Code: 50B06

MR 15

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I B.Tech – II Sem – 2nd Mid Examination Online Bits

(Common for CE, Min.E, ME and CSE branches)

Subject: **Computational Mathematics**

MODULE – III

1. To find the derivative of the function at the beginning of the table we use ------------ interpolating formula

a) Newton's forward formula b)Newton's backward formula c) Sterlings formula d)none

2)To find the derivative of a function at a particular point of the table of values we use------

a)Numerical diferentaiation b)Numerical integration c) Sterlings formula d)none

3)To find the first derivative $\frac{dy}{dx}$ at the beginning of the table at x=x_0 we use the formula----------

a)$\frac{1}{h}\left[\Delta yo - \frac{1}{2}\Delta^2 yo + \frac{1}{3}\Delta^3 yo - \frac{1}{4}\Delta^4 yo \ldots\ldots\ldots.\right]$ b)$\frac{1}{h}\left[\Delta yo + \frac{1}{2}\Delta^2 yo + \frac{1}{3}\Delta^3 yo + \Delta^4 yo \ldots\ldots\ldots\ldots\ldots\right]$

$c)\ \frac{1}{h^2}\left[\Delta yo - \frac{1}{2}\Delta^2 yo + \frac{1}{3}\Delta^3 yo - \frac{1}{4}\Delta^4 yo \ldots\ldots\ldots\ldots.\right]$ $d)\ None$

4) To find the derivative $\frac{d2y}{dx^2}$ at the beginning of the table at x=xo we use the formula----------

a)$\frac{1}{h^2}\left[\Delta^2 y_0 - \Delta^3 y_0 + \frac{11}{12}\Delta^4 y_0 - \frac{5}{6}\Delta^3 y_0 \ldots\ldots.\right]$

b) $\frac{1}{h^2}\left[\Delta^2 y_0 + \Delta^3 y_0 + \frac{11}{12}\Delta^4 y_0 + \frac{5}{6}\Delta^3 y_0 \ldots\ldots\ldots..\right]$

c)) $\left[\Delta^2 y_0 + \Delta^3 y_0 + \frac{11}{12}\Delta^4 y_0 + \frac{5}{6}\Delta^3 y_0 \ldots\ldots\ldots\ldots\right]$

d)None

5) To find the derivative $\frac{d3y}{dx^3}$ at the beginning of the table at x=xo we use the formula----------

a) $\frac{1}{h3}\left[\Delta^3 y_0 - \frac{3}{2}\Delta^4 y_0 \ldots\ldots\ldots...\right]$ b) $\frac{1}{h3}\left[\Delta^3 y_0 + \frac{3}{2}\Delta^4 y_0 \ldots\ldots\ldots...\right]$ c) $\frac{1}{h3}[\Delta^3 y_0 + \Delta^4 y_0 \ldots...]$

d)none

6) To find the derivative of the function at the end of the table we use ------------ interpoliting formula

a)Newtons forward formula b)Newtons backward formula c)sterlings formula d)none

7) To find the derivative $\frac{dy}{dx}$ at the end of the table at x=x_n we use the formula----------

a $\frac{1}{h}\left[\nabla y_n - \frac{1}{2}\nabla^2 y_n + \frac{1}{3}\nabla^3 y_n - \frac{1}{4}\nabla^4 y_n \dots\dots\dots\right]$ b) $\frac{1}{h}\left[\nabla y_n + \frac{1}{2}\nabla^2 y_n + \frac{1}{3}\nabla^3 y_n + \frac{1}{4}\nabla^4 y_n \dots\dots\dots\right]$
$c)$ $\frac{1}{h^2}\left[\nabla y_n + \frac{1}{2}\nabla^2 y_n + \frac{1}{3}\nabla^3 y_n + \frac{1}{4}\nabla^4 y_n \dots\dots\dots\right]$ $d)$ *None*

8) To find the derivative $\frac{d2y}{dx^2}$ at the end of the table at x=x_n we use the formula---------

a) $\frac{1}{h^2}\left[\nabla y_n + \frac{1}{2}\nabla^2 y_n + \frac{1}{3}\nabla^3 y_n + \frac{1}{4}\nabla^4 y_n \dots\dots\dots\right]$ b) $\frac{1}{h^2}\left[\nabla y_n + \frac{1}{2}\nabla^2 y_n + \frac{1}{3}\nabla^3 y_n + \frac{1}{4}\nabla^4 y_n \dots\dots\dots\right]$ $c)$ $\frac{1}{h^2}\left[\nabla y_n + \frac{1}{2}\nabla^2 y_n + \frac{1}{3}\nabla^3 y_n + \frac{1}{4}\nabla^4 y_n \dots\dots\dots\right]$ d)none

