Chettinad College of Engineering & Technology
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

Department of Mechanical Engineering

MA8452 – Statistics and Numerical Methods

Unit 2 - MCQ Bank

1. Newton- Gregory Forward interpolation formula can be used _____
   A. **only for equally spaced intervals**
   B. only for unequally spaced intervals
   C. for both equally and unequally spaced intervals
   D. for unequally intervals
   Answer: (A)
2. Find n for the following data if f(0.2) is asked

x	0	1	2	3	4	5	6
f(x)	176	185	194	203	212	220	229

   A. 0.4
   B. 0.2
   C.1
   D. 0.1

   Answer : (B)

3. Find n if $x_0 = 0.75825$, x = 0.759 and h = 0.00005
   A. 1.5
   B. 15
   C. 2.5
   D. 25
   Answer : (B)

4. Find x if $x_0 = 0.6$, n = 2.6 and h = 0.2.
   A. 12
   B. 1.2
   C. 1.12
   D. 1.22
   Answer : (C)

5. Interpolation is helpful in estimating
A. The missing values
B. An intermediate value for a given argument

C. The argument for a given entry
D. All of the above
Answer : (D)

6. Given n+1 data pairs, a unique polynomial of degree _____ passes through the n +1 data points

A. n +1
B. n
C. **n or less**
D. n +1 or less
Answer :(C).

7. The condition to apply Simpson's $\frac{1}{3}$ rule for integration is

A. The interval of integration must be divided into an even number of sub-intervals
B. The interval of integration must be divided into an odd number of sub-intervals
C. The interval of integration must be divided into a 3-multiple of sub-intervals

Answer :(A).

8. What is the order of error in Trapezoidal rule?

A. h
B. h^2
C. h^3
D. h^4
Answer :(B).

9. What is the order of error in Simpson's 1/3 rule?

A. h
B. h^2
C. h^3
D. h^4
Answer :(D).

10. **What is the error in Simpson's $\frac{1}{3}$ rule (or) Simpson's rule?**

A. $E = -\frac{(b-a)}{12}h^2y''(x)$

B. $E = -\frac{3(b-a)}{80}h^5y^v(x)$

C. $\boldsymbol{E = -\frac{(b-a)}{180}h^4y^{iv}(x)}$

Answer :(C)

11. **Which method can be used for both equal and unequal intervals?**

A. Lagrange's method

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B. Newton's divided difference

C. Both A and B

D. Neither A nor B

Answer :(C)

12. Newton's backward interpolation formula is used when

A. interpolation is required near the beginning of the table

B. interpolation is required near the end of the table

C. interpolation is required near the middle of the table

Answer :(B)

13. $\Delta \log x =$

A. $log\left(\frac{x+h}{x}\right)$

B. $log\left(\frac{x}{x+h}\right)$

C. $log\left(\frac{x-h}{x}\right)$

D. $log\left(\frac{x}{x-h}\right)$

Answer :(A)

14. **Newton's forward difference formula is**

A. $y(x) = y_n + \frac{u}{1!}\nabla y_n + \frac{u(u+1)}{2!}\nabla^2 y_n + \frac{u(u+1)(u+2)}{3!}\nabla^3 y_n + \ldots..$

B. $y(x) = y_0 + \frac{u}{1!}\Delta y_0 + \frac{u(u-1)}{2!}\Delta^2 y_0 + \frac{u(u-1)(u-2)}{3!}\Delta^3 y_0 + \ldots..$

C. $y(x) = \frac{1}{h}\left[y_0 + \frac{u}{1!}\Delta y_0 + \frac{u(u-1)}{2!}\Delta^2 y_0 + \frac{u(u-1)(u-2)}{3!}\Delta^3 y_0 + \ldots.. \right]$

D. none of these

Answer: (B)

15. What is the error in Simpson's $\frac{3}{8}$ rule?

A. $E = -\frac{3(b-a)}{80}h^5 y^{iv}(x)$

B. $E = \frac{3(b-a)}{80}h^5 y^{iv}(x)$

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C. $E = -\frac{3(b-a)}{50} h^5 y^{iv}(x)$

D. $E = -\frac{3(b-a)}{50} h^4 y^{iv}(x)$

Answer: (A)

16. Trapezoidal formula is also known as _____

A. Simpson's rule
B. Co-ordinate method
C. Prismoidal method
D. Average end area method
Answer: (D)

17. The value obtained from Simpson's rule depends on the nature of the curve.

A. True
B. False
Answer: (A)

18. Which of the following shapes is generally preferred in case of application of Simpson's rule?

A. Square
B. Triangle
C. Trapezoid
D. Rectangle
Answer: (C)

19. The below mentioned formula is suitable to find out

$$\int_{x_0}^{x_n} y\,dx = \frac{3h}{8}[(y_0 + y_n) + 3(y_1 + y_2 + y_4 + y_5 + \cdots) + 2(y_3 + y_6 + y_9 + \cdots)]$$

A. Simpson's 1/3 rule
B. **Simpson's 3/8 rule**
C. Trapezoidal rule
D. Newton Cote's formula
Answer: (B)

20. The below mentioned formula is suitable to find out

$$\int_{x_0}^{x_n} y\,dx = nh[y_0 + \frac{n}{2}\Delta y_0 + \frac{n(2n-3)}{12}\Delta^2 y_0 + \frac{n(n-2)^2}{24}\Delta^3 y_0 + \cdots]$$

A. Simpson's 1/3 rule
B. Simpson's 3/8 rule
C. Trapezoidal rule

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D. **Newton Cote's formula**
Answer: (D)

21. The below mentioned formula is suitable to find out
$\int_{x_0}^{x_n} y\,dx = \frac{h}{3}[(y_0 + y_n) + 4(y_1 + y_3 + y_5 + \cdots) + 2(y_2 + y_4 + y_6 + \cdots)]$is the formula of

A. Simpson's 1/3 rule
B. Simpson's 3/8 rule
C. Trapezoidal rule
D. Newton Cote's formula
Answer: (A)

22. Which formula is called closed formula?

A. **Simpson's rule**
B. Trapezoidal
Answer: (A)

23. In Simpson's $\frac{3}{8}$ rule for integration the interval of integration must be divided into how many sub intervals?

A. 2
B. **3**
C. 4
D. 5
Answer: (B)

24. The Newton's backward difference formula for first derivative at the end point x = xn is

A. $y_n + \frac{u}{1!}\nabla y_n + \frac{u(u+1)}{2!}\nabla^2 y_n + \frac{u(u+1)(u+2)}{3!}\nabla^3 y_n + \ldots..$

B. $y_0 + \frac{u}{1!}\Delta y_0 + \frac{u(u-1)}{2!}\Delta^2 y_0 + \frac{u(u-1)(u-2)}{3!}\Delta^3 y_0 + \ldots..$

C. $\frac{1}{h}\left[\nabla y_0 + \frac{1}{2}\nabla^2 y_0 + \frac{1}{3}\nabla^3 y_0 + \ldots..\right]$
Answer : (C)

25. Newton's divided difference formula is used for unequal intervals.
A.True
B. False
Answer : (A)

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