BRAINWARE UNIVERSITY

Term End Examination 2020 - 21

Programme – Bachelor of Computer Applications

Course Name – Basic Mathematics

Course Code - GEBS101

Semester / Year - Semester I

Time allotted : 75 Minutes Full Marks : 60

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 60=60

1. *(Answer any Sixty)*

(i) The set O of odd positive integers less than 10 can be expressed by

_____

a) {1, 2, 3} b) {1, 3, 5, 7, 9}

c) {1, 2, 5, 9} d) {1, 5, 7, 9, 11}

(ii) Which of the following two sets are equal?

a) A = {1, 2} and B = {1} b) A = {1, 2} and B = {1, 2, 3}

c) A = {1, 2, 3} and B = {2, 1, 3} d) A = {1, 2, 4} and B = {1, 2, 3}

(iii) Which set is equivalent to the set {2, 3, 5, 7, 11}?

a) {x: x is an odd number lying between 1 and 13} b) {21, 23, 25}

c) {x: x is a prime number less than 12} d) None of these

(iv) There are 8 students on the curling team and 12 students on the Badminton team. What is the total number of students on the two teams if three students are on both teams.

a) 20 b) 17

c) 15 d) 14

(v) The number of elements in the power set of power sets of the empty set is

a) 0 b) 1

c) 2 d) 4

(vi) Indicate which one of the following is not true.

a) Identity matrix is diagonal matrix b) Identity matrix is upper triangular matrix

c) Identity matrix is scalar matrix d) Identity matrix is skew-symmetric matrix

(vii)

The mode of the frequency distribution

x_i :	0	1	2	3	4
f_i :	23	24	21	25	20

a) 3 b) 0

c) 1 d) 2

(viii)

If A and B are two sets, then $A \cup B$ represents

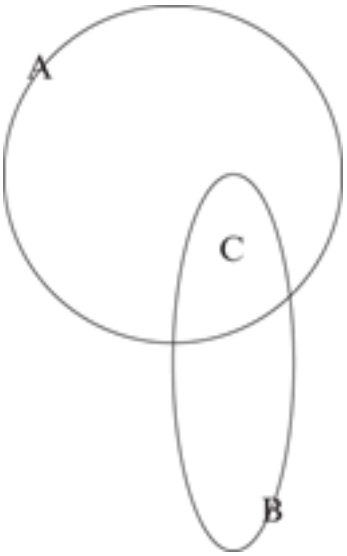
a) b)

all elements in either A and B all elements in A and B

c) d)

all elements that are in A but not B all sets that include A and B

(ix)



A = {3, 4, 5, 6, 7}, B = {5, 6, 7, 8, 9}, C = ?

a)

{3, 4, 5, 6, 7, 8, 9}

b)

{5, 6, 7}

c)

{3, 4, 8, 9}

d)

none of these

(x)

Which one of the following is not true?

a)

$(A \cup B)' = A' \cup B'$

b)

$(A \cap B)' = A' \cup B'$

c)

$(A')' = A$

d)

$A - B = A \cap B'$

(xi)

If $A \cup B = B$ holds for all sets B, then

a) $A = \phi$

b) $A = B$

c) $A = \phi$ & $A = B$

d) None of these

(xii)

Which one of the following is true?

a) $(B \cup A) \cap (B \cup C) = B \cup (A \cap C)$

b) $A \cap (B \cup C) = (A \cup B) \cap (A \cup C)$

c) $A \cap (B - C) = (A \cup B) - (A \cup C)$

d) $(A - B) \cup (B - C) \cup (C - A) = (A \cup B) - (B \cap C)$

(xiii)

Which one of the following is true?

a) $A \cup \phi = \phi$

b) $\overline{A \cap \phi = \phi}$

c) $\overline{A \cup A = \phi}$

d) $\overline{A \cap A = \phi}$

(xiv)

$n(A \cup B)$ is equal to

a) $n(A) + n(B) - n(A \cap B)$

b) $n(A) + n(B) + n(A \cap B)$

c) $n(A) + n(B)$

d) $n(A) - n(B)$

(xv)

If $\sec\theta = \frac{17}{8}$ and θ lies in first quadrant then $\operatorname{cosec}\theta =$

a) $\frac{17}{15}$

b) $-\frac{17}{15}$

c) $\frac{15}{17}$

d) None of these

(xvi)

If $\cos(90^\circ - \theta) = \frac{1}{2}$, then the value of θ is

a) 15°

b) 40°

c)

d) 0°

30°

(xvii)

The value of $\sec(-945^\circ)$ is

a) $\sqrt{2}$

b) $-\frac{1}{\sqrt{2}}$

c) $-\sqrt{2}$

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

(xviii)

$\sin(\alpha - 540^\circ) =$

a) $\sin\alpha$

b) $\cos\alpha$

c) $-\sin\alpha$

d) None of these.

