BRAINWARE UNIVERSITY

Term End Examination 2021 - 22
Programme – Diploma in Computer Science & Engineering
Course Name – Mathematics I
Course Code - DCSE104
(Semester I)

Time : 1 Hr.15 Min. **Full Marks : 60**

[The figure in the margin indicates full marks.]

Group-A

(Multiple Choice Type Question) 1 x 60=60

Choose the correct alternative from the following :

(1) The logarithm of 1728 to the base $2\sqrt{3}$ is

a) 3
b) 6
c) 9
d) none of these

(2) $\log_8^{\sqrt{8}} =$

a) $\frac{1}{6}$
b) $\frac{1}{4}$
c) $\frac{1}{2}$
d) $\frac{1}{8}$

(3) $\log_4^{\log_4^{\log_4^{2^{256}}}} =$

a) 1
b) 2
c) 4
d) 0

(4) $\log_a^{\frac{x^2}{yz}} + \log_a^{\frac{y^2}{zx}} + \log_a^{\frac{z^2}{xy}} =$

a) 0
b) 1
c) 3
d) none of these

(5) $\log_{y^3}^{x} \times \log_{z^3}^{y} \times \log_{x^3}^{z} =$

a) $\frac{1}{3}$
b) $\frac{1}{9}$
c)
d) 1

$\frac{1}{27}$

(6) If one root of the equation $x^2-8x+m=0$ is 2 , then the other root is

a) 14 b) 6
c) - 8 d) 4

(7) If one root of the equation $x^2+6x+m=0$ is 1 then the value of m is

a) -7 b) - 4
c) 9 d) none of these

(8) If the roots of the equation $(4-k)x^2+2(k+2)x+8k+1=0$ are equal ,then k=

a) 3 b) 1
c) 6 d) none of these

(9) If a and b are two roots of $4x^2+3x+7=0$ then $a^{-3}+b^{-3}=$

a) $\frac{43}{9}$ b) $\frac{251}{341}$

c) $\frac{225}{343}$ d) 0

(10) If $\frac{1}{4-3i}$ is a root of the equation $px^2+qx+1=0$, where p ,q are real then the value of p, q are

a) 25,-8 b) 25,8
c) 5,-4 d) none of these .

(11) The sum of real part and imaginary part of $\frac{(1+i)^2}{3-i}$ is

a) 2/5 b) 3/5
c) 1/5 d) 1/10

(12) If $x+iy=(1+3i)(1+2i)(1+i)$ then $x^2+y^2=$

a) 10 b) 100
c) 1 d) none of these .

(13) The value of $(2+i)(3+2i)(4-7i)$ is

a) 6 b) 60
c) 65 d) 100

(14) $\left|\frac{8+i}{8i+1}\right|=$

a) - 1 b) +1
c) ± 1 d) none of these

(15) $\left(1-\frac{1}{i}\right)(1-i)=$

a) - 2i b) 1
c) 2 d) 2i

(16) (8-3i) (3+2i) =

a) 30 - 7i
b) 18 - 25i
c) 7i+24
d) 30+7i

(17) If $\log^{27} = 1.431$ then the value of $\log 9$ =

a) 0.934
b) 0.945
c) 0.954
d) 0.958

(18) $\frac{1}{\log_3^{60}} + \frac{1}{\log_4^{60}} + \frac{1}{\log_5^{60}} =$

a) 0
b) 1
c) 5
d) 60

(19) (3-4i) + (6+7i) =

a) 9 + 3i
b) 9 - 3i
c) - 9 + 3i
d) -3 + 11i

(20) Co-factor of -3 in the determinant $\begin{vmatrix} 2 & -3 & 4 \\ 1 & 0 & 1 \\ 0 & -1 & 4 \end{vmatrix}$ is

a) 4
b) -4
c) 0
d) none of these.

(21) If $C = \begin{vmatrix} 1 & 2 & 3 \\ -3 & 0 & -1 \\ 5 & -6 & 7 \end{vmatrix}$, then the co-factor of the element 2 is

a) 6
b) -16
c) 14
d) 16

(22) The value of $\begin{vmatrix} 1 & -2 & 3 \\ 2 & -1 & 4 \\ -2 & 3 & 1 \end{vmatrix}$ is

a) 20
b) 13
c) 19
d) none of these.