9) To find the derivative $\frac{d3y}{dx^3}$ at the end of the table atx= x_n we use the formula----------

a) $\frac{1}{h^3}\left[\nabla^3 y_n + \frac{3}{2}\nabla^4 y_n + \cdots \dots\dots\right]$ b) $\frac{1}{h^3}\left[\nabla^3 y_n - \frac{3}{2}\nabla^4 y_n + \cdots \dots\dots\right]$ c) $\frac{1}{h^2}\left[\nabla^3 y_n + \frac{3}{2}\nabla^4 y_n + \cdots \dots\dots\right]$ d)none

10) To find the derivative $\frac{dy}{dx}$ at the middle of the table at x=x_o we use ----------interpolating formula

a)Newtons forward formula b)Newtons backward formula c)Sterlings formula d)none

11) To find the derivative $\frac{d2y}{dx^2}$ at the middle of the table at x=x_o we use -------------

a) $\frac{1}{h^2}\left[\Delta^2 y_{-1} + \frac{1}{12}\Delta^4 y_{-2} + \frac{1}{90}\Delta^6 y_{-3} \dots\dots\right]$ b) $\frac{1}{h^2}\left[\Delta^2 y_{-1} - \frac{1}{12}\Delta^4 y_{-2} + \frac{1}{90}\Delta^6 y_{-3} \dots\dots\right]$

c) $\frac{1}{h3}\left[\Delta^2 y_{-1} + \frac{1}{12}\Delta^4 y_{-2} + \frac{1}{90}\Delta^6 y_{-3} \dots\dots\right]$ d)none

12)To find maxima or minima of a tabulated function we must have-------------------

a) $\frac{dy}{dp} > 0$ b) $\frac{dy}{dp} = 0$ c) $\frac{dy}{dp} < 0$ d) none

13)To approximate integration of a function defined by a set of numerical values we use -----------

a)Newton-cotes quadrature formula b)Newtons interpolation formula c)Sterlings formula d)none

14)By taking n=1 in the Newton-cotes quadrature formula we get -------------

a)Trepezoidal rule b)Simpson's one-third rule c)Simpson's Three-Eighth rule d)none

15)By taking n=2 in the Newton-cotes quadrature formula we get -------------

a)Trepezoidal rule b)Simpson's one-third rule c)Simpson's Three-Eighth rule d)none

16)By taking n=3 in the Newton-cotes quadrature formula we get -------------

a)Trepezoidal rule b)Simpson's one-third rule c)Simpson's Three-Eighth rule d)none

17)Trepezoidal rule can be applied to ---------- number of intervals

a)Even number of intervals b)Odd number of intervals c) any number of intervals d)none

18)Simpson's one-third rule can be applied only when the interval [a,b] is divided into ---------- number of intervals

a)Odd number of intervals   b)Even number of intervals   c)any number of intervals   d)none

19) In the Simpsons Three-eighth rule the number of sub-intervals should be taken as----------

a)multiples of 2   b)multiples of 3   c)multiples of 4   d)any number of intervals

20)To evaluate $\int_0^1 \frac{dx}{1+x^2}$ using trapezoidal rule with h=0.2 the number of intervals will be -------

a)4   b)6   c)5   d)7

21) To evaluate $\int_0^1 \frac{dx}{1+x^2}$ using trapezoidal rule by taking n=10 thevalue of h is --------

a)0.2   b)0.3   c)0.4   d)0.1

22) To evaluate $\int_2^{10} \frac{dx}{1+x}$ using Simpson's $\frac{1}{3}$ rule taking h=1.0 the number of intervals are ---------

a) 8   b) 10   c)5   d)9

23) To evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Simpson's $\frac{3}{8}$ rule taking n=6 the value of h is -------------

a)2   b)1   c)3   d)4

24)To evaluate $\int_0^{\frac{\pi}{2}} sinx\, dx$ by using Trepezoidal rule by taking n=5 the value of h is ---------

a)0.23451   b) 0.4513   c) 0.6314   d) 0.15708

25)to evaluate $\int_0^{\pi/2} e^{sinx}$dx using Simpson's $\frac{3}{8}$ rule by taking n=3 the value of h is -----------

a) $\frac{\pi}{3}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{6}$ d)) $\frac{\pi}{8}$

