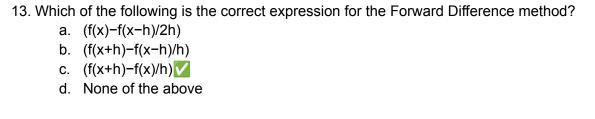
Solution: Makeup Quiz # 1

- 1. Given that we have a polynomial function of $P_5(a)$. What will be the basis of the polynomial:
 - a. $\{1,x,x^2,x^3,x^4,x^5\}$
 - b. $\{1,a,a^2,a^3,a^4,a^5\}$
 - c. $\{x, x^2, x^3, x^4, x^5\}$
 - d. $\{a,a^2,a^3,a^4,a^5\}$
- 2. Suppose we have an equation of $P_n(x) = 5x^4 + 3x^2 + 5x + 8$. Which of the following is true:
 - a. The degree of the equation is 4 and the basis is $\{1,x,x^2,x^3,x^4,x^5\}$
 - b. The degree of the equation is 5 and the basis is $\{1,x,x^2,x^4,x^5\}$
 - c. The degree of the equation is 4 and the basis is $\{1,x,x^2,x^3,x^4\}$
 - d. The degree of the equation is 5 and the basis is $\{1,x,x^2,x^4\}$
- 3. While finding the machine epsilon, we use:
 - a. The maximum value of |x|
 - b. The minimum value of |x|
 - c. The minimum value of |fl(x)-x|
 - d. The maximum value of |f|(x)-x|
- 4. According to the IEEE Standard for Floating-Point Arithmetic (IEEE 754), the number of bits assigned to sign, exponent and mantissa for Double Precision are:
 - a. s=1,e=11,m=52
 - b. s=1,e=8, m=23
 - c. s=1,e=5,m=10
 - d. None of the above
- 5. The value of 2⁻¹⁰²² is stored for
 - a. ±∞
 - b. ±0 🗸
 - C. -∞
 - d. +∞
- 6. It is given that $\beta=2$, m=3 and $e \in [-2,2]$. What will be the highest possible value that can be generated using the normalized form of the floating point representation?
 - a. 3.75
 - b. 31/4
 - c. 1.75
 - d. None of the above

- 7. Which of the following statement is true:
 - a. The scale invariant error can approach infinity if we divide two large numbers
 - b. The scale invariant error can approach infinity if we subtract two close numbers
 - c. The scale invariant error can approach infinity if we add two large Numbers.
 - d. None of the above
- 8. It is given that $\beta=2$, m=3 and $e \in [-2,2]$. What will be the Machine Epsilon value for the denormalized form?
 - a. 0.0625
 - b. 1/64
 - c. 1/16 🗸
 - d. 0.03125
- 9. If we are given 6 nodes, what should be the degree of the polynomial that is used to find the value of the coefficients using the Hermite Interpolation method?
 - a. 13
 - b. 5
 - c. 11 🗸
 - d. None of the above
- 10. Which of the following statement is true:
 - a. Using Hermite interpolation, it is easier to incorporate new nodes when compared to Lagrange interpolation technique.
 - b. Using Newton's divided difference, it is easier to incorporate new nodes when compared to Lagrange interpolation technique.
 - c. Using the Vandermonde matrix technique, it is easier to incorporate new nodes when compared to Lagrange interpolation technique.
 - d. None of the above
- 11. Which of the following statement is true:
 - a. For the runge function, the relative error decreases with the increase in degree of the polynomial
 - b. For the runge function, the most efficient choice is Chebyshev nodes.
 - c. For the runge function, the most efficient choice is equally spaced nodes.
 - d. None of the above.
- 12. For given nodes of (x_0,y_0) , (x_1,y_1) and (x_2,y_2) , the Lagrange basis, $l_0(x)$ would be:
 - a. $(x-x_1)^*(x-x_2)/(x_0-x_1)^*(x_0-x_2)$
 - b. $(x-x_1)^*(y-y_1)/(x_0-x_1)^*(y_0-y_2)$
 - C. $(y-y_1)^*(y-y_2)/(y_0-y_1)^*(y_0-y_2)$
 - d. None of the above



- 14. The truncation error of the central difference method varies according to:
 - a. Truncation error is directly proportional to -h
 - b. Truncation error is directly proportional to h²
 - c. Truncation error is inversely proportional to h
 - d. Truncation error is directly proportional to h4
- 15. Let f(x) = cos(x). The value of f'(0.5) when h=0.01, using the forward difference is:
 - a. -0.095884
 - b. 0.19177
 - c. -0.48381
 - d. None of the above
- 16. Let f(x) = cos(x). The value of f'(0.5) when h=0.001, using the backward difference is:
 - a. -0.47899
 - b. -0.47986
 - c. -0.00015246
 - d. None of the above
- 17. Let $f(x) = \cos(x)$. The value of $D^{(1)}_h$ using the Richardson Extrapolation formula with h=0.01 and h/2=0.005 is:
 - a. -0.00015246
 - b. 0.19177
 - c. -0.095884
 - d. None of the above