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SEAT No. :

PD16

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S.E. (Electrical Engineering) (Insem)

NUMERICAL METHODS & COMPUTER PROGRAMMING

(2019 Pattern) (Semester - IV) (203148)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable additional data, if necessary.***
5) ***Use of a non-programmable calculator is allowed.***

Q1) a) State and explain: **[7]**

i) Descarte's rule of sign

ii) Find the maximum number of real positive and negative real roots of the following polynomial equation:

$pn(x) = x^6 + 2x^5 - 3x^4 - 2x^3 + x^2 - 5x + 2 = 0$

Use Descarte's rule of sign

b) Explain the following terms with suitable example: **[8]**

i) Truncation error

ii) Round off error

iii) Chopping error

iv) Relative error

OR

Q2) a) State the rules for identifying significant digits in a number with examples and determine the same for: **[7]**

i) 124.06

ii) 0.02406

b) Use synthetic division and perform 2 iterations of Birge Vieta method to find the smallest positive root of the following equation. Take initial approximation $p_o = 0.5$ $f(x) = x^4 - 3x^3 + 3x^2 - 3x + 2 = 0$ **[8]**

P.T.O.

Q3) a) Fit a straight line to the given data points using least square approximation. **[7]**

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

b) Evaluate the root of the equation by using the Regula falsi method. The intervals is (2, 3). Show only 4 iterations. **[8]**

$f(x) = \sin x - x + 2$

OR

Q4) a) Fit a second degree polynomial to the given data points using least square approximation. **[8]**

x	1	2	3	4	5	6
y	2	6	7	8	10	11

b) Use the Newton-Raphson method to solve the following equations: **[7]**

$f(x) = 3x - \cos x - 1$

The initial approximation is $x_0 = 0$. Show three iterations only.

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