DEHRADUN PUBLIC SCHOOL
ASSIGNMENT (2023-24)
SUBJECT- MATHEMATICS (041)
CLASS – XI

CHAPTER 1 -SETS

Multiple choice questions:

Q1. The members of the set S = {x : x is the square of an integer and x < 100} is

a. {0, 2, 4, 5, 9, 58, 49, 56, 99, 12}
b. {0, 1, 4, 9, 16, 25, 36, 49, 64, 81}
c. {1, 4, 9, 16, 25, 36, 64, 81, 85, 99}
d. {0, 1, 4, 9, 16, 25, 36, 49, 64, 121}

Q2. A set is a

a. Collection of well defined and distinct object
b. Collection of numbers
c. Well defined collection of objects
d. Collection of integers

Q3.The empty set is represented by

a. { } b. ( ) c. α d. 0

Assertion –Reason type questions:

Two statements are labeled as Assertion (A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.
b. Both A and R are true but R is not the correct explanation of A.
c. A is true but R is false.
d. A is false but R is true.

Q4. **Assertion (A)**: If n(A)=2,then no. of subsets are 4.
Reason (R): A set having n elements has 2^n subsets.

Q5. **Assertion (A)**: Set of even prime number is {2}.
Reason (R): Symbol of null set is $\emptyset$.

Subjective type questions:

Q6. Write the set of all vowels in English alphabet which precede 's'.

Q7. Write the set A = $\{x : x \in z, x^2 < 20\}$ in the roster form.

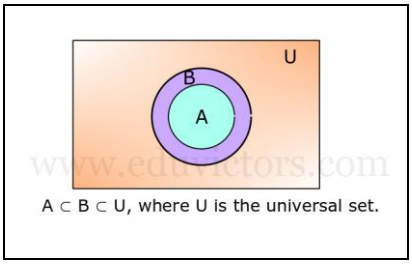
Q8. Two finite sets have m and n elements. The total number of subsets of the first set is 56 more thanthe total number of subsets of second set. Find the values of m and n.

Q9. If A and B are two sets such that n (A) = 35, n(B) = 30 and $n(\cup) = 50$, then find

(i) the greatest value of $n(A \cup B)$ (ii) the least value of $n(A \cap B)$

Q10. **Case Study: Read the following passage and answer the questions given below:**

Two non-empty sets A and B are given by:
A= {x : x is a letter in I LOVE MATHEMATICS}
B = { x : x is a letter in I LOVE STATISTICS}
i. Find the number of proper subsets of set B.
ii. Find A⋂B.



CHAPTER 2 -RELATIONS AND FUNCTIONS

Multiple choice questions:

Q1.If the set A has p elements, B has q elements, then the number of elements in A x B is

a. p+q b. p+q+1 c. pq d. p^2

Q2. Let R be a relation on N defined by x +2y =8.The domain of R is:

a. {2,4,8} b. {2,4,6,8} c. {2,4,6} d. {1,2,3,4}

Q3.Let n(A)=m and n(B)=n .Then the total number of non empty relations that can be defined from A to B is:

a. m^n b. $n^m - 1$ c. mn −1 d. $2^{mn} - 1$

Assertion –Reason type questions:

Two statements are labeled as Assertion(A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: If n(A)=3, n(B)=2 ,then number of relation from A to B is 64.

Reason (R): Number of relation from A to B is m x n, if n (A)=m, n (B) =n.

Q5. **Assertion (A)**: If (x+1 ,y – 2) = (3,1),then x=2 and y =3.

Reason (R): Two ordered pairs are equal ,if their corresponding elements are equal.

Subjective type questions:

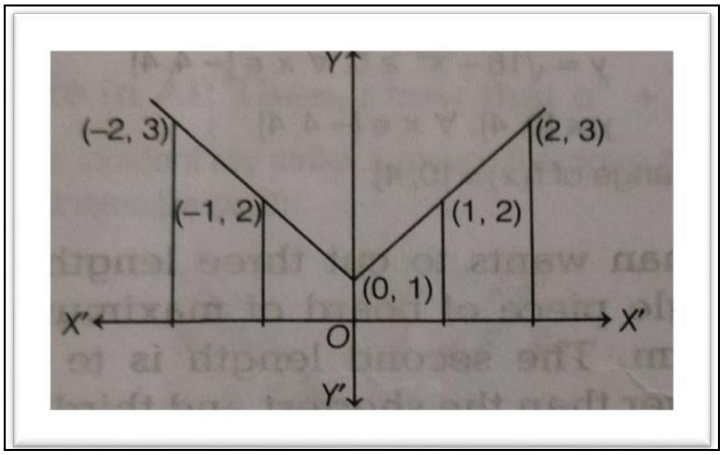
Q6.Let A={a,b}.List all the elements on A and find their numbers.

