

B.Sc. (Honours) Semester-IV Examination 2017
Computer Science (Allied)
Course : BCSA-41

Time : 3 Hours

Full Marks : 40

Questions are of value as indicated in the margin

Group – A

Attempt **any two** from this group.

1. (a) Show the NRZ-I and Manchester coded waveforms for bit stream 11000101.
(b) Why is Manchester coding preferred over NRZ?
(c) Find out a bit sequence where NRZ-L and Manchester coded waveforms would have the same number of transitions. 4+3+3=10
2. (a) Calculate 4-bit horizontal and 4-bit vertical parities for input frame 1100010000111100.
(b) Show a possible error pattern which is not detectable by this combined parity.
(c) Calculate the CRC frame check sequence for input 11100100 and generator polynomial 11001.
3. (a) If two hosts on a slotted ALOHA network suffer collision in their first transmission attempts, find the probability that collision is resolved within 8 slots for persistency value (N) = 8. Assume all other hosts are inactive.
(b) Illustrate Go-Back-N ARQ operation with a schematic diagram. 5+5=10

Group – B (Programming in Java)

Answer Question No.4 and **any two** from the rest

4. Answer **any five** from the following questions: 5×1=5
 - (a) Java program is termed “Write once run everywhere”. Explain.
 - (b) Why packages are used?
 - (c) What is the difference between JRE and JDK?
 - (d) Distinguish between method overloading and method overriding.
 - (e) What is the difference between an identifier and a literal?
 - (f) What is type casting in JAVA?
 - (g) Which array declaration style is illegal in JAVA and why?
 - (i) `int[][] twoDim = new int[4][];`
 - (ii) `twoDim[0] = new int[5];`
 - (iii) `twoDim[1] = new int[5];`
 - (iv) `int[][] twoDim = new int[][4];`
5. What is a constructor? With example, show use of default constructor and parameterized constructor? Explain why we cannot inherit the constructor of base class into subclasses. Can constructor be made final? 1.5+3+1.5+1.5=7.5
6. What is the index of the first and the last component of a one hundred component array? Explain in detail the lifecycle of an object, making reference to its creation, usage and destruction. What is the difference between an inner and a nested class in Java? How we can access a protected member of a class? 1.5+3+1.5+1.5=7.5

P.T.O.

7. The sequence 1,1,1,3,5,9,17,31,57,105,193,355,653,1201... is defined by $T_1 = T_2 = T_3 = 1$ and $T_n = T_{n-1} + T_{n-2} + T_{n-3}$.

It can be shown that 27 does not divide any terms of this sequence. In fact 27 is the first odd number with this property.

Write a program in JAVA to find the 3rd odd number that does not divide any terms of the above sequence. 7.5

8. A palindromic number is a number that is read as same when read from both sides. The largest palindrome made from the product of two 2-digit numbers is $9009 = 91 \times 99$. Write a Java program to find the largest palindrome made from the product of two 3-digit numbers. 7.5
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