KEY:
1.a 2 b 3 a 4 a 5 a 6 b 7 b 8c 9 a 10c 11b 12b 13)a 14)a 15)b 16)c 17)c18)b19)b 20)c 21d 22)a23)b 24)d 25)c

MODULE – IV

1. If y_0=1, h=0.2 $f(x_0,y_0)$ =2 then by Euler's method the value of y_1 is [ ]
   a)1.4   b)1.007   c) 1.223   d) None
2. If y_1=1.1 , h=0.1 $f(x_1,y_1)$ =1.2 then by Euler's method the value of y_2 is [ ]
   a)1.19615   b)1.007   c) 1.022   d) None
3. Which one of the following is best for solving initial value problems [ ]
   a)R-K method of 4th order b) Taylors method c) Euler's method d)None
4. If y^1 = x-y and y(0)=1 then by Picard's method $y^{(1)}$(0.1)=______ [ ]
   a) 0.905   b)1.1   c) 1.05   d)None
5. If y^1 = x+y and y(0)=1 h=0.25 then by Euler's method y(0.25)=____ [ ]

a)1.25 b)1.5 c)2.5 d)None

6. Which of the following is step by step method [ ]

a)Taylor series b)Picard's method c)Adams Bash forth d)None

7. If $y^1 = f(x,y)$ then modified Euler's formula for(n+1)th iteration is ________________ [ ]

a) $y_r^{(n)} = y_{r-1} + \frac{h}{2}[\,f(x_{r-1}, y_{r-1}) + f(x_r, y_r^{(n+1)})]$ b) $y_r^{(n)} = y_{r-1} - \frac{h}{2}[\,f(x_{r-1}, y_{r-1}) + f(x_r, y_r^{(n-1)})]$

c) $y_r^{(n)} = y_{r-1} + \frac{h}{2}[\,f(x_{r-1}, y_{r-1}) - f(x_r, y_r^{(n-1)})]$ d) $y_r^{(n)} = y_{r-1} + \frac{h}{2}[\,f(x_{r-1}, y_{r-1}) + f(x_r, y_r^{(n-1)})]$

8. If $y^1 = x+y$ and $y(0)=1$, $h=0.1$ then by Euler's method $y(0.2)$ = _____________ [ ]

a)1.1 b)1.23 c)1.233 d)1.22

9. If $y^1 = x + y$ and $y(0)=1$ then second approximation up to 2nd degree terms is using Picard's method is _________ [ ]

a) $y^{(2)} = 1+x+x^2 + x^3$ b) $y^{(2)} = 1+x+2x^2 - x^3$ c) $y^{(2)} = 1+x+x^2 + (x^3/6)$ d) $y^{(2)} = 1+x+x^2 - (x^3/6)$

10. If $\frac{dy}{dx} = \frac{x^2}{1+y^2}$ and $y(0)=0$ then $y^{(2)}(x)$ second approximation by Picard's method is___________ [ ]

a) $y^{(2)}(x)= \tan^{-1}(x^3)$ b) $y^{(2)}(x)= -\tan^{-1}(x/3)$ c) $y^{(2)}(x) = \tan^{-1}(x^3/3)$ d) $y^{(2)}(x) =3\tan^{-1}(x^3/3)$

11. If $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0)= 1$ then by Picard's method first approximation $y^{(1)}(x)$ = ______________ [ ]

a) $y^{(1)}(x)= 1-x+2\log(1+x)$ b) $y^{(1)}(x)= 1-x+2\log(1-x)$

c) $y^{(1)}(x)= 1-x-2\log(1+x)$ d) $y^{(1)}(x)= 1-x-2\log(1-x)$

12. Given $\frac{dy}{dx} = (x^3 + x y^2) e^{-x}$, $y(0) = 1$ then by using Euler's method $y(0.1)$ = ____________ [ ]

a)0.2 b)0.30 c)0.44 d)1

13. The Taylor series for $f(x) = \log(1-x)$ is ________________ [ ]

a) $x-\frac{x^2}{2}+\frac{x^3}{3}-\frac{x^4}{4}+$----------- b) $x-\frac{x^2}{2}-\frac{x^3}{3}-\frac{x^4}{4}-$ ----------- c) $-x-\frac{x^2}{2}+\frac{x^3}{3}+\frac{x^4}{4}$------------ d) $x+\frac{x^2}{2}+\frac{x^3}{3}+\frac{x^4}{4}+$--------

