**S.D.E.**

**B.C.A. (2004 COURSE SEM- II : WINTER - 2017**
**SUBJECT : NUMERICAL METHODS**

Day : **Monday** Time **02.00 PM TO 05.00 PM**
Date : **18/12/2017** Max. Marks : 80

**W-2017-4158**

**N.B.**

1) Attempt any **FIVE** questions from Section – I and any **TWO** questions from Section – II .
2) Figures to the right indicate **FULL** marks.
3) Answers to both the sections should be written in **SEPARATE** answer book.

## SECTION – I

**Q.1** Estimate the relative and absolute error in **(10)**
$z = x - y$ when $x = 0.1234 \times 10^4$ and $y = 0.1232 \times 10^4$ as stored in a system with four digit mantissa.

**Q.2** Solve the following system using Gauss Elimination method **(10)**

$3x_1 + 6x_2 + x_3 = 16$

$2x_1 + 4x_2 + 3x_3 = 13$

$x_1 + 3x_2 + 2x_3 = 9$

**Q.3** Construct a forward difference table for the following values of $x$ and $y$. **(10)**

| $x$ | 0 | 5 | 10 | 15 | 20 | 25 |
|---|---|---|---|---|---|---|
| $y = f(x)$ | 6 | 10 | 13 | 17 | 28 | 31 |

**Q.4** Obtain a root correct to three decimal places by using the Bisection method **(10)**
$x^3 + x^2 + x + 7 = 0$ .

**Q.5** Solve the following system by Gauss Seidel Iteration method **(10)**

$10x + y + z = 12$

$2x + 10y + z = 13$

$x + y + 5z = 7$

(Perform two iterations)

**Q.6** Convert the following: **(10)**
**a)** $(1253)_8 = (?)_2$ **b)** $(101010)_2 = (?)_{16}$

**Q.7** Write short notes on: **(10)**
**a)** Errors in Numerical computing
**b)** Accuracy and Precession

## SECTION – II

**Q.8** Calculate approximate value of $\int_1^3 \frac{dx}{x}$ by using Simpson's $\frac{1}{3}^{rd}$ and $\frac{3}{8}^{th}$ rule **(15)**
taking $h = 0.5$ .

**Q.9** Using Euler's method, solve the following differential equation $\frac{dy}{dx} + 2y = 0$ **(15)**
given $y(0) = 1$ . Take $h = 0.1$ , find $y(0.1), y(0.2)$ and $y(0.3)$ .

**Q.10** Apply Runge – Kutta method to find an approximate value $y$, when $x = 0.1$ **(15)**
given that $\frac{dy}{dx} = x + y$, $y = 1$ when $x = 0$, with $h = 0.1$ .

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