(23) The matrix $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 5 \\ 0 & 0 & 6 \end{bmatrix}$ is

a) a diagonal
b) an upper triangular
c) a lower triangular matrix
d) a symmetric matrix

(24) If $A = \begin{pmatrix} 2 & 9 \\ 4 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 5 \\ 7 & 2 \end{pmatrix}$, then AB-BA is

a) $\begin{pmatrix} 43 & 4 \\ 3 & -43 \end{pmatrix}$
b) $\begin{pmatrix} 42 & 0 \\ 1 & -42 \end{pmatrix}$
c) $\begin{pmatrix} 22 & -52 \\ 10 & 0 \end{pmatrix}$
d) none of these .

(25) The value of the determinant $\begin{vmatrix} 31 & 32 & 33 \\ 33 & 34 & 35 \\ 32 & 33 & 34 \end{vmatrix}$ is

a) 1
b) 0
c) -1
d) 67

(26) The value of $\begin{vmatrix} 5 & 6 \\ -1 & 2 \end{vmatrix}$ is

a) 14
b) 16
c) 2
d) none of these

(27) Transpose of a rectangular matrix is a

a) scaler matrix
b) square matrix
c) diagonal matrix
d) rectangular matrix

(28) If $\vec{a}.\vec{b}=0$ then

a) $\vec{a} \perp \vec{b}$
b) $\vec{a} \parallel \vec{b}$
c) $\vec{a}=\vec{b}$
d) none of these

(29) The vectors $\lambda i+\lambda j+3k$ and $3i+3j-2k$ are perpendicular to each other if $\lambda =$

a) 0
b) -2
c) 1
d) none of these .

(30) If $\vec{a}=i+j+k$ and $\vec{b}=i-j$ then $\left(\vec{a}+\vec{b}\right).\vec{a}$ is equal to

a) 1
b) -1
c) 3
d) -3

(31) If $\vec{\alpha}=3i+4j+2k$ and $\vec{\beta}=3i-j+k$ then $\vec{\alpha}.\vec{\beta}=$

a) 5
b) -1
c) 4
d) 7

(32) The vector in the direction of the vector $\vec{a}=\hat{i}-2\hat{j}+2\hat{k}$ that has magnitude 9 is:

a) $\hat{i}-2\hat{j}+2\hat{k}$
b) $\frac{1}{3}\left(\hat{i}-2\hat{j}+2\hat{k}\right)$
c) $3\left(\hat{i}-2\hat{j}+2\hat{k}\right)$
d) $9\left(\hat{i}-2\hat{j}+2\hat{k}\right)$

(33) If $\vec{a}=\hat{i}+2\hat{j}-3\hat{k}$ and $\vec{b}=3\hat{i}-2\hat{j}+2\hat{k}$ then the angle between $\left(\vec{a}+\vec{b}\right)$ and $\left(\vec{a}-\vec{b}\right)$

a) $\frac{\pi}{3}$
b) $\frac{\pi}{4}$
c) $\frac{\pi}{2}$
d) None of these

(34) A vector in the direction vector $i-2j+2k$ that has magnitude 15 is

a) $\frac{i-2j+2k}{3}$

b) $15i-30j+30k$

c) $i-2j+15k$

d) $5i-10j+10k$

(35) If $90^\circ < x < 135^\circ$ and $\sin x = \frac{4}{5}$ then the value of sin 2x is

a) 24/25

b) 23/25

c) 1/25

d) - 24/25

(36) If $\frac{\pi}{2} < \theta < \frac{3\pi}{4}$ and $\tan 2\theta = \frac{3}{4}$, then the value of tan θ is

a) 3

b) -3

c) 2

d) -2

(37) If $\tan 35^\circ = 0.7$, then the value of $\tan(-665^\circ)$ is

a) 0.7

b) - 0.7

c) 0

d) none of these .

(38) If $\sin x = \frac{3}{4}$ then $\cos x$ is

a) $\frac{2}{3}$

b) $\frac{\sqrt{3}}{2}$

c) $\frac{\sqrt{7}}{4}$

d) $\frac{1}{2}$

(39) $\sin\left(x-\frac{\pi}{2}\right) = ?$

a) sinx

b) –sinx

c) cosx

d) –cosx

(40) The value of $\sin 15^\circ \sin 75^\circ$ is

a) 1/2

b) 1

c) 1/4

d) none of these .