14. If $y_0 = 1$, $f(x_0, y_0) = 1$, $f(x_1, y_1^{(0)}) = 1.2954$, $h=0.2$ by Modified Euler's method $y_1^{(1)}$ = _____ [ ]

a)1.2015 b)1.525 c)1.325 d)1.2295

15. If $\frac{dy}{dx} = x - y^2$ and $y(0)=1$ then $y^{(1)}(x)$ by Picard's method is _____________ [ ]

a) $1-x + (x^2/2)$ b) $1+x + (x^2/2)$ c) $1-x + x^2$ d) $1-x - (x^2/2)$

16. If $\frac{dy}{dx} = x^2 - y$, $y(0)$ = then $y(0.1)$ taking two differentials , using Taylor series method is ____ [ ]

a)0.95 b)1.05 c)1.1 d)0.905

17. If $\frac{dy}{dx} = x+y$ and $y(0) =1$ then $y^{(1)}(0.1)$ by Picard's method is ____________ [ ]

a)1.105 b)1.205 c)1.1 d).99

18. If $\frac{dy}{dx} = x - y^2$ and $y(0)=1$ then $y^{(1)}(0.1)$ by Picard's method is _____________ [ ]

a)1.1 b)1.11 c)0.905 d)0.91

19. If $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) =1$ and $h = 0.2$ using Euler's method the value of y_1 = _________ [ ]

a)1.44 b)1.30 c)1.2 d)1.23044

20. The Taylor series for $f(x) = \sin x$ is __________________ [ ]

a) $x-\frac{x^3}{3!}+\frac{x^5}{5!}-\frac{x^7}{7!}+$--------------- b) $x+\frac{x^3}{3!}+\frac{x^5}{5!}+\frac{x^7}{7!}+$------- c) $-x-\frac{x^3}{3!}-\frac{x^5}{5!}-\frac{x^7}{7!}$ ---------------- d)None

21. The second approximation solution of $\frac{dy}{dx} = 1+xy$ using Picard's method is ___________ [ ]

a) $1+x+\frac{x^2}{2}+\frac{x^3}{3}+\frac{x^4}{8}+$------- b) $-1-x-\frac{x^2}{2}-\frac{x^3}{3}-\frac{x^4}{8}$ ------ c) $1-x+\frac{x^2}{2}-\frac{x^3}{3}+\frac{x^4}{8}-$ d) $-1+x-\frac{x^2}{2}+\frac{x^3}{3}-\frac{x^4}{8}+$-----

22. The Taylor series for $f(x) = \cos x$ is_________________ [ ]

a) $1-\frac{x^2}{2!}+\frac{x^4}{4!}-\frac{x^6}{6!}+$------ b) $-1-\frac{x^2}{2!}+\frac{x^4}{4!}-\frac{x^6}{6!}+$--------- c) $-1-\frac{x^2}{2!}-\frac{x^4}{4!}-\frac{x^6}{6!}$ --------- d) $1+\frac{x^2}{2!}+\frac{x^4}{4!}+\frac{x^6}{6!}+$--------

23. If $\frac{dy}{dx} = x-y$, and $y(0) =1$ then $y(0.1)$ taking two differentials , using Taylor series method is ____ [ ]

a)0.91 b)1.2 c)1.30 d)1.44

24. If $\frac{dy}{dx} = 3x^2 + 1$, y(1) = 2 ,by h=0.5 then y(2) using Euler's Method is ______________ [ ]

a)7.24430 b)7.875 c)7.23044 d)7.30244

25. Given h=0.2, $f(x_0, y_0) = 1$, $f(x_1, y_1^{(0)}) = 1.4214$ and $y_0 = 0$ then by using Euler's modified formula $y_1^{(1)}$ =_______________ [ ]

a)0.21424 b)0.24124 c)0.24124 d)0.24214

26. First order R-K formula is --------- [ ]

a) $y_1 = y_0 + h\, f(x_0, y_0)$ b) $y_1 = y_0 + \frac{1}{2}(k_1 + k_2)$

c) $y_1 = y_0 + \frac{1}{6}(k_1 + 4k_2 + k_3)$ d) $y_1 = y_0 + \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)$

27. Second order R-K formula is --------- [ ]

a) $y_1 = y_0 + h\, f(x_0, y_0)$ b) $y_1 = y_0 + \frac{1}{2}(k_1 + k_2)$

c) $y_1 = y_0 + \frac{1}{6}(k_1 + 4k_2 + k_3)$ d) $y_1 = y_0 + \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)$

