BUDDHA SERIES

(Unit Wise Solved Questions & Answers)

Course –B.Sc Math 2nd Year

College – Buddha Degree College

(DDU Code-859)

Department: Science

Subject: Mathematical method

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Unit - 1

Q 1- The $\lim_{(x,y)\to(0,0)} xy\frac{x^2-y^2}{x^2+y^2}$ **is equal to**

a) 1 b) 2

c) 3 d) 0

Q 2- The function f(x,y) is said to be continuous at (a,b) if $\lim_{(x,y)\to(a,b)} f(x,y)$ *is equal to* :

a) f(a,b) b) f(b,a)

c) f(0,0) d) f(x,y)

Q 3- The lagrange's condition for maximum values of a function of two variables is $rt-s^2 > 0$ and

a) $r > 0$ b) $r < 0$

c) r=0 d) none of these

Q 4- The value of $\lim_{(x,y)\to(1,2)} 3xy$ *is* :

a) 1 b) 3

c) 0 d) 6

Q 5- The value of cos x is

a) $\frac{e^{ix}+e^{-ix}}{2}$ b) $\frac{e^{ix}-e^{-ix}}{2}$

c) $\frac{e^{ix}+e^{-ix}}{2i}$ d) none of these

Q 6- For all values of x, e^{ix} *is* :

a) $\sin x - i\cos x$ b) cosx-isinx

c) cosx+isinx d) sinx+cosx

Q 7- The period of sin z is

a). π b) πi

c). 2π d) $2\pi i$

Q 8- For all values of x , e^{x} *is* :

a) $\sin hx - \cos hx$ b) coshx-sinhx

c) coshx + sinhx d) none of these

Q 9- The principal value of log(-3) is

a). $\log 3+2\pi i$ b) $\log 3+\pi i$

c) $\log 3-2\pi i$ d) None of these

Q 10- $\tanh^{-1} z$ *is equal to* :

a) $\log\left(\frac{1+z}{1-z}\right)$ b) $\frac{1}{2}\log\left(\frac{1+z}{1-z}\right)$ c) $\frac{1}{2}\log\left(\frac{1-z}{1+z}\right)$ d) none of these

Q 11- The value of sin x is

a) $\frac{e^{ix}+e^{-ix}}{2}$ b) $\frac{e^{ix}-e^{-ix}}{2}$

c) $\frac{e^{ix}+e^{-ix}}{2i}$ d) none of these

Q 12- For all values of x, ie^{-ix} is :

a) $\sin x + i\cos x$ b) cosx-isinx

c) cosx+isinx d) sinx+cosx

Q 13- The principal value of log(-5) is

a). $\log 5+2\pi i$ b) $\log 5+\pi i$

c) $\log 5-2\pi i$ d) None of these

Q 14- The function $f(x,y)=x^2+y^2$ is:

a) Continuous everywhere b) Discontinuous at origin

c) Continuous only along y = x d) Continuous only when x = 0

Q 15- The function $f(x,y)=x^2+y^2$ has:

a) Maximum at (0,0)

b) Minimum at (0,0)

c) Saddle point at (0,0)

d) No extrema

Q 16- If f(x,y)=x2−y2f(x, y) = x^2 - y^2f(x,y)=x2−y2, then the point (0, 0) is:

a) Maximum b) Minimum

c) Saddle Point d) Cannot determine

Q 17- The method of Lagrange multipliers is used to:

a) Maximize functions without constraints b) Find limits

c) Find extrema with constraints d) Find inverse functions

Q 18- In Lagrange multipliers, the equations solved are:

a) $\nabla f = 0$ b) $\nabla f = \lambda \nabla g$

c) f = g d) None of the above

Q 19- The principal value of log(i) is:

a) $i\pi$ b) $\ln 1 + i\pi/2$

c) 0 d) $i\pi/2$

Q 20- The lagrange's condition for minimum values of a function of two variables is rt-s2$>$ 0 and

a) $r > 0$ b) $r < 0$

c) r=0 d) none of these

Q 21- If $f(x, y) = x^2 + y^2$, the second-order Taylor expansion at (0, 0) is:

a) 0 b) $x^2 + y^2$ c) 2x + 2y d) x + y

Q 22- Which of the following is a necessary condition for continuity of a function f(x, y) at a point (a, b)?

a) Partial derivatives exist b) Limit does not exist

c) Limit exists and equals f(a, b) d) Gradient is non-zero

Q 23-. Which of the following implies differentiability of a function of two variables?

a) f is continuous b) All partial derivatives exist

c) Partial derivatives are continuous d) Gradient exists

Q 24-. In Lagrange method, the number of multipliers used equals:

a) Number of constraints b) Number of variables

c) Number of critical points d) Dimensions of space

Q 25-. The imaginary part of log(-1) is:

a) 0 b) π c) $\pi/2$ c) Undefined

Solutions

1. (d) ,**2.** (a) ,**3.** (b) ,**4.** (d) ,**5.** (a) ,**6.** (c) ,**7.** (c) ,**8.** (c) ,**9.** (b) ,**10.** (c) 11(d), 12(a), 13(b),.14(a), 15(b), 16(c), 17(c), 18(b), 19(d) ,20(d), 21(b), 22(c) , 23(c), 24(a), 25(b)

Unit - II

Q 1- The Laplace transform of F(t) is given by

a) $f(s) = \int_0^\infty e^{-st} F(t)dt$ b) $f(t) = \int_0^\infty e^{-st} F(t)dt$

c) $F(s) = \int_0^\infty e^{-st} F(t)dt$ d) $F(s) = \int_0^\infty e^{-st} F(s)dt$

