UG/I/CSC/H/I/16(New)

2016

COMPUTER SCIENCE

[Honours]

PAPER – I

Full Marks : 90

Time : 4 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 : 15 × 2

1. (*a*) Differentiate between int main() and void main().

(*b*) What are range of int, unsigned int and long double data type in C ?

(*c*) Write a C program to calculate $\sqrt{x}$ without using sqrt().

(*d*) Differentiate 6, '6', "6". $2 + 6 + 4 + 3$

2. (*a*) Prove that a tree with n vertices has $(N - 1)$ edges.

(*b*) What is null graph ?

(*c*) Solve the LPP using Big-M method :

Maximize $Z = x_1 + 2x_2$

Subject to $x_1 - 5x_2 \leq 10$

$2x_1 - x_2 \geq 2$

$x_1 + x_2 = 10$

$x_1, x_2 \geq 0.$ $5 + 2 + 8$

3. (*a*) What is the purpose of getch() ?

(*b*) Differentiate between '=' and '==' operator in C.

(*c*) Convert $(3201 \cdot 2)_4 = (?)_2$.

(*d*) What is radix ? Why radix is more than 1 ?

(*e*) What bit ? Differentiate data and information. Write short note about EBCDIC code.

$2 + 2 + 3 + (2 + 2) + (1 + 1 + 2)$

4. (*a*) Establish Newton's forward interpolation formula.

(*b*) There are five jobs each of which must go through the machine A, B, C in the order $\overrightarrow{ABC}$. Processing time in hours are :

Job :	1	2	3	4	5
Machine M_1 :	8	10	6	7	11
Machine M_2 :	5	6	2	3	4
Machine M_3 :	4	9	8	6	5

Find the sequence of jobs that minimize the total elapsed time and find also total elapsed time. $7 + 8$

GROUP – B

Answer any **five** questions : 8×5

5. (*a*) What do you mean by the actual and formal argument ? Write a program which will used actual and formal arguments.

   (*b*) Write down the difference between application software and system software. $(2 + 4) + 2$

6. (*a*) What is algorithm ? Write an algorithm to find GCD and LCM between two numbers.

   (*b*) What is address operator and indirection operator ? Give an example. $(2 + 3) + 3$

7. Applying Trapezoidal rule, evaluate

$$\int_0^1 (4x - 3x^2)dx$$

   by taking $n = 10$. 8

8. What is spanning tree ? Write down the Prim's algorithm to find the shortest spanning tree. $2 + 6$

9. Solve the following transportation problem using matrix minima method : 5 + 3

	D_1	D_2	D_3	D_4	
O_1	2	3	11	7	6
O_2	1	0	6	1	1
O_3	5	8	15	9	10
	7	5	3	2	

10. Solve the following system of equations by Gaussian elimination method : 8

$$3x + 2y + z = 10$$
$$2x + 3y + 2z = 14$$
$$x + 2y + 3z = 14.$$

11. (*i*) Find $\sqrt{13}$ by Newton Raphson method. Give one merit and one demerit of this method.

(*ii*) Differentiate ASCII - 7 & ASCII - 8. Find x for $(10000)_2 = (100)_x$. 3 + 1 + 2 + 2

GROUP – C

Answer any **five** questions : 4 × 5

12. Write a 'C' program to calculate sum of all digits into single digit of a integer. Example 872 ⇒ 8 or 97 ⇒ 7. 4

13. Differentiate &&, unary & and binary and operator in 'C'. 4

14. Find output with explanation for

```
void main()
    {
    int x = 7;
    printf("In %d %d %d
        %d", x + 3, x ++, ++x, x – 4);
    }
```

4

15. Find output with explanation for # define sqr(x) x * x

```
void main()
{
print f("in output = %d", sqr(5 + 3));
}
```

4

16. $(1011 - 1011 = ?)_2$ by 1's complement and 2's complement method. Are both result same ? 3 + 1

17. Prove that "A simple graph with n vertices and K component can have at most

$$\frac{(n-k)(n-k+1)}{2} \text{ edges}".$$ 4

18. Use Runge-Kutta method to solve $\frac{dy}{dx} = -xy$ at $y(0{\cdot}2)$ given $y(0) = 1$. 4

[*Internal Assessment* : 10 Marks]