BRAINWARE UNIVERSITY

Term End Examination 2020 - 21

Programme – Bachelor of Science (Honours) in Computer Science

Course Name – Algebra, Geometry and Probability

Course Code - BCS304C

Semester / Year - Semester III

Time allotted : 85 Minutes Full Marks : 70

[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 70=70

1. *(Answer any Seventy)*

(i) If p(x) = ax2 + bx + c, then is equal to

a) 0 b) 1

c) Sum of zeroes d) Product of zeroes

(ii) A quadratic polynomial whose one zero is 6 and sum of the zeroes is 0, is

a) x2 – 6x + 2 b) x2 – 36

c) x2 – 6 d) x2 – 3

(iii) The value of k, if (x – 1) is a factor of 4x3 + 3x2 – 4x + k, is

a) 1 b) 2

c) -3 d) 3

(iv) If x + 2 is a factor of x3 – 2ax2 + 16, then value of a is

a) 3 b) 1

c) 4 d) 2

(v) The polynomial of type ax2 + bx + c, a = 0 is of type

a) linear b) quadratic

c) cubic d) Biquadratic

(vi) The polynomial px2 + qx + rx4 + 5 is of type

a) linear

b) quadratic

c) cubic

d) Biquadratic

(vii)

The zeroes of the polynomial $f(x) = 4x^2 - 12x + 9$ are:

a)

$\frac{3}{2}, \frac{3}{2}$

b)

$-\frac{3}{2}, -\frac{3}{2}$

c)

3, 4

d)

–3, –4

(viii)

Which one is not a polynomial

a)

$4x^2 + 2x - 1$

b)

$y + \frac{3}{y}$

c)

$x^3 - 1$

d)

$y^2 + 5y + 1$

(ix)

If $p(x) = ax^2 + bx + c$ and a + c = b, then one of the zeroes is

a)

$\frac{b}{a}$

b)

$\frac{c}{a}$

c)

$\frac{-c}{a}$

d)

$\frac{-b}{a}$

(x)

Every algebraic equation of degree ‘n’ has exactly

a) n roots

b) n-1 roots

c) n+1 roots

d) None of these

(xi)

The roots of the equation $x^3 - 3x^2 + 4 = 0$,when two roots are equal are

a) 2,2,-1

b) 3,3,-1

c) 2,1,1

d) 1,2,2

(xii)

The remainder when $4x^4 - 10x^2 + 1$ is divided by $(x+2)$ is

a) 24

b) 25

c) 32

d) 2

(xiii)

The polynomial $x^n + 1$ is divisible by $(x+1)$ if

a)

b)

n is odd

n is even

c)

d) None of these

n is any number

(xiv)

If f(x) and it's first (m-1) derived functions all vanish for x=a, then the factor of f(x) is

a)

b)

$(x-a)^m$

$(x+a)^m$

c)

d) None of these

x^m

(xv)

If are $\alpha, \beta, \gamma, \delta$ the roots of the equation $a_0x^4+a_1x^3+a_2x^2+a_3x+a_4=0$, then $\alpha+\beta+\gamma+\delta=$

a)

b)

$-\frac{a_1}{a_0}$

$\frac{a_1}{a_0}$

c)

d)

$\frac{a_2}{a_0}$

$-\frac{a_3}{a_0}$

(xvi)

If α be a multiple root of the polynomial equation $f(x)=0$ of order *r*, then α be a multiple root of the polynomial equation $f'''(x)=0$ of order

a) r-3

b) r-2

c) r-1

d) None of these

(xvii)

If the origin is shifted to the point (-1,2) without changing the directions of the axes, the coordinates of (2,3) becomes

a) (1,3)

b) (3,1)

c) (-1,3)

d) (3,-1)

(xviii)

The angle through which the axes must be rotated to remove the *xy* term from $7x^2+4xy+3y^2=0$ is

a) π

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

c) $\frac{\pi}{4}$

d) $\frac{\pi}{8}$

(xix)

$4x^2-5xy+y^2+2x+y-2=0$ represents

a)

a circle

b)

a parabola

c)

an ellipse

d)

a pair of straight lines

(xx)

If $AX^2+BY^2+C=0$ be the transformed equation of $5x^2-6xy+5y^2-4x-4y-4=0$, then the value of *C* is

a)

-4

b) 4

c) 8

d) -8

(xxi)

