Total No. of Questions : 4]

SEAT No. :

PB15

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[6268]-209

S.E. (Electrical Engineering) (Insem)

NUMERICAL METHODS AND 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 data, if necessary.***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) State Descartes's rule of sign. Show that the polynomial equation representing the behaviour of an electrical circuit $f(x) = x^7 - 3x^4 + 2x^3 - 17 = 0$ has at least four imaginary roots. **[7]**

b) State the rules for identifying significant digits in a number and determine the same for: **[8]**

i) 124.06

ii) 0.02406

iii) 100011.0

iv) 0.230

OR

Q2) a) State the Intermediate value theorem. Show its graphical representation & Apply the intermediate value theorem to find range of positive roots:**[7]**

$f(x) = x^3 - 5x + 3$

b) Perform two iterations of Birge-Vieta method to find root of a polynomial equation representing the behaviour of an electrical circuit with initial approximation $P_o = 0.5$. **[8]**

$f(x) = x^4 - 3x^3 + 3x^2 - 3x + 2$

P.T.O.

Q3) a) Obtain the approximate value of $(17)^{\frac{1}{3}}$, correct to four decimal places using NR method with initial approximation $x_0 = 2$. **[7]**

b) The current in a particular circuit is given by $I^3 - 5I - 7 = 0$. Find the current value using Regula-Falsi method correct upto 4 decimal places. Take $I_0 = 2$ and $I_1 = 3$. **[8]**

OR

Q4) a) A series RC circuit is connected across a DC supply of 100V. Voltage across a capacitor is recorded at different instant of time. Fit the following data point second order degree curve using least square error method:**[7]**

t (in msec)	v_c (in Volts)
0	0
2	33
4	55
6	70
8	80
10	85

b) Perform five iterations of the bisection method to obtain a smallest positive root of the equation $f(x) = x^3 - 5x + 1 = 0$. **[8]**