MATH/V/CC/08c

### Student's Copy

### **2024** (CBCS) (5th Semester)

#### MATHEMATICS

### EIGHTH (C) PAPER

### ( Computer Programming in FORTRAN ) ( Theory )

Full Marks: 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

### ( SECTION : A-OBJECTIVE )

(Marks:8)

Tick ( $\checkmark$ ) the correct answer in the brackets provided :

 $1 \times 8 = 8$ 

- To find remainder when real number is divided by real number, the library function to use is
  - (a) MOD ( )
  - (b) AMOD ( )
  - (c) SIGN ( )
  - (d) ISIGN ( )

/156

- Ņ S For the set of values I = 1, J = -1,  $(I \cdot GT \cdot 0) \cdot AND \cdot NOT \cdot (J \cdot LT \cdot 0)) \cdot OR \cdot (\cdot NOT \cdot (I \cdot GT \cdot 0) \cdot AND \cdot (J \cdot LT \cdot 0))$ the value of the logical expression
- (a) 0 (
- (b) 1 ( )
- (c) true ( )
- (d) false (
- 3. Which one is invalid DO statement?
- (a) DO 25J = 1, 10 (
- (b) DO 50I = 0, -5, -1 (
- (c) DO 70J = 1.20 ( )
- 4 a DO 888 KOUNT = INK, KODE, JACK
- Which one is FORTRAN executable statement?
- (a) GOTO ( )
- (b) FORMAT (
- (c) ENDIF (
- (d) DIMENSION ( )
- Ģ A program which will read two-dimensional array B with array of 10 rows
- a READ(\*, \*)((B(I, J), J = 1, 20), I = 1, 10)
- G READ(\*, \*)((B(I, J), J = 1, 10), I = 1, , 20)
- <u></u> READ(\*, \*)((B(I, J), I = 1, 20), J = 1, 10)
- (d READ(\*, \*)((B(I, J), I = 1, 10), J = 1, 20)
- σ. Which of the following is invalid subscript variable?
- (a) B(5) ( )
- (b) INK (I · J) (
- (c) MAT (2\*J, K-2) (
- (d) EMP (I + 1, J + 2, 7) (

- . Every function must have the parameters. function is If there is no parameter, the
- (a) invalid
- 6 6 valid constant
- (d) variable
- .00 Which of the following is invalid EQUIVALENCE statement?
- (a) EQUIVALENCE (X, Y, Z)
- **(b**) EQUIVALENCE (A(3), B, C(1)), (D, E, F(2)), (K(1), I, M)
- 6 EQUIVALENCE (D(I), E)
- (d None of the above

# SECTION : B--SHORT ANSWERS )

Marks: 15)

nswer five questions, taking at least one from each Unit :

 $3 \times 5 = 15$ 

UNIT-I

- ۲ Write g FORTRAN program to find the volume of cylinder.
- What is the final value of R in the following program?

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R = (R + 0.5) \* 10 $R = 2 \cdot 56$ = R

R = R/10R = I

# UNIT-II

- ω Write the general form of IF-THEN-ELSE statement.
- 4
- Write a short note on nested DO loop.
- 1156

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Contd

# UNIT-III

- ģ If marks obtained by 40 students in science are denoted by an array MARK (I), write a FORTRAN program to arrange the marks in ascending order
- σ. Consider the sequence 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, .... FORTRAN program to obtain the first 150 terms of this sequence Write a

# UNIT-IV

- 7 What is CALL statement? Write the general format of CALL statement.
- ° Write a short note on subroutine subprogram.

# (SECTION : C-DESCRIPTIVE )

( Marks : 52 )

Answer the following :

Unit—I

13×4=

- 1. (a) What are algorithm and flowchart? Write the benefits and limitations of algorithm and flowchart. 2+4
- 6 Write a FORTRAN program to find the sum of the cubes of the first

*n* natural numbers given by  $\left[\frac{n(n+1)}{2}\right]^2$ .

<u></u> What are the values of I and J in the following arithmetic statement, if J = 1, K = 3?

