

POST-GRADUATE COURSE

Term End Examination — December, 2014 / June, 2015

MATHEMATICS

Paper - 4B : Computer Programming & Its
Application To Numerical Analysis

Time : 2 Hours

Full Marks : 50

(Weightage of Marks : 80%)

Special credit will be given for accuracy and relevance
in the answer. Marks will be deducted for incorrect
spelling, untidy work and illegible handwriting.

The marks for each question has been
indicated in the margin.

[OLD SYLLABUS]

(For Enrolled Before July, 2012 Batch)

Answer Question No. 1 and any *four* from the rest.

1. Answer any *five* questions : $2 \times 5 = 10$
- a) Explain the functions of ALU and CU.
 - b) Write a brief note on input devices.
 - c) Write the use of INT function used in BASIC.
 - d) Explain PRINT USING "###.##" statement used in BASIC.
 - e) Explain 'pow' function used in C with an example.

- f) Which technologies are used in first and third generations of computer ?
 - g) What are mainframe and super computer ?
2. a) Write down the output of the following program :
- ```
10 FOR X = 1.0 TO 2.0 STEP 0.2
20 F = X ↑ 2 + 3.0
30 PRINT X; F
40 NEXT X
50 END
```
- b) Write the following expressions in equivalent BASIC expressions :
- i)  $\log_e (x^2 + y^2) + |\sin x|$
  - ii)  $\frac{a}{b} + \left| x^{\frac{1}{3}} + y^{\frac{6}{5}} \right| + e^{x^2}$
  - c) Write INPUT statement in BASIC.
- $4 + 3 + 3$
3. a) Write an algorithm to find the roots of a quadratic equation.

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- b) In an examination of full marks 1000 the grades are awarded as per the following rule :

| <u>Marks obtained (M)</u> | <u>Grade awarded (G)</u> |
|---------------------------|--------------------------|
| $M \geq 800$              | X                        |
| $600 \leq M \leq 799$     | A                        |
| $400 \leq M \leq 599$     | B                        |
| $200 \leq M \leq 399$     | C                        |
| $0 \leq M \leq 199$       | D                        |

Write a BASIC/C program to read the names of the students and their marks and print the names and their grades. 4 + 6

4. a) Explain subscripted variables used in BASIC/C.
- b) Write a program to find the product of two matrices. 3 + 7
5. a) Write a program in C/BASIC to evaluate  $\int_{1.5}^{2.5} (x^2 + 3x + \log x) dx$  by Simpson's  $\frac{1}{3}$  rule.
- b) Explain DIM statement.
- c) Explain user defined functions in BASIC.

6 + 2 + 2

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6. a) Write a program in C/BASIC to solve the differential equation

$$\frac{dy}{dx} = x^2 + y \text{ for } x = 1.0, 1.2, 1.5$$

given that  $y(1.0) = 2.0$ , by 4<sup>th</sup> order Runge-Kutta method.

- b) Explain the following escape sequence  $\backslash n$ ,  $\backslash f$ ,  $\backslash t$  and  $\backslash'$ . 8 + 2

7. a) If  $x = 12$ ;  
 $y = 14$   
 $a = (x \leq y) ? x : y$

Find the value of  $a$ .

Write the above statements using if-then-else statement used in C.

- b) Explain 'continue' and 'break' statements used in C.
- c) Draw a flow chart to find a real root of the equation  $x^3 - 3x^2 + 2 \cdot 2 = 0$  by iteration method. 3 + 3 + 4

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