NEW

2016

Part-I 3-Tier

COMPUTER SCIENCE

PAPER—I

(General)

Full Marks : 90

Time : 3 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Group—A

Answer any *two* questions of the following : 2×15

1. (a) What is 'Word' and 'Nibble'? What is the function of Control Unit (CU)?

(b) 'Smart phone screen' — which type of device ? Explain your own concept.

(c) Explain the different types of software.

(d) Draw a flowchart to find the highest of three numbers.

(e) What is the disadvantages of Assembly language ?

(2+2)+3+3+3+2

2. (a) (i) Construct a logic circuit for the Boolean expression $A \cdot \bar{B} + C \cdot (A + B \cdot D)$ using NAND gates only.

(ii) Simplify the Boolean expression :

$\bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + A\bar{B}C + AB\bar{C}$

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

(iv) State de-Morgan's theorem.

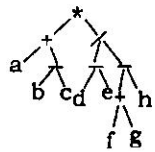
(b) (i) Write down the truth table of Half Adder with diagram.

(ii) What is Race Condition ?

(3+2+2+2)+(4+2)

3. (a) (i) What do you mean by Strictly Binary Tree ?

(ii) Write inorder, preorder, and postorder sequence from this figure :



(b) (i) What is Algorithm ? Write the basic properties of algorithm.

(ii) Write an algorithm of selection sort and find its time complexity.

(2+4)+(1+2+6)

4. (a) What is cache memory ?

(b) Write down the advantages of cache memory.

(c) How many 128 × 8 RAM chip are needed to provide a memory capacity of 2048 bytes ?

(d) What is cache hit ?

(e) Give a brief descriptions of bitwise operators in C.

1+3+5+1+5

Group—B

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

5. (a) What is Stack ?

(b) Convert the following infix notation to postfix expression :

$$((X+Y)-(W+Z)*K/L)*M$$

2+6

6. (a) What is software ?

(b) Describe the various type of software with example.

(c) What is middle level and high level language with example ?

(d) What are the difference between assembler and compiler ?

1+3+2+2

7. What is recursion? Write a C program to find the Fibonacci series using recursion. 2+6

8. (a) Define Space and Time complexity of an Algorithm.

   (b) What is Deque? Write down the application of Stack. (2+2)+(2+2)

9. (a) Define non-linear data structure with an example.

   (b) What is queue? Write a function to insert an element into a circular queue. 2+(2+4)

10. (a) Explain fixed-point and floating-point representation of numbers.

    (b) $(1101101)_2 = (?)_8$

    (c) $(FF)_{16} = (?)_{10}$ 4+2+2

11. (a) (72 – 50) = ? Calculate using 2's complement method.

    (b) What are the BCD codes? What are its advantages?

    (c) What is the full form of EBCDIC? 4+(1+1)+2

Group—C

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

12. (a) Give an example in C of conditional expression.

    (b) What is relational and logical operators? 2+2

13. (a) What is variable ?

(b) Give an example to show how global variable is access in the program.

(c) What is the difference between '&' and '&&' ?

1+2+1

14. (a) What is escape sequence ? Give example.

(b) Find the error from the following code in C :

```
for (i=1; i<=(n=10); i++)
  {
    if (i%2=0);
      {
    printf ("The number is odd % x"; i);
      }
    else
      printf ("The number is even %y;; i).
  }
```

☐ Logical error = ? ☐ Syntactical error ?

2+2

15. (a) What are the difference between array and list ?

(b) What will be the time complexity of following code :

```
for (i=0; i<n; i++)
  {
    S = S+i;
  }
printf ("%d", S);
```

2+2

16. (a) Write the final value of K in the following program segment :

```
int K = 5, i = 3, j = 252, m;
m = i*1000 + j*10;
k = m/1000 + K;
K = m % k++;
```

(b) State some advantages to the use of functions in C. 2+2

17. Write a C program to calculate the sum of all numbers from 0 to 100 that are divisible by 4. 4

18. Write down the truth table of J–K flip-flop with diagram. 4