*I* = *J*\*2/3+*K*/2+6-*J*\*3/8 *J* = *I*+*K* 

OR

2 a) Write a flowchart to find the factorial of a number n. Also write a trace  $_{4}^{\omega}$ 

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- 6 Write the general form of DATA statement. What will be the values of A and B from the following statements? 2+2=4
- Ē DATA A, B / 22 · 12, 20 · 16 /
- (ii)DATA A, B / 2\*0.7 /
- 6 mathematical expressions Convert the following FORTRAN arithmetic expressions into

ω

- 3 SQRT (SIN((1 · +X\*\*3)\*\*3) + 1.)
- (11) A\*2 + B\* \*2 + C\* \*2 + 2 ·\* A\* B\* C\* -2

## UNIT-II

- ω (a) What are logical IF and arithmetic IF statements? Write a FORTRAN using arithmetic IF statement. program to evaluate the roots of a quadratic equation  $ax^2 + bx + c = 0$ 4+4=8
- Θ A function f(x) is given by

$$x) = \begin{cases} 0 & \text{if } x \le 0 \\ x(x-5)(x-7) & \text{if } 0 \le x \le 5 \\ (x-5)(x-7)(x-10) & \text{if } 5 \le x \le 7 \\ (x-7)(x-10)(x-15) & \text{if } 7 \le x \le 10 \\ (x-10)(x-15) & \text{if } 10 \le x \le 15 \\ 0 & \text{otherwise} \end{cases}$$

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structure Write മ FORTRAN program to evaluate f(x) using IF-THEN-ELSE

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### OR

- (a) Write the general form of DO statement. Correct the following program segments 1+2+2=5
- (i) IF (N.LE.9) GOTO 25

25 SUM = SUM + X

20 CONTINUE

CT.

Contd.

(ii) IF (N.LT.10) GOTO 20

DO 20 *I* = 1, 40 SUM = SUM + *I* 

20 CONTINUE

- 9 Write a decreasing order using DO loop. FORTRAN program to arrange മ given set of numbers it
- <u></u> Correct the following DO loop using IF statement

SUM = 0 DO 5 I = 1, 100 READ (\*, \*) ASUM = SUM + A

# UNIT-III

- Ģ a) Write a short note on implied DO notation. Write a FORTRAN progra which will read a matrix B with two-dimensional arrays of m rows are n columns in row-wise using implied DO notation.
- 6 Write the general form of DIMENSION statement. Write a program f fitting a straight line using DIMENSION statement.

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- <u>ە</u> (Q Write Let Let  $A = [a_{ij}]_{n \times n}$  be a square ma  $A^2 = A \times A, A^3 = A^2 \times A, A^4 = A^3 \times A$ , etc. ø FORTRAN program to find matrix power g, of a square order 7 matr 1
- (6) Write a FORTRAN program to find the transpose of an  $m \times n$  mat

Write a subroutine to find roots of a quadratic equation  $ax^2 + bx + c$ Also write a main program to call this subroutine.

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(a)

UNIT-IV

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(b) A function f(x) is defined as follows :

$$f(x) = \begin{cases} x+3 & \text{if } x < -3 \\ 3x-1 & \text{if } -3 < x < 3 \\ 2x & \text{if } x > 3 \end{cases}$$

Write a function subprogram to evaluate the function. Also write ø

main program which will compute the value of  $2f(x) - [f(x)]^2$ . 3+3=6

### OR

- 00 (a) polar coordinates for the point. that reads values of x and y and prints out both the rectangular and the point to its polar coordinates. Call this subroutine in a main program (x, y) and the polar coordinates  $(r, \theta)$  of a point  $x = r \cos \theta$ ,  $y = r \sin \theta$ . Write a subroutine subprogram to convert rectangular coordinates of a The following is the relationship between the rectangular coordinates 3+3=6
- 9 terms of its 3 sides a, b and c. Write a function subprogram which calculates the area of a triangle in

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0 given base and height. Write an arithmetic statement function to find the area of triangle to ω

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- (a) 0 ENDIF
- DIMENSION
- ģ A program which will read two-dimensional array B with array of 10 rows and 20 columns in row-wise is
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- 6) EQUIVALENCE (A(3), B, C(1)), (D, E, F(2)), (K(1), I, M)
- 0 EQUIVALENCE (D(I), E) -
- (d) None of the above

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- <u></u> What are the values of I and J in the following arithmetic statement, if  $r_{-1}$  ,  $r_{-2}$

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UNIT-IV

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