Q7.Given A ={1,2,3},B = {3,4} and C={4,5,6},find (A x B)∩ (B x C).

Q8.Write the Relation R = { (x,x^3): x is a prime number less than 10} in roster form .

Q9.Find the domain and range of the real valued function f(x) given by f(x) = $(4 - x)/(x - 4)$.

Q10**. Case Study: Read the following passage and answer the questions given below:**



The figure, show a graph of curve y = f(x)

Based on the above information answer the following

i. Write the equation for graph of f(x).

ii. Find the domain and range of f(x).

CHAPTER 3 -TRIGONOMETRIC FUNCTIONS

Multiple choice questions:

Q1. If tanA= 1/2 and tanB=1/3,then the value of A+B is

a. π/6 b. π c. 0 d. π/4

Q2. The value of cos1°cos2°cos3°...cos179° is

a. $1/\sqrt{2}$ b. 0 c. 1 d. –1

Q3.Find the angle between the minute hand of a clock and the hour hand when the time is 7:20AM.

a. 120^0 b. 220^0 c. 100^0 d. 110°

Assertion –Reason type questions:

Two statements are labeled as Assertion (A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: In a unit circle, radius of circle is 1 unit.
Reason (R):1 min is divided into 60 s.

Q5. **Assertion (A)**: The measure of rotation of a given ray about its initial point is called an angle.
Reason (R): The point of rotation is called a vertex.

Subjective type questions:

Q6. Find the length of an arc of a circle of radius 5cm subtended a central angle measuring 15^0.

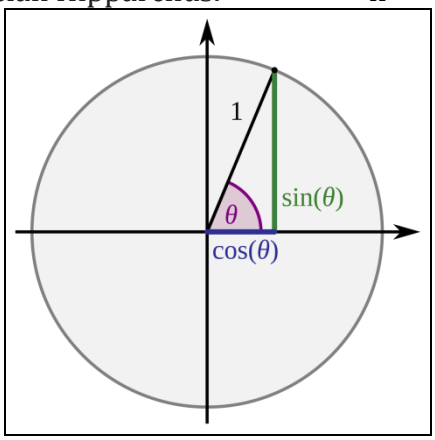
Q7. The angles of a quadrilateral are in AP and the greatest angle is 120^0.Express the angles in radians.

Q8. If a=sec x – tan x and b=cosec x + cot x, then show that ab+ a–b+1 = 0

Q9. Prove that $\sqrt{2+\sqrt{2+2\cos 4\theta}} = 2\cos\theta$

Q10. **Case Study: Read the following passage and answer the questions given below:**

Trigonometry is one of the important branches in the history of mathematics that deals with the study of the relationship between the sides and angles of a right-angled triangle. This concept is given by the Greek mathematician Hipparchus.Consider $T_n = \sin^n\theta + \cos^n\theta$



i. Find the value of $T_3 - T_5$.

ii. Find the value of T_3, if $\theta = \pi$.

CHAPTER 4 -COMPLEX NUMBER & QUADRATIC EQUATIONS

Multiple choice questions:

Q1.The value of $(1+i)(1+i^2)(1+i^3)(1+i^4)$is

a. 2 b. 0 c. 1 d. i

Q2. If $i^2=-1$,then the sum $i+i^2+i^3+$...upto1000 terms is

a.1 b. − 1 c. I d. 0

Q3.The value of $(1+i)^4 + (1-i)^4$ is

a.8 b. 4 c. −8 d. −4

Assertion –Reason type questions:

Two statements are labeled as Assertion (A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: Simplest form of i^{-35} is –i.

Reason (R): Additive inverse of (1−i) is equal to −1+i.

