

2014

MATHEMATICS

(Major)

Paper : 6.3

Full Marks : 40

Time : 2 hours

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

1. Answer any six questions : 1×6=6
- (a) What is the utility of an 'assembler'?
 - (b) What is an algorithm?
 - (c) If a is an integer variable, then what value will be returned by $a = 5 / 2$?
 - (d) What is the use of "\n"?
 - (e) What is a source program?
 - (f) Mention two basic data types used in C language.
 - (g) What happens if the condition in a do ... while loop is initially false?
 - (h) Give examples of two library functions.

2. Answer any *two* questions : 2×2=4

- (a) What is the difference between C 'character' and C 'string'? Explain briefly.
- (b) What is an 'array variable'? How does it differ from an 'ordinary variable'?
- (c) Mention two advantages of 'user defined functions'.

3. Answer any *two* questions : 5×2=10

- (a) Write a C program to find the biggest of three given numbers using a 'nested if' statement.
- (b) Give the general form of the 'switch' statement and explain how it works.
- (c) Write a C program using 'for loop' to find the factorial of a given integer *K*.

4. (a) Define a one-dimensional array having 50 elements. Write a C program to calculate the sum of values stored in even numbered elements starting from the subscript 0.

5

Or

Write a C program to add two 3×3 matrices.

(3)

Or

Obtain the estimate of the missing figures in the following table :

x	:	1	2	3	4	5	6	7	8
$f(x)$:	2	4	8	—	32	—	128	256

(c) Find the first derivative of the function tabulated below at the point $x=3.0$:

x	:	3.0	3.2	3.4	3.6	3.8	4.0
$f(x)$:	-14.000	-10.032	-5.296	0.256	6.672	14.000

Or

Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using (i) Simpson's $\frac{1}{3}$ rd rule and (ii) Simpson's $\frac{3}{8}$ th rule.

4. Answer either (a) or (b) :

(a) (i) Derive the Newton's forward interpolation formula and mention when the formula gives best approximation.

$$4+1=5$$

- (ii) In an examination, the number of candidates who obtained marks between certain limits were as follows :

Marks obtained	Number of candidates
0-19	41
20-39	62
40-59	65
60-79	50
80-99	17

Estimate the number of candidates who obtained less than 70 marks. 5

- (b) (i) State and derive Stirling's central difference formula. Hence or otherwise establish Bessel's formula. 3+3=6

- (ii) Apply Bessel's formula to obtain y_{25} , given $y_{20} = 2854$, $y_{24} = 3162$, $y_{28} = 3544$, $y_{32} = 3992$. 4

5. Answer either (a) or (b) :

- (a) Explain briefly the idea of numerical integration. Establish the general quadrature formula and deduce trapezoidal rule from it. 2+5+3=10

(3)

- (b) Write a function to find the factorial of a given integer and then use it to find ${}^n C_r$, where

$${}^n C_r = \frac{n!}{r!(n-r)!} \quad 5$$

Or

Write a C program to find the sum of two values using pointer.

5. (a) What is meant by a 'recursive function' or 'recursion'? Explain with the help of an example. 5

Or

What are different storage classes in C? Write short notes on any two of them.

- (b) Write short notes on : 5
(i) Break statement
(ii) Continue statement

Or

In C language, a function can be called by the calling program in two ways—

- (i) call by value;
(ii) call by reference.

Explain both the ways.
