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## ***B.Tech. Degree III Semester Supplementary Examination November 2021***

**CS 15-1306 DATA AND COMPUTER COMMUNICATION**  
(2015 Scheme)

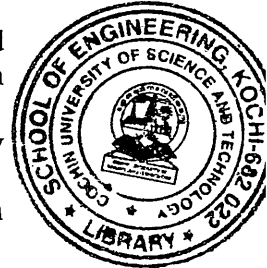
Time: 3 Hours

Maximum Marks: 60

**PART A**  
(Answer *ALL* questions)

(10 × 2 = 20)

- I. (a) What is the difference between network layer delivery and transport layer delivery?
- (b) Can we say if a signal is periodic or nonperiodic by just looking at its frequency domain plot? How?
- (c) How many invalid (unused) code sequences can we have in 5B/6B encoding?
- (d) Assume that a voice channel occupies a bandwidth of 4 kHz. We need to multiplex 10 voice channels with guard bands of 500 Hz using FDM. Calculate the required bandwidth.
- (e) What is the significance of the twisting in twisted-pair cable?
- (f) There are three communication phases involved in a circuit switched network. Match these phases with the phases in a telephone call between two parties.
- (g) Distinguish between **forward error correction** and **error correction by retransmission**.
- (h) Compress **BBBHHDDXXXXKKKKWWZZZZ** using run length encoding.
- (i) For each of the following networks, discuss the consequences if a connection fails.
- (i). Five devices arranged in a mesh topology
- (ii). Five devices arranged in a ring topology
- (j) Why is there no need for CSMA/CD on a full-duplex Ethernet LAN?



**PART B**

(4 × 10 = 40)

- II. (a) Explain the responsibilities of each layer in the ISO-OSI model. (7)
- (b) What is the propagation time if the distance between the two points is 12,000 km? Assume the propagation speed to be  $2.4 \times 10^8$  m/s in cable. (3)
- OR**
- III. (a) Encode 01001110 using (5)
- (i) NRZ-L
- (ii) NRZ-I
- (b) Distinguish between bit rate and baud rate. An analog signal carries 4 bits per signal element. If 1000 signal elements are sent per second, find the bit rate. (5)

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IV. Explain the various transmission media. (10)

**OR**

V. (a) Distinguish between circuit switching and packet switching. (5)

(b) Explain the characteristics of virtual circuit networks. (5)

VI. A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is  $x^3 + 1$ . Show the actual bit string transmitted. (10)

Suppose that the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end.

**OR**

VII. Explain Go-Back-N ARQ with the help of diagrams. (10)

VIII. Explain the functions of the following network devices: (10)

- (i) Hub
- (ii) Bridge
- (iii) Router
- (iv) Gateways

**OR**

IX. (a) Explain ad hoc and infrastructure networks. (5)

(b) With the help of a diagram, explain Hidden Station Problem. (5)

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