Q5. **Assertion (A)**: If $z= i^9 + i^{19}$,then z is equal to 0+0i.

Reason (R): The value of $1 +i^2 +i^4$……..$+i^{20}$ is equal to −1.

Subjective type questions:

Q6. Express $3i^3+6i^{16}-7i^{29}+4i^{27}$ in the x +iy form where x, y $\in$ R

Q7.Find the real numbers x and y, if (x– iy)(3+5i) is the conjugate of −6 −24i.

Q8.Find the multiplicative inverse of $(2+\sqrt{3}\,i)^2$.

Q9. Find the value of :

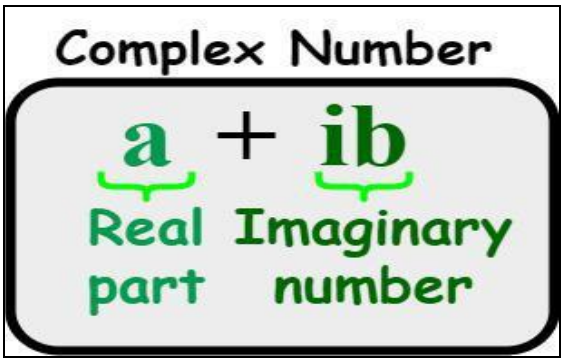
$$\frac{i^{592} + i^{590} + i^{588} + i^{586} + i^{584}}{i^{582} + i^{580} + i^{578} + i^{576} + i^{574}}$$

Q10. **Case Study: Read the following passage and answer the questions given below:**

A complex number is a number of the form a + bi, where a and b are real numbers, and i is an indeterminate satisfying $i^2 = -1$.The given complex number is $z = (1+ i)^2$.

i. Write the standard form of z .

ii. Find the conjugate of complex number z.



CHAPTER 5 -LINEAR INEQUALITIES

Multiple choice questions:

Q1 The length of a rectangle is three times the breadth. If the minimum perimeter of the rectangle is160cm,then

a. breadth > 20 cm b. length< 20cm c. breadth ≥20cm d. length≤ 20cm

Q2. If $-3x+17<-13$,then

a. $x\in(10,\infty)$ b. $x\in[10,\infty)$ c. $x\in(-\infty,10]$ d. $x\in[-10,10)$

Q3. Solving $-8\leq 5x-3<7$, we get

a. $-1/2\leq x\leq 2$ b. $1\leq x<2$ c. $-1\leq x<2$ d. $-1<x\leq 2$

Assertion –Reason type questions:

Two statements are labeled as Assertion (A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.
b. Both A and R are true but R is not the correct explanation of A.
c. A is true but R is false.
d. A is false but R is true.

Q4. **Assertion (A)**: Graph of linear inequality in one variable is a visual representation.
Reason (R):If a point satisfying the line ax +by = c ,then it will lie in upper half plane.

Q5. **Assertion (A)**: The inequality ax+ by <0 is strict inequality.
Reason (R): The inequality ax +by ≥ 0 is slack inequality.

Subjective type questions:

Q6.Solve the linear inequality $7x+9>30$.

Q7. Solve $5x-3<3x+1$ when :
i. x is a real number ii. x is integer number iii. x is a natural number.

Q8. A man wants to cut three lengths from a single piece of board of length 91 cm. The second length is to be 3 cm longer than the shortest and third length is to be twice as long as the shortest. What are the possible lengths for the shortest board if third piece is to be at least 5 cm longer than the second.
Write set of values of x satisfying the inequality $(x^2-2x+1)(x-4)\geq 0$.

Q9. A solution of 9% acid is to be diluted by adding 3% acid solution to it. The resulting mixture is to be more than 5% but less than 7%.If there is 460 litres of 9% solution, how many litres of 3% solution will have to be added?

Q10**. Case Study: Read the following passage and answer the questions given below:**

A manufacturing company produces certain goods. The company manager used to make a data record on daily basis about the cost and revenue of these goods separately. The cost and revenue function of a product are given by C(x)=20x+4000 and R(x)=60x+2000,respectively,Where x is the number of goods produced and sold.

i. How many goods must be sold to realize some profit?
ii. If the cost and revenue functions of a product are given by C(x)=3x+ 400 and R(x)= 5x+20 respectively, where x is the number of items produced by the manufacturer, then how many items must be sold to realize some profit?

