

2025

COMPUTER SCIENCE — HONOURS

Paper : DSCC-10

(Data Communication and Networking)

Full Marks : 75

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer **any five** questions : 2×5
- (a) What is packet switching? Explain with proper illustration.
 - (b) What is Simplex transmission?
 - (c) Define a MAC address. Explain in brief why it is referred to as a physical address in computer networks.
 - (d) What are bit rate and baud rate?
 - (e) What are the meanings of semantics and syntax?
 - (f) State the Shannon's capacity for a noisy channel.
 - (g) Define Statistical Time Division Multiplexing.
 - (h) What is port addressing and why is it used?

Group - A

Answer **any three** questions.

2. Explain Quadrature Amplitude Modulation (QAM) with suitable example. 5
3. (a) Encode the bit pattern 011010011010 using Differential Manchester. Draw the appropriate diagram.
(b) What is a DC component and baseline wandering? How can line coding schemes eliminate them? 3+2
4. (a) What are the merits of Mesh topology that make it robust compared to other topologies?
(b) What are the key components of a data communication system? 3+2
5. What is the principle behind optical fiber? Explain the construction with suitable diagram and explain the different types of propagation modes. 2+1+2
6. Compare and contrast between FDMA, TDMA and CDMA. 5

Please Turn Over

(4521)

Group - B

Answer *any five* questions.

7. (a) What are the different types of transmission impairments? Describe each with examples or illustrations.
- (b) Why does baseband transmission require a low-pass channel, while broadband transmission requires a bandpass channel? Explain with illustrations. 5+5
8. (a) Explain Frequency Division Multiplexing (FDM) with illustrations.
- (b) Eight channels, each with 200 kHz bandwidth, are multiplexed. What is the minimum link bandwidth if a 20 kHz guard band is needed between channels? 7+3
9. (a) Describe CRC (Cyclic Redundancy Check) error detection technique with an example.
- (b) Describe the working of ADSL modem. 7+3
10. (a) Compare the layers of the TCP/IP protocol suite with the OSI Model and explain the layers in brief.
- (b) How is data rate managed in TDM? Explain with examples. 7+3
11. (a) Differentiate between Pure ALOHA and SLOTTED ALOHA with appropriate illustrations.
- (b) Explain the medium access protocol CSMA/CD. Why is CSMA/CD not used in wireless networks? What protocol is used instead? Explain its advantages. (2+2)+(2+1+1+2)
12. (a) State Nyquist theorem for a noiseless channel. For a noiseless channel with 8000Hz bandwidth transmitting signals with four levels, calculate the maximum bit rate.
- (b) Write a short note on IPv4 addressing schemes used in Internet technology. (2+3)+5
13. (a) Compare and contrast between LAN, WAN and MAN.
- (b) What are the advantages of optical fiber over twisted-pair? 8+2
14. Write short notes on (*any two*) : 5×2
- (a) FTP versus SMTP
- (b) UDP
- (c) Email
- (d) DNS.
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