Q 2- The Laplace transform of coshat is :

a) $\frac{s}{s^2-a^2}$ b) $\frac{s}{s^2+a^2}$

c) $\frac{1}{s^2-a^2}$ d) $\frac{a}{s^2+a^2}$

Q 3- $L(\frac{sint}{t}) = \cdots ?$

a) $\tan^{-1}\frac{1}{s}$ b) $\tan^{-1} s$

c) $\tan^{-1}\frac{2}{s}$ d) none of these

Q 4- The value of $\int_0^\infty \frac{sint}{t}\, dt$ is :

a) 1 b) none of these c) 0 d) $\frac{\pi}{2}$

Q 5- The value of $L^{-1}\left[\frac{1}{s^4}\right]$ is

a) $\frac{t^3}{3!}$ b) $\frac{t^4}{4!}$

c) $\frac{t^5}{5!}$ d) none of these

Q 6- Find the inverse Laplace transform for $\frac{s}{(s+2)^2}$.:

a) $e^{-2t}(1-2t)$ b) $e^{-2t}(1+2t)$ c) $e^{-t}(1-2t)$ d) none of these

Q 7- If $L^{-1}[f(s)] = F(t)$, then $L^{-1}[f(s-a)]$ is

a). $e^{-at}F(t)$ b) $e^{at}F(t)$

c). $e^{-t}F(t)$ d) $F(at)$

Q 8- Find the inverse Laplace transform for $\frac{1}{s^2+a^2}$ is :

a) sin at b) cos at

c) $\frac{sinat}{a}$ d) none of these

Q 9- If $L^{-1}[f(s)] = F(t)$, then $L^{-1}\left[\frac{f(s)}{s}\right]$ is

a). $-1^n t^n F(t)$ b) $F'(t)$

c) $\int_0^t F(u)du$ d) None of these

Q 10- If $[F(t)] = f(s)$, then $L[tF(t)]$ is

a) $f'(s)$ b) $-f'(s)$ c) $\frac{1}{s}f(s)$ d) none of these

Q 11-The function $H(t-a) = \begin{cases} 1, t > a \\ 0, t > a \end{cases}$ is called:

a) Heaviside function b). Error function

c) Dirac delta function d) none of these

Q 12- The value of $L^{-1}\left\{\frac{1}{s-2}\right\}$ is

a) e^{2t} b) e^{-2t} c) e^{t} d) e^{-t}

Q 13-The value of $L^{-1}\left\{\frac{a}{s^2-a^2}\right\}$ is

A. sin at B.cos at C. sin h at D. cos h at

Q 14- The value of $L^{-1}\left\{\frac{1}{s+3}\right\}$ is

a) e^{2t} b) e^{-3t} c) e^{t} d) e^{-t}

Q15-The value of $L\{t^2e^{-3t}\}$ is.

A. $\frac{(-1)}{(s+3)^2}$ B. $\frac{2}{(s+3)^2}$ C. $\frac{(-2)}{(s+3)^2}$ D. $\frac{1}{(s+3)^2}$

Q16-The value of $L\{e^{at}\sin hbt\}$ is

A. $\frac{b}{(s-a)^2+b^2}$ B.$\frac{a}{(s-a)^2-b^2}$ C. $\frac{b}{(s-a)^2-b^2}$ D. $\frac{s}{(s-a)^2-b^2}$

Q17-The value of $L\{1\}$ is

A. s B.$\frac{1}{s}$ C. 1 D. 0

Q18-The value of $L\{\cos hat\}$ is

A. $\frac{a}{s^2-a^2}$ B.$\frac{s}{s^2-a^2}$ C. $\frac{a}{s^2+a^2}$ D. $\frac{s}{s^2+a^2}$

Q 19-The value of $\int_0^{\infty} e^{-2t}\sin 3t\,dt$ is

A. $\frac{3}{13}$ B.$\frac{2}{13}$ C. $\frac{13}{3}$ D. $\frac{13}{2}$

Q 20-If $L\{F(t)\} = f(s)$ then $L\{F(at)\}$ is

A. f (s/a) B $.\frac{1}{a}$ f (s) C. $\frac{1}{a}$ f (s/a) D. $\frac{1}{s}$ f (s/a)

Q 21-The value of $\int_0^{\infty} e^{-t}\frac{\sin t}{t}dt$ is

A. $\frac{\pi}{2}$ B. $\frac{\pi}{3}$ C. $\frac{\pi}{4}$ D. $\frac{\pi}{6}$

Q 22-The value of $L^{-1}\left\{\frac{1}{s^2+1}\right\}$ is

A. sin ht B.cos ht C. cos t D. sin t

Q 23 -The value of $L^{-1}\left\{\frac{1}{s^3}\right\}$ is

A. $\frac{2}{t^2}$ B.$\frac{t^2}{2}$ C. $2t^2$ D. t^2

Q 24- The value of $L^{-1}\left\{\frac{1}{s\,(s-1)}\right\}$ is

A. $e^{-t}+1$ B. $e^{-t}-1$ C. $e^{t}-t$ D. $e^{t}-1$

Q 25-The value of $L^{-1}\left\{\frac{a}{s^2+a^2}\right\}$ is

A. sin at B.cos at C. sin h at D. cos h at

Solutions

1. (a) ,**2.** (a) ,**3.** (a) ,**4.** (d) ,**5.** (a) ,**6.** (a) ,**7.** (b) ,**8.** (c) ,**9.** (c) ,**10.** (c) . 1**1.** (a) ,1**2.** (a),13(b) ,14(b),1**5.** (a) ,1**6.** (a) ,1**7.** (a) ,1**8.** (d) ,1**9.** (c) ,2**0.** (b) **21. (a), 22. (a) ,23. (a) 24. (b) 25. (a)**