CHAPTER 6 -PERMUTATIONS AND COMBINATIONS

Multiple choice questions:

Q1. The value of P(n,n-1)is

a. n b. n! c. 2n d. 2n!

Q2. The number of ways in which 8 students can be seated in a line is

a. 5040 b. 50400 c. 40230 d. 40320

Q3. The number of squares that can be formed on a chess board is

a. 64 b. 160 c. 204 d. 224

Assertion –Reason type questions:

Two statements are labeled as Assertion (A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: ${}^{10}C_r = {}^{10}C_4 \Rightarrow r = 4$ or 6.

Reason (R): ${}^{n}C_r = {}^{n}C_{n-r}$

Q5. **Assertion (A)**: Product of five consecutive natural number is divisible by 4!

Reason (R): Product of n consecutive natural numbers is divisible by (n+1)!

Subjective type questions:

Q6. How many numbers are there between 100 and 1000 in which all the digits are distinct?

Q7. A gentleman has 6 friends to invite. In how many ways can he send invitation cards to them ,if he has three servants to carry the cards?

Q8. A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has

i. no girl ii. at least one boy and one girl iii. at least3 girls

Q9.How many arrangements can be made by the letters of the word MATHEMATICS? In how many of them are, if vowels occur :

i. together ii. not together

Q10**. Case Study: Read the following passage and answer the questions given below:**

On Diwali festival, few people are playing cards. One person choose 4 cards from a pack of 52 playing cards.

i. Find the number of ways choosing these 4 cards such that they are of the same suit.

ii. Find the number of ways choosing these 4 cards such that they are face cards.

CHAPTER 7 -BINOMIAL THEOREMS

Multiple choice questions:

Q1. The coefficient of y in the expansion of $(y^2+c/y)^5$ is

a. 10c b. $10c^2$ c. $10c^3$ d. 10

Q2. The fourth term in the expansion $(x-2y)^{12}$is

a. $-1670x^9\times y^3$ b. $-7160x^9\times y^3$ c. $-1760\ x^9\times y^3$ d. $-1607x^9\times y^3$

Q3. The number of terms in the expansion of$(1+x)^{10}$is

a. 10 b. 11 c. 9 d. 12

Assertion –Reason type questions:

Two statements are labeled as Assertion (A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**:The coefficients of expansions are arranged in an array. This array is called Pascal's triangle.

Reason (R): There are11th terms in the expansion of $(4x+7y)^{10}+(4x-7y)^{10}$.

Q5. **Assertion (A)**: Number of terms in the expansion of $(2x+3)^3$ is 4.

Reason (R): If n is odd then number of terms are n+1.

Subjective type questions:

Q6.Expand $(x^2+2a)^5$ by binomial theorem.

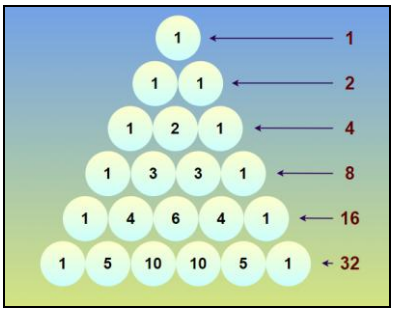
Q7.Using Binomial theorem, compute $(98)^6$.

Q8. Find an approximate value of $(0.99)^5$ by using the first three terms of its expansion.

Q9.Using Binomial theorem, prove that 6^n-5n always leaves the remainder 1 when divided by 25.

Q10**. Case Study: Read the following passage and answer the questions given below:**

The binomial theorem states the principle for expanding the algebraic expression $(x+y)^n$ and expresses it as a sum of the terms involving individual exponents of variables x and y. Each term in a binomial expansion is associated with a numeric value which is called coefficient. Pascal's triangle is the arrangement of the data in triangular form which is used to represent the coefficients of the binomial expansions, i.e. the second row in Pascal's triangle represents the coefficients in $(x+y)^2$ and so on.



i. Find number of terms in the expansion of $(x+y)^{10}$.

ii.Find the coefficient of x in $(x+y)^3$ by using Pascal triangle.

