**NATIONAL OPEN UNVERSITY OF NIGERIA**

**JABI, ABUJA**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCE**

**JANUARY/FEBRUARY 2017\_2 EXAMINATION**

**COURSE CODE: PHY314COURSE TITLE: NUMERICAL COMPUTATION TIME: 2 Hours 30 Minutes**

**CREDIT UNIT:2**

**INSTRUCTION: Answer Any four questions.**

* 1. Use the intermediate value theorem to show that has a root in the interval [-1, 0] (6 Marks)
	2. Convert the following machine numbers to their decimal equivalent
		1. 0 1000010 100100001000000000000000
		2. 1 1111010 100100001000000000000000 (7.5 Marks)
	3. Evaluate at x=4.71 using three digit
		1. Chopping and
		2. Rounding arithmetic (4 Marks)
	4. The polynomial+ has root at , 1, beginning with two suitable value that bracket the root , show the bisection method converges to that root . (8 Marks)
	5. With the polynomial given in (a) ,start with using the secant method and determine how many iterations are required to estimate the root correct to four decimals ii) with the starting values which root is obtained by the secant method? iii) what will the root be when the starting values are . (9.5 Marks)
1. For the functions given in question 5, evaluate the integral using Simpson’s rule with

(a) h=0.1 (b) h=0.2 (c) h=0.4 determine the errors in computations. (17 ½ marks)

 4. Consider the function over [0.0,1,2]

 a) Use the nodesto construct a linear Interpolation

polynomial . (8.5 Marks)

 b) Use the three nodes to construct a quadratic interpolation polynomial . (9 Marks)

 5. The following values of a function are given

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 |
|  | 1.543 | 1.668 | 1.811 | 1.971 | 2.151 | 2.352 | 2.577 | 2.828 | 3 .107 |

Find , using the trapezoidal rule with (a) h=0.1 (b) h=0.2 and (c) h=0.4. The function determine the error in the computations. (17 ½ Marks)