2024**

**ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**

**4AID4-07 Data Communication and Computer Networks**

**CS, IT, AID, CAI**

**Time : 3 Hours**

**Maximum Marks : 70**

**Instructions to Candidates :**

**Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.**

*Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.*

*(Mentioned in Form No. 205)*

[ersahilkagyan.com](http://ersahilkagyan.com)

1. ....

2. ....

**PART-A**

**[10x2=20]**

**(Answer should be given up to 25 words only)**

**All questions are compulsory**

Q.1. What is the use of RJ-45 connector?

Q.2. What are the differences between star and ring topology?

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- Q.3. Define the Data Rate.
  - Q.4. How we detect the error in packet at the transport layer?
  - Q.5. What is Piggy backing?
  - Q.6. List the four functions of the Network Layer.
  - Q.7. What do you mean by Quality of Services?
  - Q.8. Define the segmentation at the transport layer.
  - Q.9. What is port number?
  - Q.10. SMTP is a push protocol. Justify the statement.

**PART-B**

**[5x4=20]**

**(Analytical/Problem solving questions)**

**Attempt any five questions**

**(Word limit : 100 words)**

- Q.1. What is the need of Line Encoding? Draw the wave diagrams of the binary sequence 01110110 for following Line Encoding :
  - (a) NRZ-L
  - (b) NRZ-I
  - (c) Polar RZ
  - (d) Manchester
  - (e) Differential Manchester
- Q.2. Explain the Checksum. Suppose that a message 1001 1100 1010 0011 is transmitted using Internet Checksum (4-bit word). What is the value of the checksum?
- Q.3. Consider the delay of pure ALOHA versus slotted ALOHA at low load. Which one is less? Explain your answer.
- Q.4. Explain the working of Routing Information Protocol (RIP). Why do you think RIP uses UDP instead of TCP?
- Q.5. Why does the maximum packet lifetime, T, have to be large enough to ensure that not only the packet but also its acknowledgments have vanished?

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- Q.6. In a TCP connection, the initial sequence number at the client site is 2171. The client opens the connection sends three segments, the second of which carries 1000 bytes of data, and closes the connection. What is the value of the sequence number in each of the following segments sent by the client?
- (a) The SYN segment
  - (b) The data segment
  - (c) The FIN segment
- Q.7. FTP uses two separate well-known port numbers for control and data connection. Does this mean that two separate TCP connections are created for exchanging control information and data?

**PART-C**

**[3x10=30]**

**(Descriptive/Analytical/Problem Solving/Design question)**

**Attempt any three questions**

- Q.1. Assume that an application-layer protocol is written to use the services of UDP. Can the application-layer protocol use the services of TCP without change?
- Q.2. A 20 Kbps satellite link has a propagation delay of 400 msec, the transmitter employs the "Go back N" ARQ scheme with N set to 10. Assuming that each frame is 100 bytes long, what is the maximum data rate possible?
- Q.3. Compare and contrast the IPv4 header with the IPv6 header. Create a table to compare each field.
- Q.4. A computer on a 6-Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 1 Mbps. It is initially filled to capacity with 8 megabits. How long can the computer transmit at the full 6 Mbps?
- Q.5. Explain the request and response message format of the HTTP protocol.

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