The point on the conic $\frac{15}{r}=1-4\cos\theta$ whose radius vector is 5 is

a)

(5,

b)

(5,

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

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

c)

d) None of these

Both (5, $\frac{2\pi}{3}$) and

(5, $\frac{4\pi}{3}$)

(xxii)

$r = \frac{12}{2 - \cos\theta}$ is the equation of

a)

b)

ellipse

circle

c)

d)

parabola

hyperbola

(xxiii)

To remove the terms containing *x* and *y* of degree one from $ax^2 + bxy + cy^2 + px + qy + r = 0$, the needed transformation is

a)

b)

translation

rotation

c)

d) None of these

translation followed by rotation

(xxiv)

$6x^2 - 5xy - 6y^2 + 14x - 5y + 4 = 0$ represents

a) a circle

b) a parabola

c) an ellipse

d) a pair of straight lines

(xxv)

The centre of $5x^2 - 6xy + 5y^2 - 4x - 4y - 4 = 0$ is

a) (1,1)

b) (-1,1)

c) (1,-1)

d) (-1,-1)

(xxvi)

$r = 3\sin\theta + 4\cos\theta$ is the equation of

a) a circle

b) a parabola

c) an ellipse

d) a hyperbola

(xxvii)

After rotation of coordinate axes by an angle

$\frac{\pi}{4}$, if the coordinates of a point becomes (0, $\sqrt{2}$), then original coordinates are

a)

(1,1)

b)

(-1,1)

c)

(-1,0)

d)

(-1,-1)

(xxviii)

The coordinates of the point remains same under the change of the coordinate axes by the rigid rotation $x' = \frac{4}{5}x - \frac{3}{5}y + 2$; $y' = \frac{3}{5}x + \frac{4}{5}y - 2$, the point is

a)

$(4,3)$

b)

$(4,2)$

c)

$(3,2)$

d)

$(3,3)$

(xxix)

The reduced canonical form of the conic $(c^2 + d^2)(x^2 + y^2) = (cx + dy + 2f)^2$ is

a)

[redacted]

b)

[redacted]

$$Y^2 = \frac{4f}{\sqrt{c^2 + d^2}} X$$

c)

$$X^2 = \frac{4f}{\sqrt{c^2 + d^2}} Y$$

d)

[redacted]

$$X^2 = \frac{f}{\sqrt{c^2 + 4^2}} Y$$

$$X^2 = \frac{f}{\sqrt{c^2+d^2}}Y$$

(xxx)

The latus rectum of the conic $(c^2+d^2)(x^2+y^2) = (cx+dy+2f)^2$ is

a) $\frac{f}{\sqrt{c^2+d^2}}$

b) $\frac{4f}{\sqrt{c^2+d^2}}$

c) $\frac{f}{\sqrt{c^2+4^2}}$

d) $\frac{f}{\sqrt{3^2+d^2}}$

(xxxi)

The direction cosines of the $y-axis$ are

a) 1,1,1

b) 1,0,0

c) 0,0,1

d) 0,1,0

(xxxii)

If the direction ratios of a straight line are -18,12,-4, then the direction cosines are

a)

$\frac{9}{11}, \frac{6}{11}, \frac{2}{11}$

b)

$-\frac{9}{11}, \frac{6}{11}, -\frac{2}{11}$

c)

$\frac{9}{11}, \frac{6}{11}, -\frac{2}{11}$

d) None of these

(xxxiii)

Which one of the followings is correct

a)

if α, β, γ are the direction angles of a straight line, then $\alpha + \beta + \gamma \neq 2\pi$.

b)

if α, β, γ are the direction angles of a straight line, then $\alpha + \beta + \gamma = 2\pi$.

c)

if l,m,nbe the direction cosines of a straight line, then

d) None of these

(xxxiv)

The angle between two diagonals of a cube is

a)

$\frac{\pi}{6}$

b)

$\frac{\pi}{4}$

c)

$\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$

d)

$\cos^{-1}\left(\frac{1}{3}\right)$

(xxxv)

The equation of the straight line which is parallel to the $x-axis$ is

a) $\frac{x-x_1}{0}=\frac{y-y_1}{a}=\frac{z-z_1}{a},\ a\neq 0$

b) $\frac{x-x_1}{a}=\frac{y-y_1}{0}=\frac{z-z_1}{0},\ a\neq 0$

c) $\frac{x-x_1}{0}=\frac{y-y_1}{a}=\frac{z-z_1}{0},\ a\neq 0$

d) $\frac{x-x_1}{0}=\frac{y-y_1}{0}=\frac{z-z_1}{a},\ a\neq 0$

(xxxvi)

