

No. of Printed Pages : 03

Roll No.

G-227

B. Tech. EXAMINATION, May 2017

(Seventh Semester)

(Old Scheme) (Re-appear Only)

(IT)

IT-413

NUMERICAL METHODS

Time : 3 Hours]

[Maximum Marks : 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section.
Answer to the point.

(2-46/13) M-G-227

P.T.O.

Section A

1. Explain the floating point representation of numbers. **20**
2. Calculate 0 1000 0001 110...0 plus 0 1000 0010 00110 ... 0 both are single-precision IEEE 754 representation. **20**
3. Use Bisection method to find the only real root of the equation $x^3 - x - 1 = 0$ correct to 9 decimal places. **20**
4. The equation that gives the depth x in meters to which the ball is submerged under water is given by : **20**

$$x^3 - 0.165x^2 + 3.993 \times 10^{-4} = 0$$

Use the Newton-Raphson method of finding roots of equations to find :

- (a) the depth x to which the ball is submerged under water. Conduct three iterations to estimate the root of the above equation.

- (b) the absolute relative approximate error at the end of each iteration.
- (c) the number of significant digits at least correct at the end of each iteration.

Section B

5. Obtain Newton's divided difference interpolating polynomial satisfied by $(-4, 1245)$, $(-1, 33)$, $(0, 5)$, $(2, 9)$ and $(5, 1335)$. **20**
6. Compute the integral $I = \sqrt{\frac{2}{\pi}} \int_0^1 e^{-x^2/2} dx$ using Simpson's 1/3 rule, taking $h = 0.125$. **20**
7. Using Taylor series, solve :
$$5xy' + y^2 - 2 = 0, y(4) = 1$$

Also, find $y(4.1)$. **20**
8. Find Lagrange's interpolation polynomial fitting the points $f(1) = -3, f(3) = 0, f(4) = 30, f(6) = 132$. Hence find $f(5)$. **20**