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320555(20)

B. E. (Fifth Semester) Examination,
April-May/Nov.-Dec. 2020

(New Scheme)

(Civil Engg. Branch)

NUMERICAL METHODS & COMPUTER PROGRAMMING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all units. Part (a) is compulsory from each question. Attempt any* ***two*** *parts from part (b), (c) and (d) from each question.*

Unit-I

1. (a) What is the output of following program : 2

```
void main ( )
{
```

```
    int a = b = c = 10;
    a = b = 50;
    count <<a << b << c;
}
```

(i) 10, 10, 10

(ii) 10, 50, 10

(iii) 50, 50, 10

(iv) 50, 50, 50

(b) Explain the different types of operators in C++. 7

(c) Write a program to find the values using formula :

$$f(n) = x^2 - 5x + 3$$

where $x = 1, 2, 3 \ldots\ldots 10$. 7

(d) Write a program to find the area and perimeter of a circle and store it into a file when radius is entered through the keyboard. 7

Unit-II

2. (a) Find the output of the program : 7

```
void main ( )
{
  int × [ ] = {10, 20, 30, 40, 50};
```



```
    clrscr ( );
    cout << 4 (×] << × [0];
    getch ( );
}
```

(i) 4 0

(ii) 50 10

(iii) 40 10

(iv) Error

(b) Explain the concept of call by value and call by address in function. 7

(c) Write a program to calculate deflaction using function where :

$$r = 5/38{\cdot}4 \cdot \frac{WL^4}{EI}$$ 7

(d) Write a program to add two 3×3 matrix and display the content. 7

Unit-III

3. (a) List the applications of graphics. 2

(b) Write a graphics program to draw shapes such as circle, line, rectangle and display the text on screen. 7

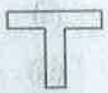
(c) Explain the following : 7

(i) in it graph ( )

(ii) close graph ( )

(iii) graphics driver

(iv) graphics mode

(d) Write a program in graphics to design  section and  section. 7

Unit-IV

4. (a) Write down the normal equations for fitting a second degree parabola. 2

(b) Solve by Gauss-Jordan method : 7

$$2x - 6y + 8z = 24$$

$$5x + 4y - 3z = 2$$

$$3x + y + 2z = 16$$

(c) The pressure and volume of a gas are observed as follows : 7

p (kg/cm^2)	0·5	1·0	1·5	2·0	2·5	3·0
v (cm^3)	1·62	1·00	0·75	0·62	0·52	0·46

Fit the curve $pv^{\alpha} = C$, a constant.

(d) Predict the mean radiation dose at an allitude of 3000 feet by fitting an exponential curve to the given data : 7

Altitude (x)	50	450	780	1200	4400	4800	5300
Dose of radiation (y)	28	30	32	36	51	58	69

Unit-V

5. (a) The second order partial differential equation

$$Au_{xx} + Bu_{xy} + Cu_{yy} + Du_x + Eu_y + fu = 0$$

is elliptic if :

(i) $B^2 - 4AC < 0$

(ii) $B^2 - 4AC = 0$

(iii) $B^2 - 4AC > 0$

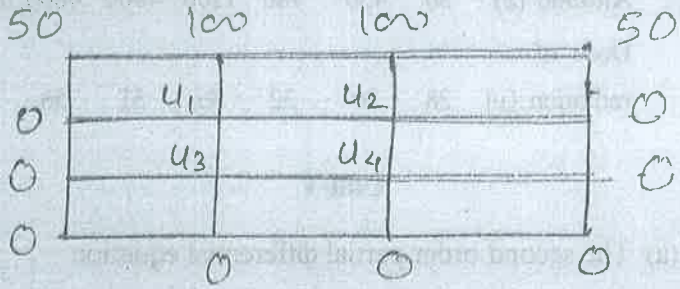
(iv) $B^2 > (2AC)^2$

(b) Using Runge-Kutta method of fourth order, solve :

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$$

with $y(0)=1$ at $x=0{\cdot}2$ and $x=0{\cdot}4$. 7

(c) Solve the equation $u_{xx}+u_{yy}=0$ for the following square mesh with the given boundary conditions : 7



(d) Solve by Milne's Predictor-corrector method,

$$\frac{2\,dy}{dx}=\left(1+x^2\right)y^2$$

given : $y\,(0)=1$, $y\,(0{\cdot}1)=1{\cdot}06$,
$y\,(0{\cdot}2)=1{\cdot}12$, $y=(0{\cdot}3)=1{\cdot}21$.
find $y\,(0{\cdot}4)$. 7