CHAPTER 8 -SEQUENCE AND SERIES

Multiple choice questions:

Q1. Three numbers form an increasing G.P. If the middle term is doubled, then the new numbers are in A.P. The common ratio of G.P.is

a.$2+\sqrt{3}$ b.$2-\sqrt{3}$ c.$2\pm\sqrt{3}$ d.2

Q2. The third term of a geometric progression is 4.The product of the first five terms is

a. 4^3 b. 4^5 c.4^4 d.4

Q3. In a G.P. of even number of terms, the sum of all terms is five times the sum of the odd terms. The common ratio of the G.P. is

a.4 b.3 c.–4 d.–3

Assertion –Reason type questions:

Two statements are labeled as Assertion(A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: For x= ± 1 ,the numbers $\frac{-2}{7}$, x ,$\frac{-7}{2}$ are in G.P.

Reason (R): Three numbers a, b, c are in G.P. if $b^2=ac$.

Q5. **Assertion (A)**: If the third term of a G.P. is 4, then the product of its first five terms is 4^5

Reason (R): Product of first five terms of a G.P. is given as a $(ar)(ar^2)(ar^3)(ar^4)$

Subjective type questions:

Q6. If the m^{th} term of a G.P. is n and n^{th} term is m, find $(m+n)^{th}$ term.

Q7. The first term of a G.P. is 1. The sum of the 3^{rd} and 5^{th} terms is 90. Find the common ratio of G.P

Q8. Find the sum of series $\frac{1}{2}+\frac{1}{2^2}+\frac{1}{2^3}$ ----------∞.

Q9. If a, b, c are in G.P. and x, y are the arithmetic means of a, b and b, c respectively, then prove that (a/x) + (c/y) =2 and (1/x) +(1/y) = 2/b

Q10**. Case Study: Read the following passage and answer the questions given below.**

A person writes a letter to four of his friends. He asks each one of them to copy the letter and mail to four different persons with instruction that they move the chain similarly. Assuming that the chain is not broken and that it costs 50 paise to mail one letter.

i. Find the total numbers of letters when 8th set of letter is mailed.

ii. Find the amount spent on the postage when 8th set of letter is mailed.

CHAPTER 9 -STRAIGHT LINE

Multiple choice questions:

Q1. In a ΔABC ,if A is the point (1,2)and equations of the median through Band C are respectively x+ y =5 and x=4, then B is

a. (1,4) b.(7, –2) c. (4,1) d. (2,4)

Q2. The equation of line which is perpendicular to ax +by + c=0 is

a. ax−by+λ=0 b. bx−ay+λ=0 c. ax+by−λ=0 d. ax+by+λ=0

Q3. If two vertices of a triangle are(3, -2)and (-2,3)and its orthocenter is (-6,1) then its third vertex is

a. (5,3) b. (-5,3) c. (5,-3) d.(-5, -3)

Assertion –Reason type questions:

Two statements are labeled as Assertion(A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: The centroid can not lie on the Y-axis.

Reason (R): The condition that the centroid may lie on the X-axis is a +b =3.

Q5. **Assertion (A)**: Slope of AB = Slope of BC and slope of CD= Slope of AD .

Reason (R): Mid- point of AC = Mid-point of BD.

Subjective type questions:

Q6. A line passing through the point A (3, 0) makes 30^0 angle with the positive direction of x - axis. If this line is rotated through an angle of 15^0 in clockwise direction, find its equation in new position.

Q7. Find the equations to the altitudes of the triangle whose angular points are A(2,–2), B(1, 1) and C(–1,0)

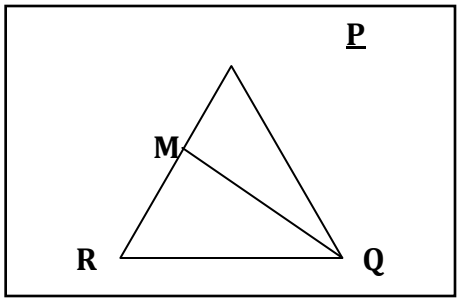
Q8. Equation of a line is 3x–4y+10 = 0. Find its

i. slope ii. x and y- intercepts.

Q9. A ray of light coming from the point (1,2) is reflected at a point A on the x-axis and then passes through the point (5,3). Find the coordinates of the point A.

