MIDTERM EXAMINATION
Summer 2017
CSE 330: Numerical Methods
Total Marks: 40 Time Allowed: 1 Hour
[Answer Any 2]

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1. Bangladesh Bureau of Statistics published a report about number of children under age 10 over a period of 30 years with 5 years interval in a city. At year 5, numbers of children were 320.532K (320532). Then after each interval numbers of children were 304.714K, 262.132K and 240.219K respectively. At year 25, the value was exactly two-third of that of year 5 and at year 30, the value was exactly half of that of year 5. Now, a child products manufacturing company which was formed 16 years after the reporting started faced a massive loss due to excessive production in their 2nd year. When the report was published they wanted to investigate the approximate numbers of children at the year they were in loss. Your job here is to apply 3rd order Newton's divided difference interpolation method to find the company the approximate number of children at the year they faced loss. [20]

2. a) Find the value of f(x) for x= 9 from the following table using 1st order lagrange polynomial method and linear splines. [15]

x	f(x)
1	10.62
5	80.03
8	120.19
12	350.25
14	389.65

b) Derive the formula for false-position method using graphical method. [5]

3. a) Find a root of the non-linear equation given below. Use Newton's Raphson method and continue your solution up to 3rd iteration. Show your results in a tabular form including the percentage errors. Assume the starting value of the root as -0.5. [12]

$$f(x) = e^x + 3x^2$$

b) Draw the diagram of Numerical Computing Process. What is Human blunders. [8]