B.Sc. (Honours) Examination 2018
Semester-V
Computer Science
Course : BCSC-52
(Digital Communication)

Time : 3 Hours **Full Marks : 40**

Questions are of value as indicated in the margin

Answer **any five** questions.

1. a) Show the Manchester and differential-manchester coded waveform for bitstream 11001001.2
   b) A system is constrained to use NRZI line coding scheme – but cannot function if the voltage level remains same for more than 7-bit duration. Can a bit-scrambling technique be devised without adding any resultant DC voltage? Illustrate and justify. (2+2)+4=8

2. Let modulated sinusoid be represented as $s(t) = A\cos(2\pi ft + \varphi)$.
   a) How many times would A and φ change during transmission of 1010000011110110 using 16-QAM?
   b) How many times would A and φ change during transmission of the same bitstream using QPSK?
   c) Transmitted power of $s(t) = A^2/2$. For the same average power, compare the peak transmission power for QPSK and 16-QAM. 4+2+2=8

3. a) Compare the framing overhead in transmitting 0111001111110111 using flag-based framing scheme with 011110 as delimiter.
   b) Briefly describe the corresponding receiver operation.
   c) Briefly illustrate length-based framing mechanism. 3+3+2=8

4. a) 4-bit vertical and 4-bit horizontal checksum is appended to a 24-bit input packet. Illustrate bit error patterns not detectable by this checksum.
   b) 4-bit CRC with generator 10111 is appended to input 10010010. If 1st and 8th bits (numbered from left) of the transmitted codeword are received in error, verify if that error is detectable.
   c) Would answer of (b) be different for different input bit sequence? Justify. 3+3+2=8

5. a) Packet transmission time and round-trip time of a stop-and-wait ARQ are 2 ms and 10 ms respectively. Probability of a packet being received in error is 0.1. Assume acknowledgements as error-free. Find the average packet throughput rate if maximum retransmission count = 5
   b) Explain why maximum window size is 16 for a selective-repeat ARQ with modulo-32 sequence numbering.
   c) Illustrate Go-Back-N ARQ operation having polling function and both ACKs and NACKs. 3+2+3=8

6. a) What are different fields of a UDP packet?
   b) What is the difference between protocol and interface?
   c) What is the utility of software port? 4+2+2=8

P.T.O.

7. a) Briefly describe the steps executed by a HTTP client to display a web page.
   b) What is the role of the DNS server in the context of HTTP communication? How does DNS server store the IP address for fast retrieval? 3+(2+3)=8

8. Write short notes on the following : 2×4=8
   a) Cookies
   b) SMTP
   c) Subnet mask
   d) State-full server

_____