Q10**. Case Study: Read the following passage and answer the questions given below.**

The vertices of Δ PQR are P (2, 1), Q (–2, 3) and R (4, 5).



i. Find the slope of RP.

ii. Find the coordinates M(midpoint of PR)

CHAPTER 10 -CONIC SECTIONS

Multiple choice questions:

Q1. The length of the latus rectum of the hyperbola $x^2 - 4y^2 = 4$ is

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

Q2. The parametric coordinate of any point of the parabola $y^2 = 4ax$ is

a.$(-at^2, -2at)$ b.$(-at^2, 2at)$ c.$(a\sin^2 t, -2a\sin t)$ d.$(a\sin t, -2a\sin t)$

Q3. The equation of parabola with vertex at origin the axis is along x-axis and passing through the point (2,3) is

a.$y^2 = 9x$ b.$y^2 = 9x/2$ c. $y^2 = 2x$ d. $y^2 = 2x/9$

Assertion –Reason type questions:

Two statements are labeled as Assertion(A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: The area of the ellipse $2x^2 + 3y^2 = 6$ is more than the area of the circle $x^2 + y^2 - 2x + 4y + 4 = 0$.

Reason (R): The length of semi major axis of an ellipse is more than the radius of the circle.

Q5. **Assertion (A)**: Centre of circle $x^2 + y^2 - 2x + 4y + 4 = 0$ is $(1, -2)$.

Reason (R): The coordinates of the centre of the circle are $(-\frac{1}{2}$ coordinates of x, $-\frac{1}{2}$ coordinates of y).

Subjective type questions:

Q6. Find the equation of the circle having centre at (3,–4)and touching the line $5x+12y-12 = 0$

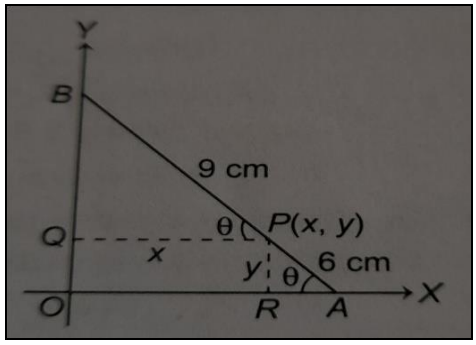
Q7. Find the equation of the circle which touches both axes and the line $3x-4y+8=0$ and lies in the third quadrant.

Q8. Find the eccentricity, coordinates of the foci, equations of directrix and length of latus-rectum of the hyperbola $9x^2-16y^2=144$.

Q9. Find the equation of ellipse which passes through (–3, 1) and eccentricity is major $(\frac{\sqrt{2}}{5})$ with x-axis as its axis & centre at the origin.

Q10. **Case Study: Read the following passage and answer the questions given below:**

A rod AB of length 15 cm rests in between two coordinate axes in such a way the end point A lies on X-axis and end point B lies on Y-axis.



Let the rod AB making an angle θ with OX as shown in figure.

i. Find the value of $\cos\theta$.

ii. Find the length of minor axis.

CHAPTER 11 -INTRODUCTION TO THREE-DIMENSIONAL GEOMETRY

Multiple choice questions:

Q1. The cartesian equation of the line is $3x + 1 = 6y - 2 = 1 - z$ then its direction ratio are

a. 1/3,1/6,1 b.-1/3,1/6,1 c.1/3,-1/6,1 d. 1/3,1/6, -1

Q2. Three planes $x + y=0, y+z =0$, and $x+z=0$

a. Meet in a unique point b. Meet in a line

c. Never intersect d. Meet taken two at a time in parallel lines

Q3. The maximum distance between points $(3\sin\theta,0,0)$ and $(4\cos\theta,0,0)$ is

a. 3 b. 4 c.5 d. Can not be find

Assertion –Reason type questions:

Two statements are labeled as Assertion(A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: Points (1,2,3),(4,5,6) and (7,8,9) are collinear.

Reason (R): Three points A,B and C are collinear if AB+BC =AC.

Q5. **Assertion (A)**: A point P(x,0,0) lies in first octant .

Reason (R): A point is on the x-axis then its y coordinate and z coordinate are 0 and 0 respectively.

Subjective type questions:

Q6. Using section formula ,show that the points A(–4,6,10),B (2,4,6) and C(14,0,–2) are collinear.