(41) If $\tan\theta = 3$, then the value of $\cos 2\theta$ is

a) - 4/5

b) 4/3

c) 1/3

d) 2/3

(42) The value of $\frac{\sqrt{3}}{2\cos 10^\circ} - \frac{1}{2\sin 10^\circ}$ is

a) -2

b) 2

c) 1

d) -1

(43) Which of the following points on the line y = 3x+2 ?

a) (1,3) , (-1,-1)

b) (1,5) , (-1,-1)

c) (-1,1) , (0,2)

d) (-1,-1) ,(-2,4)

(44) What is the equation between the two points (1 , -1) , (-2 , -3) ?

a) 2x-3y=5

b) 2x+3y= - 1

c) 3y-4x= -7

d) 4x-3y=7

(45) What is the gradient , m , and y – intercept , b , of the line 2x-5y=10 ?

a) $m=2, b=10$

b) $m=\frac{2}{5}, b=-2$

c) $m=-\frac{2}{5}, b=2$

d) $m=\frac{5}{2}, b=5$

(46) The radii of two circles are in the ratio 3:2. the area of these two circles will be in the r atio

a) 5:4

b) 9:4

c) 3:2

d) none of these

(47) If $\phi(x)=\frac{1-\tan x}{1+\tan x}$ then $\phi\left(\frac{\pi}{4}-x\right)=$

a) $\tan x$

b) $\tan \pi$

c) $-\tan x$

d) $\cot x$

(48) $\lim_{x\to 3}\frac{x^3-27}{x^2-9}=$

a) 9/5

b) 27

c) 9/2

d) 2/9

(49) If $f(x)$ is continuous in $[0,4]$ and $f(2)=\frac{2}{5}$ then $\lim_{x\to 2} f(x)=$

a) 2/5

b) 5/2

c) 4

d) 0

(50) If $y=\log(\log x)$ (base of the log are e) then the value of $\frac{dy}{dx}$

a) $\frac{1}{\log x}$

b) $\frac{1}{x\log x}$

c) $\frac{x}{\log x}$

d) none of these

(51) If $y=\log\tan x$ then $\frac{dy}{dx}$ is equal to

a) $2\sec 2x$

b) $2\operatorname{cosec} 2x$

c) $2\sec^3 x$

d) $2\operatorname{cosec}^3 x$

(52) $\lim_{x\to 0}\frac{x}{x}=$

a) 0

b) 1

c) 2

d) 3

(53) If $x=a\sec^2\theta$, $y=b\tan^2\theta$, then $\frac{dy}{dx}=$

a) $\frac{a}{b}$

b) a

c) ab

d) $\frac{b}{a}$

(54)

$\lim_{x\to 2}\frac{x^3-8}{x^2-4}=$

a) 4
b) 0
c) 1
d) 3

(55) At x=1, $\frac{d}{dx}\{\sec(\tan^{-1}x)\}=$

a) $\sqrt{2}$
b) $-\sqrt{2}$
c) 2
d) $\frac{1}{\sqrt{2}}$

(56) If $y=\tan^{-1}\frac{a+bx}{1-bx}$, then $\frac{dy}{dx}=$

a) $\frac{1}{1+x^2}$
b) $-\frac{1}{1+x^2}$
c) $1+x^2$
d) none of these.

(57) If $x=a\cos t$ and $y=b\sin t$, then $\frac{dy}{dx}=$

a) $\frac{b}{a}\cot t$
b) $\frac{a}{b}\cot t$
c) $-\frac{b}{a}\cot t$
d) $\frac{b}{a}\tan t$

(58) $y=\tan^{-1}\frac{\sqrt{1+\cos 2x}}{\sqrt{1-\cos 2x}}$, then $\frac{dy}{dx}=$

a) -1
b) 1
c) 2
d) 0

(59) If $y=\tan^{-1}x+\tan^{-1}\frac{1}{x}$, then the value of $\frac{dy}{dx}$ is

a) π
b) 1
c) $\frac{2}{1+x^2}$
d) 0

(60) If $y=\cot^{-1}(\tan x)+\tan^{-1}(\cot x)$, then the value of $\frac{dy}{dx}$ is

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