28. Third order R-K formula is --------- [ ]

a) $y_1 = y_0 + h\, f(x_0, y_0)$ b) $y_1 = y_0 + \frac{1}{2}(k_1 + k_2)$

c) $y_1 = y_0 + \frac{1}{6}(k_1 + 4k_2 + k_3)$ d) $y_1 = y_0 + \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)$

29. Fourth order R-K formula is --------- [ ]

a) $y_1 = y_0 + h\, f(x_0, y_0)$ b) $y_1 = y_0 + \frac{1}{2}(k_1 + k_2)$

c) $y_1 = y_0 + \frac{1}{6}(k_1 + 4k_2 + k_3)$ d) $y_1 = y_0 + \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)$

30. Using R-K Method, to solve the $\frac{dy}{dx} = x + y\, , y(0) = 1\, , h = 0.1\ then\ \ k_1 = \cdots$ [ ]

a) 0.1 b) 0.11 c) 0.1105 d) 0.1385

31. Using R-K Method, to solve the $\frac{dy}{dx} = x + y\, , y(0) = 1\, , h = 0.1\ then\ \ k_2 = \cdots$ [ ]

a) 0.1 b) 0.11 c) 0.1105 d) 0.1385

32. Using R-K Method, to solve the $\frac{dy}{dx} = x + y\, , y(0) = 1\, , h = 0.1\ then\ \ k_3 = \cdots$ [ ]

a) 0.1 b) 0.11 c) 0.1105 d) 0.1385

33. Using R-K Method, to solve the $\frac{dy}{dx} = x + y\, , y(0) = 1\, , h = 0.1\ then\ \ k_4 = \cdots$ [ ]

a) 0.1 b) 0.11 c) 0.1105 d) 0.1385

34. Using R-K Method, to solve the $\frac{dy}{dx} = y - x^2\, , y(0.6) = 1.7379\, , h = 0.1\ then\ \ k_1 = \cdots$ [ ]

a) 0.1378 b) 0.1384 c) 0.1385 d) 0.1386

35. Using R-K Method, to solve the $\frac{dy}{dx} = y - x^2\, , y(0.6) = 1.7379\, , h = 0.1\ then\ \ k_2 = \cdots$ [ ]

a) 0.1378 b) 0.1384 c) 0.1385 d) 0.1386

36. Using R-K Method, to solve the $\frac{dy}{dx} = y - x^2\, , y(0.6) = 1.7379\, , h = 0.1\ then\ \ k_3 = \cdots$ [ ]

a) 0.1378 b) 0.1384 c) 0.1385 d) 0.1386

37. Using R-K Method, to solve the $\frac{dy}{dx} = y - x^2, y(0.6) = 1.7379, h = 0.1 \; then \; k_4 = \cdots$ [ ]

a) 0.1378 b) 0.1384 c) 0.1385 d) 0.1386

38. Using R-K Method, to solve the $\frac{dy}{dx} = x + y^2, y(0) = 1, h = 0.1 \; then \; k_1 = \cdots$ [ ]

a) 0.1 b) 0.11525 c) 0.11685 d) 0.13474

39. Using R-K Method, to solve the $\frac{dy}{dx} = x + y^2, y(0) = 1, h = 0.1 \; then \; k_2 = \cdots$ [ ]

a) 0.1 b) 0.11525 c) 0.11685 d) 0.13474

40. Using R-K Method, to solve the $\frac{dy}{dx} = x + y^2, y(0) = 1, h = 0.1 \; then \; k_3 = \cdots$ [ ]

a) 0.1 b) 0.11525 c) 0.11685 d) 0.13474

41. Using R-K Method, to solve the $\frac{dy}{dx} = x + y^2, y(0) = 1, h = 0.1 \; then \; k_4 = \cdots$ [ ]

a) 0.1 b) 0.11525 c) 0.11685 d) 0.13474

42. In R-K Method Second order the value of $k_1 = --$ [ ]

a) h f(x_0 , y_0) b) h f(x_0+h, y_0+ k_1)

c) $h\,f(x_0 + \frac{h}{2}, y_0 + \frac{k_1}{2})$ d) $h\,f(x_0 + h, y_0 + k^1)$

43. In R-K Method Second order the value of $k_2 = --$ [ ]

a) h f(x_0 , y_0) b) h f(x_0+h, y_0+ k_1)

c) $h\,f(x_0 + \frac{h}{2}, y_0 + \frac{k_1}{2})$ d) $h\,f(x_0 + h, y_0 + k^1)$

44. In R-K Method Third order the value of $k_2 = --$ [ ]

a) h f(x_0 , y_0) b) h f(x_0+h, y_0+ k_1)