(xix)

The value of $\cos 13^\circ \sin 17^\circ + \cos 17^\circ \sin 13^\circ$ is

a)

b) 1

$\frac{1}{2}$

c) 0

d) None of these

(xx)

$\frac{\sin(A-B)}{\sin A \sin B} =$

a) $\cot A - \cot B$

b) $\cot B - \cot A$

c) $\cot A + \cot B$

d) none of these.

(xxi)

If $\tan\alpha = \frac{7}{5}$ and $\tan\beta = \frac{5}{7}$, then the value of $\cot(\alpha-\beta)$ is

a) 35

b) $\frac{35}{12}$

c) $\frac{5}{12}$

d) $-\frac{35}{12}$

(xxii)

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

a) $\frac{24}{25}$

b) $\frac{23}{25}$

c) $\frac{1}{25}$

d) $-\frac{24}{25}$

(xxiii)

IF $\tan A + \frac{1}{\tan 2A} =$

a) $\cos 2A$

b) $\sec 2A$

c) $\sin 2A$

d) $\operatorname{cosec} 2A$

(xxiv)

If $0 \leq \theta \leq \frac{\pi}{4}$ and $\sin 2\theta = \frac{4}{5}$, then the value of $\tan \theta$ is

a) 2

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

c)

d) -2

$-\frac{1}{2}$

(xxv)

If $\cos x + \sin x - 1 = 0$, then $\sin 2x =$

a) 0

b) 1

c) -1

d) 2

(xxvi)

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

a)

2sec2x

b)

2cosec2x

c)

$2\sec^3 x$

d)

$2\,cosec^3 x$

(xxvii)

If, $y = 2x^3 - 15x^2 + 36x + 8$ then $\frac{dy}{dx} =$

a)

$5x^2 - 30x + 36$

b)

$\frac{1}{1+x^2}$

c)

$6x^2 - 30x + 36$

d)

none of these.

(xxviii)

$\frac{d}{dx}(\sin x^0) =$

a) $\cos x^0$

b) $\cos x$

c) $\cos\frac{x}{\pi}$

d) $\frac{\pi}{180}\cos x^0$

(xxix)

If $y = \log(\log x)$, then the value of $\frac{dy}{dx}$ is

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

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

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

d) None of these.

(xxx)

If $y = e^{\sin x}$, then $\frac{dy}{dx} =$.

a)

b)

[redacted] $\cos x e^{\sin x}$

$\sin x e^{\sin x}$

c)

d)

[redacted] $-\frac{1}{1+x^2}$

$\frac{1}{1+x^2}$

(xxxi)

If $x^2+y^2=a^2$, then find $\frac{dy}{dx}$.

a)

b)

[redacted] $\frac{1}{1+x^2}$

[redacted] $-\frac{1}{1+x^2}$

c)

d) None of these

$1+x^2$

(xxxii)

At x= $\frac{\pi}{4}$, $\frac{d}{dx}(\sec x)=$

a)

[redacted] $\sqrt{2}$

b)

[redacted] 2

c)

$-\sqrt{2}$

d)

$\frac{1}{\sqrt{2}}$

(xxxiii)

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)

$\frac{b}{a}\tan t$

(xxxiv)

If $y = 3\sin^2 t, x = 2\cos^2 t$, then $\frac{dx}{dy} =$

a)

$\frac{3}{2}$

b)

$-\frac{3}{2}$

c)

$\frac{1}{2}$

d)

$-\frac{2}{3}$

(xxxv)

If $e^x - x^y = 0$, then $\frac{dy}{dx}$ is

a)

x^y

b)

$\frac{\log x - 1}{\log x}$

c) d) None of these

$\frac{\log x - 1}{(\log x)^2}$

(xxxvi)

The derivative of $\sin^2 x$ with respect to $\cos^2 x$ is

a) -1 b) 2
c) sin x d) cos x

(xxxvii)

$\lim_{x \to 0} \frac{e^{ax} - 1}{\log(1 + ax)}$ is equal to

a) 1 b) a
c) -a d) None of these

(xxxviii)

$\lim_{x \to 0} (1 + 2x)^{\frac{1}{x}}$ is equal to

a) e b) 2e
c) d)

$\sqrt{e}$ e^2

(xxxix)

If $f(x)$ is continuous in [0,4] and if $\lim_{x\to 1} f(x) = \frac{1}{2}$ then $f(1)$ is equal to

a)

