

# Agnihotri Engg. & GATE Classes

Scripting success stories

UNIT – 4<sup>th</sup> -- Solution of ordinary Differential equation , Integral methods & Correlation-Regression

**Q.1) Use picard's Method to solve following ?**

a) Perform 2 iterations of Picard's method to find an approximate solution of the initial value problem

$$dy/dx = x + y^2 ; y(0)=1$$

b) Use Picard's method to approximate the value of y when x = 0.1 given that y = 1 when x = 0 & dy/dx = 3x + y<sup>2</sup>.

( Ans = ; 1.127 )

c) Approximate y when x = 0.2 , given that y = 1 when x = 0 & dy/dx = x-y . ( Ans = ; 0.8375)

d) Approximate y when (i) x = 0.1 & (ii) x = 0.2 , given that y = 1 when x = 0 & dy / dx = x + y.

( Ans (i)1.11034 , (ii)1.2428 )

**Q.2) Solve following by using Taylor's method ?**

a) Employ Taylor's series method to approximate the value of y at x = 0.2 for the differential equation

$$dy/dx = 2y + 3e^x , y(0) = 0$$

( Ans = ; 0.811 )

b) Approximate the value of y at x = 0.4 if y(0) = 2 & f(x,y) = 1 + xy . ( Ans = ; 2.587)

**Q.3) Use Euler's method to solve following ?**

a) Find y(0.4) from the differential equation dy/dx = xy , y(0) = 1 & h = 0.1 for each steps. ( Ans = ; 1.061106 )

b) Use 5 steps of Euler's method to solve dy/dx = (y-x)/(y+x) with the initial condition y = 1 at x = 0 & find y(0.1).

( Ans = ; 1.0928 )

**Q.4) Use Euler's Modified method to solve following ?**

a) Approximate the value of dy/dx = 1-y with y(0) = 0 & h = 0.1 when (i) x = 0.1 (ii) x = 0.2 .

( Ans = ; (i) 0.0952 (ii) 0.1814

b) Find an approximate value of the initial value problem dy/dx = x + y<sup>2</sup> ; y(0)=1 at x = 0.5 . ( Ans = ; 2.2067 )

c) Find the value of y at x = 0.1 for the equation dy/dx = x<sup>2</sup> + y with y(0) = 0.94 & take h = 0.1 ( Ans = ; 1.0395)

d) Find an approximate value of y at x = 2 for the differential equation dy/dx = 2 + √xy with y(1)=1 ( Ans = 5.0537 )

**Q.5) Solve following by Runge Kutta method ?**

a) Find the approximate value of y for x = 0.2 in step of 0.1 if dy/dx = x + y<sup>2</sup> & y(0) = 1. ( Ans = ; 1.2736 )

b) Find the approximate value of y for x = 0.2 given that dy/dx = x + y & y(0) = 1. ( Ans = ; 1.243)

c) Approximate the value of y when x = 0.1 , given that y(0) = 1 & dy/dx = 3x + y<sup>2</sup>. ( Ans = 1.127)

d) Solve dy/dx = xy for x = 1.2 by taking h = 0.1 if initially x = 1 & y = 2 . ( Ans = ; 2.4921)

e) Find y(1.1) when h = 0.1 for dy/dx = x. √<sup>1/3</sup> with y(1) = 1. ( Ans = ; 1.10682)

Classes on (ED,BEEE,M1,M2,M3,NA,CONTROL,DSP & other GATE oriented Engineering Subjects)

By :- Agnihotri sir (7415712500) Infront C.M. House, Sherpura , Vidisha

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