c) $h\,f(x_0 + \frac{h}{2}, y_0 + \frac{k_1}{2})$ d) $h\,f(x_0 + h, y_0 + k^1)$

45. In R-K Method Third order the value of $k_3 = --$ [ ]

a) h f(x_0 , y_0) b) h f(x_0+h, y_0+ k_1)

c) $h\,f(x_0 + \frac{h}{2}, y_0 + \frac{k_1}{2})$ d) $h\,f(x_0 + h, y_0 + k^1)$

46. Using Euler's Method, to solve the $\frac{dy}{dx} = x + y, y(0) = 1, h = 0.1 \; then \; k_2 = \cdots$ [ ]

a) 0.1 b) 0.11 c) 0.1105 d) 0.1385

47. Using Modified Euler's Method, to solve the $\frac{dy}{dx} = x + y, y(0) = 1, h = 0.1 \; then \; k_3 = \cdots$ [ ]

a) 0.1 b) 0.11 c) 0.1105 d) 0.1385

48. Using Euler's Method, to solve the $\frac{dy}{dx} = x + y, y(0) = 1, h = 0.1 \; then \; k_4 = \cdots$ [ ]

a) 0.1 b) 0.11 c) 0.1105 d) 0.1385

49. Using Modified Euler's Method, to solve the $\frac{dy}{dx} = y - x^2, y(0.6) = 1.7379, h = 0.1 \; then \; k_1 = \cdots$ [ ]

a) 0.1378 b) 0.1384 c) 0.1385 d) 0.1386

50. Using Euler's Method, to solve the $\frac{dy}{dx} = y - x^2, y(0.6) = 1.7379, h = 0.1 \; then \; k_2 = \cdots$ [ ]

a) 0.1378 b) 0.1384 c) 0.1385 d) 0.1386

KEY to MODULE-IV

1.a	2.d	3.a	4.a	5.a
6.c	7.d	8.d	9.c	10.c
11.a	12.d	13.b	14.d	15.a
16.d	17.a	18.c	19.c	20.a

21.a 22 .a 23.a 24.b 25.d

26) A 27)B 28)C 29)D 30)A 31)B 32)C 33)D 34) A 35)B

36)C 37)D 38) A 39) B 40)C 41)D 42) A 43) B 44) C 45) D 46)B 47)C 48)D 49) A 50)B

MODULE – V

1. Which of the following equation is parabolic--------- [ ]
a)$f_{xx} - f_x = 0$ b)$f_{xx} + 2f_{xy} + f_{yy} = 0$ c) $f_{xx} + 2f_{xy} + 4f_{yy} = 0$ d) None

2. The PDE $A(x,y)\frac{\partial^2 u}{\partial x^2} + B(x,y)\frac{\partial^2 u}{\partial x \partial y} + C(x,y)\frac{\partial^2 u}{\partial y^2} + F\left(x,y,u,\frac{\partial u}{\partial x},\frac{\partial u}{\partial y}\right) = 0$ is said to be elliptic-[ ]

a)$B^2 - 4AC = 0$ b) $B^2 - 4AC < 0$ c) $B^2 - 4AC > 0$ d) None

3. The PDE $A(x,y)\frac{\partial^2 u}{\partial x^2} + B(x,y)\frac{\partial^2 u}{\partial x \partial y} + C(x,y)\frac{\partial^2 u}{\partial y^2} + F\left(x,y,u,\frac{\partial u}{\partial x},\frac{\partial u}{\partial y}\right) = 0$ is said to be hyperbolic

a) $B^2 - 4AC = 0$ b) $B^2 - 4AC < 0$ c) $B^2 - 4AC > 0$ d) None [ ]

4. The PDE $A(x,y)\frac{\partial^2 u}{\partial x^2} + B(x,y)\frac{\partial^2 u}{\partial x \partial y} + C(x,y)\frac{\partial^2 u}{\partial y^2} + F\left(x,y,u,\frac{\partial u}{\partial x},\frac{\partial u}{\partial y}\right) = 0$ is said to be parabolic

a) $B^2 - 4AC = 0$ b) $B^2 - 4AC < 0$ c) $B^2 - 4AC > 0$ d) None [ ]

