



UNIVERSITY OF NORTH BENGAL

B.Sc. General Part-I Examination, 2020

COMPUTER SCIENCE

PAPER-I (Revised New Syllabus)

Time Allotted: 1 Hour

Full Marks: 25

The figures in the margin indicate full marks.

Answer Question No. 1 and any *one* from the rest

1. (a) Select the correct option (any *three*): 1×3 = 3
- (i) Which one of the following is a minterm of a Boolean function $f(A, B, C)$?
(A) $A\bar{B}\bar{C}$ (B) $\bar{A} + BC$ (C) $(A + \bar{B})C$ (D) $\bar{A}B + A\bar{C}$
- (ii) Which one of the following is not an output of a four-bit ring counter?
(A) 1000 (B) 0100 (C) 0000 (D) 0001
- (iii) A _____ is a sequential circuit.
(A) multiplexer (B) decoder (C) full-adder (D) SR flip-flop
- (iv) 1 Terabyte = 1024 _____
(A) Gigabytes (B) Petabytes (C) Zettabytes (D) Yottabytes
- (v) Find the odd one out.
(A) MS-Windows 7 (B) MS-Office
(C) Adobe Photoshop (D) Corel Draw
- (vi) Master-slave design eliminates _____ in J-K flip-flop.
(A) race condition (B) racing
(C) clipping (D) toggling
- (vii) Find the odd one out.
(A) ASCII (B) EBCDIC (C) GRAY code (D) UNICODE
- (b) State True or False (any *two*): 1×2=2
- (i) Gray code is weighted.
- (ii) A full-adder can be built with half-adders.
- (iii) C is a structured language.
- (iv) An algorithm may have an infinite loop.
- (v) $AB + \bar{A}C + BC = AB + \bar{A}C$

2. (a) Define a pseudocode. Discuss the essential features of a pseudocode. 2+8=10
(b) Give a comparative account of different types of computers based on their functionality. 8
(c) What do you mean by utility software? 2
3. (a) Give a comparative account of the various representations of negative binary numbers. 9
(b) Define an algorithm. Discuss the essential features of an algorithm with suitable examples. 2+6=8
(c) Design an OR gate using NAND gates only. 3
4. (a) What is the function of a multiplexer? Draw and explain the logical circuit and the operation of a 4×1 multiplexer with the help of a truth table. 2+8=10
(b) Discuss the design of a 4-bit word comparator. 5
(c) Design a full-adder using half-adders. 5
5. (a) Discuss the design of a 4-bit synchronous counter with a control. 8
(b) Explain racing in a level clocked J-K flip-flop. Discuss how racing can be eliminated with edge-triggering. 2+6=8
(c) Write a short note on A/D converters. 4

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