The direction ratios of the straight line $3x-2=2y+1=2z-4$ are

a) $\frac{1}{3},-\frac{1}{2},\frac{1}{2}$

b) $-\frac{1}{3},\frac{1}{2},\frac{1}{2}$

c) $\frac{1}{3},\frac{1}{2},\frac{1}{2}$

d) $\frac{1}{3},\frac{1}{2},-\frac{1}{2}$

(xxxvii)

The equation of the straight line passing through the point $(5,2,7)$ and which is parallel to the $y-axis$ is

a)

b)

$\frac{x-5}{b}=\frac{y-2}{0}=\frac{z-7}{b}, b\neq 0$

$\frac{x+5}{b}=\frac{y+2}{0}=\frac{z+7}{b}, b\neq 0$

c)

d)

$\frac{x-5}{0}=\frac{y-2}{b}=\frac{z-7}{0}, b\neq 0$

$\frac{x+5}{0}=\frac{y+2}{b}=\frac{z+7}{0}, b\neq 0$

(xxxviii)

If the straight line $\frac{x-x_1}{a}=\frac{y-y_1}{b}=\frac{z-z_1}{c}$ be parallel to the $z-axis$, then

a)

b)

[redacted] $a=c=0$ and $b\neq 0$

$a = b = 0$ and $c \neq 0$

c)

d)

$b = c = 0$ and $a \neq 0$

$a = b = c = 0$

(xxxix)

The two straight lines $\frac{x - x_1}{l_1} = \frac{y - y_1}{m_1} = \frac{z - z_1}{n_1}$ and $\frac{x}{l_2} = \frac{y}{m_2} = \frac{z}{n_2}$ are perpendicular, then

a)

b)

$l_1 l_2 + m_1 m_2 + n_1 n_2 = 1$

$l_1 l_2 + m_1 m_2 + n_1 n_2 = 0$

c)

d)

$\frac{l_1}{l_2} = \frac{m_1}{m_2} = \frac{n_1}{n_2}$ $\frac{l_1}{l_2} = \frac{m_1}{m_2} = -\frac{n_1}{n_2}$

(xl)

The distance of the point $(1,1,1)$ from $x-axis$ is

a) b)

1 unit $\sqrt{2}$ unit

c) d)

2.14 unit $\sqrt{7}$ unit

(xli)

The straight line $\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-2}{12}$ intersects the plane $x-2y+z=20$ at the point

a) b)

$(8,7,26)$ $(-8,7,26)$

c) d)

$(8,-7,26)$ $(8,7,-26)$

(xlii)

If the two straight lines $\frac{x-2}{1} = \frac{y-3}{1} = \frac{z-4}{-k}$ and

$\frac{x-1}{k}=\frac{y-4}{2}=\frac{z-5}{1}$ be coplanar, then

a) $k=1 \text{ or } -1$

b) $k=0 \text{ or } -3$

c) $k=3 \text{ or } -3$

d) $k=0 \text{ or } -1$

(xliii)

The distance between the planes $x+2y-2z=1$ and $2x+4y-4z+5=0$ is

a) 1 unit

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

c) $\frac{7}{6}$ unit

d) $\frac{5}{7}$ unit

(xliv)

The foot of the perpendicular from the point $(1,1,2)$ upon the plane $2x-2y+4z+5=0$ is

a) $\left(\frac{1}{12},\frac{25}{12},\frac{2}{12}\right)$

b) $\left(-\frac{1}{12},\frac{25}{12},-\frac{2}{12}\right)$

c)

d) None of these

$\left(\frac{1}{12}, \frac{25}{12}, -\frac{2}{12}\right)$

(xlv)

Which of the following divides a group of data into four subgroups?

a)

Percentiles

b)

Deciles

c)

Median

d)

Quartiles

(xlvi)

Relation between mean, median and mode is

a)

Mode=3 Median -2 mean

b)

Mode=3 Median +2 mean

c)

Mode=2 Median -3 mean

d)

Mode=2 Median +3 mean

(xlvii)

The Arithmetic Mean of $x-2, 10, x+3, 7$ is 9 .Then the value of x is

a) 10

b) 9

c) 0

d) 11

(xlviii)

