**CBNST Assignment No. 4**

**(Based on Unit - 4)**

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| **Q1.** Find y(0.2) if | 𝑑𝑦  𝑑𝑥= log(𝑥 + 𝑦); y(0) = 1. Use Picard’s method. | | |
| **Q2.** Employ Picard’s method to obtain the solution of decimal places, given that y = 0 when x = 0. | | 𝑑𝑥= 𝑥2 + 𝑦2for x = 0.1 correct to four | |
| **Q3.** Employ Picard’s method to find y (0.2) and y (0.4) given that | | | 𝑑𝑦  𝑑𝑥= 1 + 𝑦2and y (0) = 0. |

𝑑𝑦   
**Q4.** Given that 𝑑𝑥= 𝑙𝑜𝑔10(𝑥 + 𝑦) with the initial condition that y = 1 when x = 0. Find y

for x = 0.2 and x = 0.5 using Euler’s modified formula.

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| **Q5.** Given 𝑑𝑥= 𝑥2 + 𝑦 , y(0) = 1, find y(.02), y(.04) and y(.06) using Euler’s modified  method. | |
| **Q6.** Solve for y at x = 1.05 by Euler’s method, the differential equation y = 2 when x = 1. (Take h = 0.05). | dy y  dx= 2 − ( x) where |

𝑑𝑦   
**Q7.** Use Euler’s modified method to compute y for x = .05 and .10. Given that 𝑑𝑥= 𝑥 + 𝑦

with the initial condition x0 = 0, y0 = 1. Give the correct result up to 4 decimal places.

**Q8.** Find y(2.2) using modified Euler’s method for

𝑑𝑦   
𝑑𝑥= −𝑥𝑦2; 𝑦(2) = 1. Take h = .1 .

**Q9.** Solve by Taylor’s method: 𝑦′= 𝑦 −

2𝑥   
𝑦; y(0) = 1. Also compute y(0.1).

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| **Q10.** Given the differential equation | 𝑑𝑦  𝑑𝑥= | 1  𝑥2+𝑦with y(4) = 4. Obtain y (4.1) and y(4.2) by |
| Taylor’s series method. |

**Q11.** Use Runge-Kutta Method to find y when x = 1.2 in steps of 0.1 given that

𝑑𝑦   
𝑑𝑥= 𝑥2 + 𝑦2 and y(1) = 1.5 .

**Q12.** Given 𝑦′= 𝑥2− 𝑦 , y (0) = 1 find y(0.1), y(0.2) using Runge-Kutta Methods of (i)

Second Order (ii) Fourth Order.

**Q13.** Using Runge-Kutta Method of Fourth Order, solve for y(0.1), y(0.2) and y(0.3), given

that 𝑦′= 𝑥𝑦 + 𝑦2, y(0) = 1.

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**Q14.** Given 𝑑𝑥= 𝑥𝑦 with y(1) = 5. Using the Fourth Order Runge-Kutta Method, find the

solution in the interval (1, 1.5) using step size h = 0.1.

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**Q15.** Apply Milne’s Method to solve the differential equation 𝑑𝑥= −𝑥𝑦2at x = 0.8, given

that y(0) = 2, y(0.2) = 1.923, y(0.4) = 1.724, y(0.6) = 1.471

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| 𝑑𝑦 1  **Q16.** Given 𝑑𝑥= 2 (1 + 𝑥2) 𝑦2and y(0) = 1, y(0.1) = 1.06, y(0.2) = 1.12, y(0.3) = 1.21,  evaluate y(0.4) by Milne’s Predictor-Corrector Method. |

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**Q17.** Given 𝑑𝑥= −𝑥𝑦 with y(0) = 1. Solve the equation in the interval (0, 1) using step size

= 0.5 using Predictor-Corrector Method. Give algorithm of Predictor-Corrector Method.