

2017

COMPUTER SCIENCE

[ Honours ]

PAPER – I

Full Marks : 100

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*

GROUP – A

Answer any two questions : 15 × 2

1. (a) What is storage class ? Describe any two storage class with example. 1 + 4
- (b) When Gauss-elimination method fails ? 1

( Turn Over )

- (c) Solve, by Jacobi's iteration method, the equations : 5

$$3x + 20y - z = -18$$

$$2x - 3y + 20z = 25$$

$$20x + y - 2z = 17$$

- (d) Prove that any tree with two or more vertices has at least two pendant vertices. 4

2. (a) Solve the LPP using Big-M method : 8

$$\text{Maximize } Z = 2x_1 - 3x_2$$

$$\text{subject to } -x_1 + x_2 \geq -2$$

$$5x_1 + 4x_2 \leq 46$$

$$7x_1 + 2x_2 \geq 32$$

$$x_1, x_2 \geq 0.$$

- (b) Convert  $(665 \cdot 15)_7$  to  $(?)_{10}$ . 4

- (c) Write down the difference between array and structure. 3

3. (a) Prove that 'In a graph  $G$ , the number of odd degree vertices is an even number. 3

(b) What is Regular graph and draw  $K_3$  Regular graph? 2 + 2

(c) Write about Bitwise operator in 'C' with examples. 3

(d) Why binary arithmetic is used in computer? 3

(e) What is nibble? 2

4. (a) Obtain an optimum basic feasible solution to the following transportation problem using VAM: 5

	$W_1$	$W_2$	$W_3$	$W_4$
$F_1$	19	30	50	10
$F_2$	70	30	40	60
$F_3$	40	8	70	20

(b) Find the value of  $x$  for which  $f(x) = 0$ , where  $f(x)$  is given in the following table: 5

$x :$	-1	-2	2
$fx :$	-1	-9	11

- (c) Write a C program to check a integer no. is perfect or not. [28 is a perfect numbers] 5

GROUP – B

Answer any five questions : 8 × 5

5. (a) Write a program which will find the  $n$ th term in the series : 6

$$x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

- (b) What is assembly language ? 2
6. Find the optimal sequence for the following problem of 4 jobs and 5 machines. Process in the order ABCD. Find also the total elapsed time. Processing time in hours are : 8

Machine Jobs	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$
A	7	5	2	3	9
B	6	6	4	5	10
C	5	4	5	6	8
D	8	3	3	2	6

7. (a) What is Hamiltonian graph? 2  
(b) Show that a graph with  $n$  vertices is a tree if and only if it is connected and has  $(n-1)$  edges. 6
8. (a) Write a program to concatenate two strings without using strcat ( ) function. 5  
(b) Write down the difference between primary memory and secondary memory. 3
9. (a) Write about Grey Code and its application. 3  
(b) Convert  $(101101)_{\text{grey}}$  to equivalent binary code. 1  
(c) Find the approx value of

$$\int_1^2 \frac{1}{x} dx \quad dy$$

Simpson's one-third rule with  $n = 5$  and justify error. 4

10. (a) Write difference between entry control loop and exit control loop in 'C'. 3

- (b) Rewrite the following for loop structure into equivalent while loop structure : 2

for ( $i = 5; i < 20; i + +$ );

- (c) Draw half adder cum half subtractor. 3

11. (a) What is nested macro ? 2

- (b) Predict the output with explain. 3

```
# include <stdio.h>
# define squre (x) x * x
# define cube (x) x * squre (x)
void main ( )
{
    printf ("\\n output = %d", cube (3 + 2));
}
```

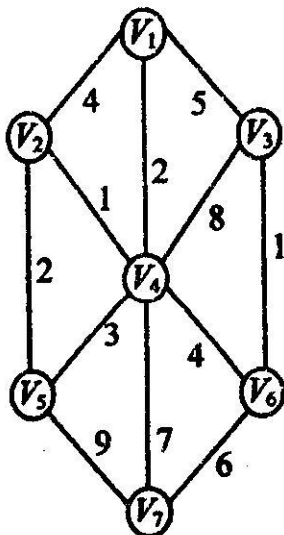
- (c) Solve the following LPP using graphical method : 3

Max  $Z = 5x + 7y$   
subject to  $3x + 8y \leq 12$   
 $x + y \leq 2$   
 $2y \leq 3$   
for  $x, y \geq 0$ .

12. (a) "Is Android Nougat a system software ?" 2  
Justify.

( 7 )

- (b) What is spanning tree ? Find the shortest spanning tree from following graph using Prims algorithm : 4



- (c) Find the base for  $\sqrt{41} = 5$ . 2

### GROUP - C

Answer any five questions :

4 × 5

13. Write down the difference between call by value and call by reference. 4

14. (a) Prove that  $\Delta^m \cdot \Delta^n = \Delta^{m+n}$ . 2

(b) Calculate the error committed in composite Trapezoidal rule. 2

15. Solve the LPP by graphical method : 4

$$\begin{aligned} \text{Maximize } Z &= 2x_1 + 4x_2 \\ \text{subject to } &x_1 + 2x_2 \leq 5 \\ &x_1 + x_2 \leq 4 \\ &x_1, x_2 \geq 0. \end{aligned}$$

16. What is flow chart ? Draw a flow chart to find highest no. among three numbers. 1 + 3

17. Write about Cache memory and non-impact printer. 4

18. Solve by Euler's method the following differential equation for  $x = 1$  by taking  $h = 0.2$

$$\frac{dy}{dx} = xy, y = 1 \text{ when } x = 0. \quad 4$$

19. Discuss any two : 2 × 2

fflush (stdin), fprintf ( ), fseek ( ).

[ Internal Assessment : 10 Marks ]