5. Classify $\frac{\partial^2 u}{\partial x^2} + 4\frac{\partial^2 u}{\partial x \partial y} + 4\frac{\partial^2 u}{\partial y^2} - \frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0$ ---- [ ]

a)Parabolic b) Hyperbolic c)Elliptic d)None

6. Classify $x^2\frac{\partial^2 u}{\partial x^2} + (1-y^2)\frac{\partial^2 u}{\partial y^2} = 0,\ -\infty < x < \infty, -1 < y < 1$ [ ]

a)Parabolic b) Hyperbolic c)Elliptic d)None

7. Classify $(1+x^2)\frac{\partial^2 u}{\partial x^2} + (5+2x^2)\frac{\partial^2 u}{\partial x \partial y} + (4+x^2)\frac{\partial^2 u}{\partial y^2} = 0 ------$ [ ]

a)Parabolic b) Hyperbolic c)Elliptic d)None

8. what is the classification of $f_{xx} + 2f_{xy} + f_{yy} = 0$------- [ ]

a)Parabolic b) Hyperbolic c)Elliptic d)None

9. what is the classification of $(x+1)u_{xx} - 2(x+2)u_{xy} + (x+3)u_{yy} = 0$------ [ ]

a)Parabolic b) Hyperbolic c)Elliptic d)None

10. what is the classification of $y^2 u_{xx} - 2xyu_{xy} + x^2 u_{yy} + 2u_x - 3u = 0$------ [ ]

a)Parabolic b) Hyperbolic c)Elliptic d)None

11.what is the classification of $x^2 u_{xx} + y^2 u_{yy} = xu_x - yu_y$ ------ [ ]

a)Parabolic b) Hyperbolic c)Elliptic d)None

12. Classify $3\frac{\partial^2 u}{\partial x^2} + 4\frac{\partial^2 u}{\partial x \partial y} + 6\frac{\partial^2 u}{\partial y^2} - 2\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} - u = 0$ ---- [ ]

a)Parabolic b) Hyperbolic c)Elliptic d)None

13. The Laplace equation is-- [ ]

a)$\nabla^2 u = 0$ b) $\nabla^2 u \le 0$ c) $\nabla^2 u \ge 0$ d) None

14. Laplace equation is of type [ ]

a)Parabolic type b) Hyperbolic type c)Elliptic type d)Circular Type

15. The Poisson's equation is-- [ ]

a)$\nabla^2 u = f(x,y)$ b) $\nabla^2 u \le f(x,y)$ c) $\nabla^2 u \ge f(x,y)$ d) None

16 .Poisson's equation is of type [ ]

A)Parabolic type b) Hyperbolic type c)Elliptic type d)Circular Type

17. Standard 5-point formula is $u_{i,j} =$ [ ]

a)$\frac{1}{4}(u_{i-1,j} + u_{i+1,j} + u_{i,j} + u_{i,j+1})$ b) $\frac{1}{4}(u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1})$

c) $\frac{1}{4}(u_{i-1,j} + u_{i+1,j} + u_{i+1,j} + u_{i,j+1})$ d) None

18. Diagonal 5-point formula is $u_{i,j} =$

a)$\frac{1}{4}(u_{i-1,j} + u_{i+1,j-1} + u_{i,j} + u_{i,j+1})$ b) $\frac{1}{4}(u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1})$
c) $\frac{1}{4}(u_{i-1,j+1} + u_{i+1,j-1} + u_{i+1,j+1} + u_{i-1,j-1})$ d) None

19. The one Dimensional Heat Conduction equation is

a) $\frac{\partial u}{\partial t} = c^2 \frac{\partial u}{\partial y}$ b) $\frac{\partial^2 u}{\partial x^2} = \frac{\partial^2 u}{\partial x \partial y}$ c) $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$ d)None

20. The Wave equation is

a) $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x \partial y}$ b) $\frac{\partial^2 u}{\partial x^2} = \frac{\partial^2 u}{\partial x \partial y}$ c) $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$ d) $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$

21. Bender-Schmidt Recurrence relation is is $u_{i,j+1} =$

a)$\frac{1}{2}(u_{i-1,j}+u_{i+1,j})$ b) $\frac{1}{2}(u_{i-1,j}+u_{i,j+1})$ c) $\frac{1}{2}(u_{i-1,j+1}+u_{i+1,j-1})$ d) None