$\frac{1}{2}$

b) 1

c) 2

d) 3

(xl)

The function $f(x) = \tan x$ is discontinuous at x=

a)

$\frac{\pi}{4}$

b)

π

c) 0

d)

$\frac{\pi}{2}$

(xli)

Which of the following is correct?

a)

[redacted]

b)

$\int \sec^2 x dx = \tan x + c$

$\int \sec^2 x dx = \cot x + c$

c)

d)

[redacted]

$\int \sec^2 x dx = -\tan x + c$

[redacted]

d. $\int \sec^2 x dx = -\cot x + c$

(xlii)

$\int \sin 3x dx = k\cos 3x$ then k is equal to

a)

b)

$-\frac{1}{3}$

$\frac{1}{3}$

c) 3

d) None of these

(xliii)

$\frac{d}{dx}[F'(x)] = f(x)$ then $\int f(x)dx$ is

a)

b)

$f(x) + c$

$F'(x) + c$

c)

d) None of these

$f'(x) + c$

(xliv)

$\int \frac{1}{x}(x+\frac{1}{x})dx$ is equal to

a) $x-\frac{1}{x}+c$

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

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

d) $x+\frac{1}{x}+c$

(xlv)

Evaluate $\int_{-1}^{2} x^9 dx$

a) 102.3
b) 102.4
c) 1024
d) 0

(xlvi)

Find the value of $\int_{0}^{2} [x]dx$

a) 0
b) 1
c) 2
d) 3

(xlvii)

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) 1
d) 0

(xlviii)

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

a) 0
b) 13
c) 19
d) none of these.

(xlix)

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

a) a diagonal matrix
b) an upper triangular matrix

c)

a lower triangular matrix

d)

a symmetric matrix

(l)

The value of $|-3|$ is

a) 3

b) -3

c) 4

d) 1

(li)

$A=\begin{pmatrix}2 & 9\\ 4 & 3\end{pmatrix}$ 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

(lii)

If A and B are square matrices and A^{-1} , B^{-1} exist, then $(AB)^{-1}=$

a)

b)

$B^{-1}.A^{-1}$

$A^{-1}.B^{-1}$

c)

d)

AB^{-1}

$A^{-1}B$

(liii)

If $A=\begin{bmatrix}0 & -1\\ 1 & 3\\ 2 & 0\end{bmatrix}$, then $2A^{T}=$

a)

b)

$\begin{bmatrix}0 & 2 & 4\\ -2 & 6 & 0\end{bmatrix}$

$\begin{bmatrix}0 & -2\\ 2 & 6\\ 4 & 0\end{bmatrix}$

c)

d)

$\begin{bmatrix}0 & 1 & 2\\ -2 & 6 & 0\end{bmatrix}$

$\begin{bmatrix}0 & -1\\ 1 & 3\\ 4 & 0\end{bmatrix}$

(liv)

The probability of any event A satisfies

a)

b)

$P(A)\geq 1$

$P(A)<0$

c)

$0 \le P(A) \le 1$

d)

None of these

(lv)

Two event A and B are mutually exclusive if

a)

b)

$P(A \cap B) = P(A)P(B)$

$$P(A \cup B) = P(A) + P(B)$$

c)

d)

None of these

$P(A \cap B)=0$

(lvi)

Two unbiased coins are tossed . Then the probability of getting atleast one tail is

a) $\frac{4}{3}$

b) $\frac{3}{4}$

c) $\frac{1}{3}$

d) none of these

(lvii)

The probability that a leap year selected at random will contain 53 Wednesdays is

a)

b)

$\frac{3}{4}$

$\frac{2}{7}$

c)

d)

[redacted] $\frac{1}{3}$

$\frac{6}{7}$

(lviii)

Two dice are thrown. Then the probability that the sum of the faces equal to 10 is

a)

b)

$\frac{1}{12}$

$\frac{1}{3}$

c)

d)

$\frac{1}{36}$

$\frac{1}{18}$

(lix)

Two events are independent if

a)

b)

$P(A \cup B) = 1$

$P(A \cap B) = P(A) + P(B)$

c)

d)

$P(A \cap B) = P(A)P(B)$

$P(A \cap B) = 0$

(lx)

If A and B be two events with $P(A)=\frac{1}{2}, P(B)=\frac{1}{3}$ and $P(A\cup B)=\frac{2}{3}$ then $P(A\cap B)=$

a) $\frac{5}{6}$

b) $\frac{6}{7}$

c) $\frac{1}{9}$

d) $\frac{1}{6}$