

2015

COMPUTER SCIENCE

[General]

PAPER – I

Full Marks : 100

Time : 3 hours

The figures in the right hand margin indicate marks
Candidates are required to give their answers in their
own words as far as practicable
Illustrate the answers wherever necessary

[NEW SYLLABUS]

GROUP – A

Answer any two questions of the following : 15 × 2

1. (a) Define the term byte ?

(b) Convert the following :

(i) $(1010.011)_2 = (?)_{10}$

(ii) $(3AF)_{16} = (?)_8$

(c) What is the difference between a compiler and interpreter ?

(d) What is algorithm ? Write down basic properties of algorithm.

(e) What are the different component of a computer ? Write function of ALU and CU.

$$1+2+3+1+3+5$$

2. (a) What is flip flop ? Write down the truth table of a clocked R-S flip flop with diagram. What is race condition ?

(b) (i) Simplify the Boolean Expression

$$\overline{ABC} + A\overline{BC} + ABC + B\overline{C}$$

(ii) Draw logic circuit of $xy + z$ using NOR gates only.

(iii) Prove that complement of X-OR is X-NOR.

$$1+4+2+3+3+2$$

3. (a) Write algorithm of binary search. Calculate its time complexity.

(b) (i) What is binary tree ?

(ii) Consider a algebraic expression :

$$(a - b * c) / (d + e / f)$$

- Construct a binary tree.
- Find its preorder, postorder and inorder expression.

(c) What is an array ? Explain different types of array in C language. $2 + 3 + 2 + 2 + 2 + 1 + 3$

4. (a) Write the syntax of switch case statement.

(b) Write the difference between while and do-while loop with example.

(c) What is pointer ? Define array of pointer and pointer of array in C language.

(d) Differentiate call by value and call by address.

$$3 + 4 + 2 + 2 + 4$$

GROUP – B

Answer any **five** questions of the following : 8×5

5. State de Morgans theorem.

Convert :

$$(623.77)_8 = (?)_{10} = (?)_2 = (?)_{16}$$

$2+2+2+2$

6. (a) Perform $3570 - 2100$ using 10's complement.

(b) Perform $11010 - 1101$ using 2's complement.

(c) What is BCD code ? Add 5 and 7 using BCD method. $2+2+2+2$

7. (a) Write a C program to find factorial of a given number using recursion.

(b) What is formal and actual argument in C? $6+2$

8. (a) Find the complement

$$F = (\overline{AB} \cdot A)(\overline{AB} \cdot B)$$

(b) Simplify the Boolean expression using K-map

$$F(A, B, C, D) = \sum (7, 13, 14, 15) \quad 4+4$$

9. Write a bubble sort algorithm and find its time complexity. 8
10. (a) Write a C program to reverse a number.
 (b) Write the function of break and continue statement. 5+3
11. (a) What is stack? Write PUSH and POP operation.
 (b) Convert infix to postfix expression
 $((A + B) * D) \uparrow (E - F)$ 2+4+2
12. What is universal gate? Prove for AND, OR, NOT gate using universal gate. 8

GROUP – C

Answer any **five** questions of the following : 4 × 5

13. What is logical and conditional operator in C? 2+2
14. Write short note on dot matrix printer. 4
15. Differentiate RAM and ROM. Write full form of EBCDIC and ASCII code. 3+1

16. What is flowchart ? Mention different symbols used in flowchart. 1 + 3
17. (a) What is the difference between $i++$ and $++i$?
(b) If $P = 5$, then find $(P++) + (++P)$. 2 + 2
18. What is half subtractor ? Give truth table and logic circuit. 4
19. (a) What is complete binary tree ?
(b) What is Binary search tree ? 2 + 2
20. What is dequeue ? What types of dequeue are available ? 4
21. (a) Write the difference between a positional and non-positional number system.
(b) Given that :
- $(16)_{10} = (100)_b$
- determine the value b . 2 + 2
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