22.what is the classification of $u_{xx}+3u_{xy}+u_{yy}=0$ [ ]

a)Parabolic b) Hyperbolic c)Elliptic d)None

23.The partial differential equation $f_{xx}-2f_{xy}=0$ is [ ]

a)Parabolic Type b) Hyperbolic Type c)Elliptic Type d)None

24.The two Dimensional Heat Equation in steady State $u_{xx}+u_{yy}=0$ is

a)Parabolic b) Hyperbolic c)Elliptic d)Circle

25.The partial Differential equation $\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}=f(x,y)$ is called

a)Laplace equation b) Heat Equation c)Poisson equation d) Wave equation

26) In any partial differential equation the total number of Independent variable is

a) 1 b) more than 1 c) Less than 2 d) None

27) The standard five point formula useful when

a) Adjacent four values are known b) Diagonal four values are known c) Adcacent 3 vaues are known

d) Diagonal 3 vlaues are known

28) The partial Differential equation $\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}=0$ is called

a)Laplace equation b) Heat Equation c)Poisson equation d) Wave equation

29) Laplace equation order is

a) 1 b)2 C) 3 D) None

30) A General Partial differential equation is said to be Hyperbolic if it has to follow the condition

a) B^2 -4AC <0 b) B^2 -4AC >0 c) B^2 -4AC = 0 d) None

31) A General partial differential equation is said to be Elliptic it has to follow the condition

a) B^2 -4AC <0 b) B^2 -4AC >0 c) B^2 -4AC = 0 d) None

32) Parabolic equation mesh ratio r always lies between for convergence to the exact solution is

a) $0<r\leq 1/2$ b) $0<r<1/2$ c)$0<r<1$ d) $0<r\leq 1$

33) The dimension of the partial differential equation $u_{xx}+u_{yy}=0$ is

a) 1 b) 2 c) 3 d) None

34) In the Numerical solution of partial differential equations the main concept is to get the solution at a

a) Grid point b) region c) line d) None

35) Heat equation is the type of

a) Parabolic b) Elliptic c) Hyperbolic d) All

36) In a given Boundary value problem, Boundary conditions are given only as a function values , such problem is called

a) Dirichlet's problem b) Neumann's Problem c) Mixed problem d) All

37) In the Numerical technique once we replace derivative value with the associated Numerical scheme it becomes

a) Differential equation b) Integral equation c) Difference equation d) None.

38) $\frac{\partial u}{\partial x} = \frac{\partial^2 u}{\partial y^2}$ is an example of

a) Heat equation b) Laplace equation c) Diffusion equation d) None

39) $\frac{\partial^2 u}{\partial x^2} = \frac{\partial^2 u}{\partial y^2}$ is which type of equation

a) Hyperbolic b) Parabolic c) elliptic d) All

40) $x\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ is parabolic when x equal to

a) Zero b) Non-zero c) Any x d) None

41) $x\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ is Hyperbolic when x is

a) Non-zero b) zero c) $x>0$ d) $x<0$

42) $x\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ is is said to be Elliptic if x is

a) $x=0$ b) $x\neq 0$ c) $x>0$ d) $x<0$

43) $u_{tt} - u_{xx} = 0$,$t>0$ is a type of $u(x,0)= f(x)$ & $u_t(x,0) = h(x)$ is a

a) Dirichlet problem b) Cauchy's Problem c) Nuemann problem d) None

44) In the standard five point formula the order of convergence is of order

a) 4 b) 3 c) 6 d) 5

45)In the Gauss seidel iteration method the solution order of convergence is

a) 1 b) 2 c) 3 d) 4

46) $f_{xx} - f_x = 0$ is a type of

a) Hyperbolic b) Elliptic c) Parabolic d) None

47) The Diagonal five point formula is useful when

a) 4 of the adjacent values are known b) 4 of the diagonal values are unknown c) 4 of the adjacent t values are unknown d) 4 of the diagonal values are known

48) $\frac{1}{2}(u_{i-1,j} + u_{i+1,j})$ is equal s to

a) $u_{i,j+1}$ b) $u_{i,j-1}$ c) $u_{i,j}$ d) None

49) A Numerical partial differential equation with boundary conditions is said to be Nuemann's if

a) Only function values are given b) derivative boundary conditions are given c) Mixed boundary conditions are given.

d) None

50) A Numerical partial differential equation with boundary conditions is said to be Dirichlet's if

a) Only function values are given b) derivative boundary conditions are given c) Mixed boundary conditions are given.

d) None

KEY:

1.b 2.b 3.c 4.a 5.a 6.c 7.b 8.a 9.b 10. A 11.c 12.c 13.a 14.c 15. A 16.c 17.b 18. C 19.C 20. D 21.a 22.b 23.a 24 .c 25. C 26. B 27. A 28. A 29. B 30. B 31.A 32.A 33.B 34.A 35.A 36.A 37.C 38.C 39.A 40A 41. D 42. C 43.B 44.C 45. B 46.C 47.D 48 A 49. B 50. A