The standard deviation of the datas 5,1,7,2,6,3 is (a) 4.66 (b) 2.16 (c) 1.47 (d) none of these.

a)

4.66

b)

2.16

c)

1.47

d) None of these

(xlix)

The standard deviation of the datas -3,-6,-1,-4,-8,-11,-15 is a positive no

a)

True

b)

False

c) Both True and False

d) None of these

(l)

The variance of 1,5,6 is

a)

4.67

b)

9.1

c)

0.067

d)

3.67

(li)

The median and mode of the observations : 7,4,10,15,7,3,5,2,9,12 are

a)

7.4 and 7

b)

8.4 and 7

c)

7.4 and 15

d)

8.5 and 7

(lii)

Two dice are thrown simultaneously, the probability of getting a pair of 1 is

a)

$\frac{1}{36}$

b)

$\frac{1}{2}$

c)

$\frac{1}{3}$

d)

$\frac{1}{6}$

(liii)

If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{4}$, then the value of $P(A \cup B) =$

a)

$\frac{6}{7}$

b)

$\frac{3}{7}$

c) 1

d)

$\frac{7}{12}$

(liv)

The probability $P(a \le X \le b)$ (where F(x) is the distribution function of the random variable X) is defined by

a) $F(b)-F(a)$

b) $F(b)+F(a)$

c) $F(a)-F(b)$

d) $F(a)F(b)$

(lv)

If for a random variable X , $Var(X)=1$, then $Var(2X+3)$ is

a) 1

b) 2

c) 4

d) None of these

(lvi)

The mean of the Binomial distribution $B\left(10,\frac{2}{5}\right)$

a) 4

b) 6

c) 5

d) 0

(lvii)

If $F(x)$ is the distribution function of a random variable , then

a) $F(x)$ is continuous at all points

b) $F(x)$ is monotonic decreasing

c) $F(-\infty)=1$

d) $F(\infty)=1$

(lviii)

If $P(A+B)=\frac{2}{7}$ then the probability of $P(\bar{A}.\bar{B})$ *is*

a) $\frac{1}{7}$

b) $\frac{2}{7}$

c) $\frac{5}{7}$

d) None of these

(lix)

The probability of any event A satisfies

a) $P(A)\geq 1$

b) $P(A)<0$

c)

d) None of these

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

(lx)

When two perfect coins are tossed simultaneously, the probability of getting atleast one head is

a)

b)

$\frac{1}{2}$

$\frac{1}{4}$

c)

d) 1

$\frac{3}{4}$

(lxi)

A bag contains 5 Red, 4 Black balls. 2 balls are drawn at random, the probability that thay match is

a)

b)

$\frac{2}{9}$

$\frac{4}{9}$

c)

d)

$\frac{5}{9}$

$\frac{7}{9}$

(lxii)

In rolling two fair die, the probability of getting equal numbers or numbers with an even product is

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

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

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

d) None of these

(lxiii)

If $\overline{A}$ is the complement of the event A, then

a) $P(\overline{A}) = 1 - P(A)$

b) $P(\overline{A}) = P(A)$

c) $P(\overline{A}) = 1 + P(A)$

d) None of these

(lxiv)

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

a)

b)

$\frac{4}{3}$

$\frac{3}{4}$

c)

d) None of these

$\frac{1}{3}$

(lxv)

A die is thrown once , then the probability of obtaining a ‘six’ is

a)

b)

$\frac{1}{3}$

$\frac{1}{2}$

c)

d) None of these

$\frac{1}{6}$

(lxvi)

If $P(A)=0.2, P(B)=0.4, \mathrm{P}(A \cup B)=0.6$ then A and B are

a)

b)

mutually exclusive

independent

c)

d)

exhaustive

complement of each other

(lxvii)

Of 6 men in a room 3 have blue eyes. If 2 of them are selected at random , the probability that both have blue eyes is

a) $\frac{4}{5}$

b) $\frac{1}{5}$

c) $\frac{1}{11}$

d) $\frac{2}{9}$

(lxviii)

The probability of all possible outcomes of a random experiment is always equal to

a) One

b) Zero

c) Infinity

d) All of these

(lxix)

What is the probability of getting a sum 9 from two throws of dice.

a) 1/3

b) 1/9

c) 1/12

d) 2/9

(lxx)

In a throw of dice what is the probability of getting number greater than 5

a) 1/6

b) 1/3

c) 0

d) 1