TDC Even Semester Exam., 2019

COMPUTER SCIENCE

(Honours)

(2nd Semester)

Course No. : BCSH–201

(Scientific Computation)

Full Marks : 35
Pass Marks : 12

Time : 2 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, selecting **one** from each Unit

UNIT—I

1. Explain in brief the types of errors one might encounter in performing numerical calculations. 7

2. Find the relative error and percentage error in computation of $x \quad y$ for x 11 75 and y 7 23 having absolute errors x 0 002 and y 0 005. 7

UNIT—II

3. Find the root of the equation by bisection method $x^3 \quad 2x \quad 5 \quad 0$. 7

4. Calculate $f(35\ 5)$ by using Lagrange's interpolation formula : 7

x	:	35	36	39	41
$f(x)$	:	42875	46656	59319	68921

UNIT—III

5. Write short notes on the following : 3+4=7

(a) Curve fitting

(b) Fourier approximation

6. Find the least squares polynomial of degree 2 for the following data : 7

x	:	0·78	1·56	2·34	3·12	3·81
y	:	2·50	1·20	1·12	2·25	4·28

UNIT—IV

7. Evaluate

$$\int_0^1 \frac{1}{1 \quad x}\, dx$$

correct up to 3 decimal places using trapezoidal rule [take $h \quad 0\ 2$]. 7

8. Find the value of

$$\int_0^6 f(x)\,dx$$

by using Simpson's $\frac{1}{3}$rd and Simpson's $\frac{3}{8}$th rules from the following table : 3+4=7

x :	0	1	2	3	4	5	6
$f(x)$:	6·9897	7·4036	7·7815	8·1291	8·4510	8·7506	9·0309

UNIT—V

9. Use the Runge-Kutta method to estimate $y_{0\ 4}$ when $f(x)$ is equal to $x^2 \quad y^2$ with $Y_0 \quad 0$. Assume $h \quad 0\ 1$. 7

10. Given the equation

$$\frac{dy}{dx} \quad 3x^2 \quad 1,\ y_1 \quad 2$$

Estimate y_2 by Euler's method using—

(a) $h \quad 0\ 5$;

(b) $h \quad 0\ 25$.

4+3=7

★ ★ ★