

VI/MAT (xii) (b)

2014

(6th Semester)

MATHEMATICS

Paper : MATH-364 (B)

(Computer Programming in FORTRAN)

(Optional)

Full Marks : 55

Time : 2 hours

(PART : B—DESCRIPTIVE)

(Marks : 35)

*The figures in the margin indicate full marks
for the questions*

Answer five questions, selecting one from each Unit

UNIT—I

1. What are algorithm and flowchart? Draw an algorithm and a flowchart to find the GCD using Euclid's algorithm. 1+1+2+3=7

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(Turn Over)

2. (a) What are the values of I and J in the following arithmetic statement, if $J = 1$, $K = 3$ 3

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

$$J = I + K$$

- (b) Which of the following FORTRAN variables are of integer types, real types or not valid (state with justifications)? 4

(i) PUC

(ii) MZU

(iii) GZRSC

(iv) GAC

UNIT—II

3. (a) Find out the errors in the following program : 4

INTEGER A, B, C, D

A = 5

B = 3.0

C = 6

AVG = $\frac{A+B+C}{3}$

WRITE (*, *) AVG

STOP

END

- (b) Write a program to find out a factorial of a given number.

3

4. (a) The sum of the squares of the first n natural numbers is given by

$$\frac{n(n+1)(2n+1)}{6}$$

Write a FORTRAN program to find the sum.

4

- (b) Evaluate the following expressions, assuming that $X = 10.0$, $Y = -2.0$ and $Z = 5.0$:

3

$(X * Y.LT.Z/X.OR.X/Y.GT.Z * X.AND.Z * Y.LT.X)$

UNIT—III

5. (a) Write the general form of DO statement. Correct the following program segments :

1+2=3

IF (N.LT.10) GOTO 10

DO 10 I = 1, 40

SUM = SUM + I

10 CONTINUE

- (b) Write the general form of IF-THEN-ELSE statement. Suppose the value of Y is given by the equation

$$Y = \begin{cases} x^5 & \text{if } x < 3.0572 \\ x^3 + 3x + 4 & \text{if } x \geq 3.0572 \end{cases}$$

Write a FORTRAN program to evaluate Y .

1+3=4

6. (a) N is said to be a prime number if its only divisors are 1 and itself. Write a FORTRAN program using 'DO loop' that reads an integer $N > 2$ and determines if N is a prime by testing if N is divisible by any of the integers 2, 3, ..., $N/2$.

5

- (b) Assume that at the beginning of the following program fragment $NERD = 5$ and $JOCK = 10$:

```

      IF (JOCK.GT.NERD) GO TO 10
      NERD = NERD + 1
      GO TO 20
10  NERD = JOCK
20  NERD = NERD + JOCK

```

What will be the final value of $NERD$ at the end of the fragment?

2

(5)

UNIT—IV

7. (a) In the matrix

$$A = [A_{ij}] = \begin{bmatrix} 2 & 3 & 4 \\ 1 & 2 & 3 \\ 6 & 7 & 8 \end{bmatrix}$$

(i) what are the values of i and j in case of the element 4?

(ii) write the print statement in FORTRAN to display all the elements of A.

2+2=4

(b) Given a matrix

$$A = [A_{ij}] = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 0 & 0 & 6 \\ 7 & 8 & 9 & 5 \end{bmatrix}$$

show the printouts of the following print statements :

3

(i) WRITE (*, *) ((A (I, J),
J = 1, 4), I = 1, 3)

(ii) WRITE (*, *) ((A (I, J),
I = 1, 3), J = 1, 4)

8. Given marks obtained by 50 students in Mathematics. If this mark array is denoted by MARK (I), write a COMPLETE program that will arrange Marks in descending order.

7

UNIT—V

9. (a) A function $f(x)$ is defined as follows :

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

Write a function subprogram to evaluate the function. Also, write a main program which will compute the value $2f(x) - [f(x)]^2$.

5

- (b) What is library function? Give example.

$$1+1=2$$

10. Write a simple but complete programme which illustrates the use of subroutine and common statements. Mention the objective of your programme.

$$6+1=7$$

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MATHEMATICS

Paper No. : MATH-364 (B)

(Computer Programming in FORTRAN)

(Optional)

(PART : A—OBJECTIVE)

(Marks : 20)

Answer all questions

SECTION—A

(Marks : 5)

Each question carries 1 mark

Put a Tick ☒ mark against the correct answer in the box provided :

1. Which one of the following is the correct integer constant?

(a) $5 / 4 - 1$ ☐

(b) 3455 ☐

(c) 12345 ☐

(d) 7654321 ☐

2. The statement DATA A, B/5.2, 1.0/ will assign

(a) A = 5.2 and B = 1.0 ☐

(b) A = 1.0 and B = 5.2 ☐

(c) A = 5.2 and B = 5.2 ☐

(d) A = 1.0 and B = 1.0 ☐

3. Which one of the following is FORTRAN-executable statement?

(a) DIMENSION ☐

(b) ENDIF ☐

(c) FORMAT ☐

(d) GOTO ☐

4. A program which will read two-dimensional array B with array of 10 rows and 20 columns in rowwise is

(a) READ (*, *) ((B(I, J), J = 1, 20), I = 1, 10) ☐

(b) READ (*, *) ((B(I, J), I = 1, 10), J = 1, 20) ☐

(c) READ (*, *) ((B(I, J), J = 1, 10), I = 1, 20) ☐

(d) READ (*, *) ((B(I, J), I = 1, 20), J = 1, 10) ☐

(3)

5. To find remainder when one integer is divided by another integer, the library function used is

(a) MOD ☐

(b) AMOD ☐

(c) DIM ☐

(d) IDIM ☐

(4)

SECTION—B

(Marks : 15)

Each question carries 3 marks

6. Convert the following algebraic expressions into FORTRAN expressions :

(i) $\log_e \sqrt{\frac{\sin x^2}{x^2 y}}$

(ii) $\frac{\frac{x}{y} + 6}{a - \frac{b}{c}}$

(5)

7. What are the values of A and B after the execution of the following program segment?

A = 5

B = 7

C = B

B = A

A = C

8. Write the general form of 'COMPUTED GO TO' statement

(7)

9. Write a program which will read a matrix B with two-dimensional arrays of m rows and n columns in rowwise using implied DO notation.

(8)

10. Write a program to find the curved surface area of a cylinder using subroutine subprogram.

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