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# RR-0853

## Third Year B. Sc. Examination

### March / April – 2010

## Computer Oriented Numerical Methods

*(CAN Course)*

*(New Course)*

Time : **3** Hours] [Total Marks : **70**

**Instructions :**

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
**Fillup strictly the details of ☛ signs on your answer book.**

Name of the Examination :

☛ **T. Y. B. Sc.**

Name of the Subject :

☛ **Computer Oriented Numerical Methods (NEW) (CAN)**

☛ Subject Code No. : **0 8 5 3** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) **All** the questions are **compulsory**.

(3) Figures to the **right** indicate **full** marks.

**1** Answer the following questions : **10**

(1) Write arithmetic operators in FORTRAN.

(2) Check the validity of the following GO TO statements :

(i) GO TO 15

(ii) GO TO JUMP

(3) Classify the following variable names :

(i) LAMDA

(ii) THETA

(iii) RLIFE

(iv) KRISS

(4) Count the occurence of iterations :

DO 50 J=1, –10, –3

(5) Write the general form of Arithmetic IF statement.

2 (a) Draw a flowchart to calculate the sum of the series $\sum_{n=1}^{100} x^n$. **5**

(b) Explain Arithmetic statement with illustration. **5**

(c) Give Fortran expression for $\frac{(-1)^i x^{2i+1}}{2y}$. **2**

**OR**

2 (a) Write a program to find the sum of the series $1+\frac{x^3}{3}+\frac{x^5}{5}+\frac{x^7}{7}+\frac{x^9}{9}$. **5**

(b) Explain type declaration for integers and reals with illustration. **5**

(c) What is the value of I calculated in the following Arithmetic statement : **2**

```
I = J * 2/3 + K/4 + 6 –J * * 3/8
```

(where J=2, K=5)

3 (a) Explain LOGICAL IF statement with illustration. **5**

(b) Write a program to find the roots of the quadratic equation $ax^2+bx+c=0 \quad (a \neq 0, a, b, c \in R)$. **5**

(c) Take $N=5, J=10$, find the value of N after the following statement : **2**

```
IF (2*J .LE. 3*N) GO TO 10
N=N+1
GO TO 20
10 N=J
20 N=J+N
```

**OR**

3 (a) Explain DO LOOP statement with illustration. **5**

(b) Write a program to evaluate the sum $\sum_{n=1}^{10} \frac{(-1)^n x^{n/2}}{n(n+1)}$. **5**

(c) Explain GO TO statement. Why it is not used frequently in FORTRAN 77 ? **2**

4 (a) Prepare a program to evaluate the equation $x^3 - 2x + 3 = 0$ by Newton-Raphson method. **6**

(b) Write a program to solve the equation $x^3 - 2 = 0$ by method of false position. **6**

**OR**

4 (a) Write a program to solve the equation $x^2 - 2x + 3 = 0$ by Bisection method. **6**

(b) Write a program to solve the equation $x^2 - 6x + 1 = 0$ by method of false position. **6**

5 (a) Write a program to implement Newton's Forward interpolation formula. **6**

(b) Write a program to evaluate $\int_1^3 \frac{dx}{x}$ by Simpson's rule. **6**

**OR**

5 (a) Prepare a program to implement Lagrange's interpolation formula. **6**

(b) Prepare a program to find solution of the equation $x^2 - 5x + 4 = 0$ by the method of false position. **6**

6 (a) Prepare a program to evaluate $\int_1^2 \frac{dx}{1+x^2}$ by Trapezoidal rule. **6**

(b) Write a program to solve the differential equation $\frac{dy}{dx} = x^2 + y^2$, $(y(0) = 0)$ by Euler's method. (Take $h = 0.1, 0 \le x \le 0.5$) **6**

**OR**

6 (a) Prepare a program to evaluate $\int_0^1 \frac{dx}{1+x}$ by Simpson's $1/3$ rule. **6**

(b) Prepare a program to solve the differential equation $\frac{dy}{dx} = x^2 + y$, $y(0) = 0.1$, by Euler's method. **6**