Q7. The centroid of a triangle ABC is at point (1,1,1). If the coordinates of A and B are (3,–5,7) and (–1,7,–6) respectively, find the coordinates of the point C.

Q8. If the origin is the centroid of the triangle PQR with vertices P(2a,2,6);Q(–4,3b,–10) and R(8,14,2c), then find the values of a, b, c.

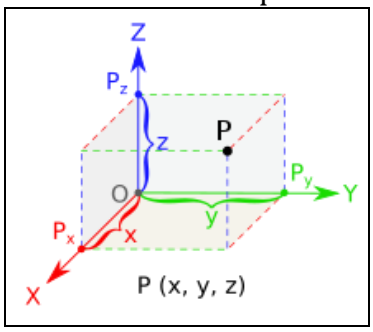
Q9. The three vertices of the parallelogram are A(3,–1,2), B(1,2,–4) and C(–1,1,2). Then find the coordinate of the fourth vertex.

Q10**. Case Study:** Read the following passage and answer the questions given below:

Four students in traditional dresses represent four states of India, standing at points represented by O(0, 0, 0), A(a, 0, 0),B(0, b, 0) and C(0, 0, c). If a girl representing BHARATMATA be placed in such a way that she is equidistant from the four students, then answer the following questions which are based on above it.

i. Find the x-coordinate of girl representing BHARATMATA.

ii. Which concept is used for finding the coordinates of point?



CHAPTER 12 -LIMITS AND DERIVATIVES

Multiple choice questions:

Q1. The value of $\lim_{x\to 0} \frac{\tan bx}{x}$ is

a. $-b$ b. b c. x d. $-x$

Q2 The value of $\lim_{x\to 0} \frac{\tan ax}{\sin x}$ is

a. $-a$ b. a c. x d. $-x$

Q3. The value of $\lim_{x\to 3} \frac{x^3-3^3}{x-3}$ is

a. 9 b. 27 c. 81 d. 3

Assertion –Reason type questions:

Two statements are labeled as Assertion(A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: The derivative of 100 is 0.

Reason (R): Derivative of a constant is o.

Q5. **Assertion (A)**:The derivative of x^5 is 5x .

Reason (R):The derivative of x^n is nx^{n-1}.

Subjective type questions:

Q6. Find the derivative of f(x) = $x^3 e^x$

Q7. Find the derivative of f(x) =$\cos x^2 + (e^x)^4$

Q8. Find the derivative of f(x) = $\frac{x^2 \cos\frac{\pi}{4}}{\sin x}$.

Q9. If the function f(x) satisfies $\lim_{x\to 1}[(f(x)-20)/(x^2-1)]$ evaluate $\lim_{x\to 1} f(x)$.

Q10**. Case Study: Read the following passage and answer the questions given below:**

A limit is the value that a function (or sequence) approaches as the input (or index) approaches some value. Limits are essential to calculus and mathematical analysis, and are used to define continuity, derivatives, and integrals.

Two important limits are given as:

$\lim_{x\to 0} \sin x/x = 1$

$\lim_{x\to 0} \frac{1-\cos x}{x} = 0$

$$\lim_{x\to 0} \sin(x) = 0$$
$$\lim_{x\to 0} \cos(x) = 1$$
$$\lim_{x\to 0} \tan(x) = 0.$$

i. Find the value of $\lim_{x\to 0} \sin 3x/\sin 5x$.

ii.Find the value of $\lim_{x\to 0}(1-\cos x)/2x$.

CHAPTER 13 –STATISTICS

Multiple choice questions:

Q1. The Variance of first five natural numbers is

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

Q2. The measure of variability which is independent of units ,is called

a. Mean deviation b. Variance c. Standard deviation d. Range

Q3.The mean deviation about mean of first five natural number is

a. 1 b.1.2 c.2 d. 2.2

Assertion –Reason type questions:

Two statements are labeled as Assertion(A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: The mean deviation about the mean for data 4, 7, 8,9,10,12,13,17 is 3.

Reason (R): Mean deviation (M.D) = $\frac{\sum D}{n}$ where D=|x-$\bar{x}$|

Q5. **Assertion (A)**: The standard deviation for data 4, 8, 8,9,10,12,13,17 is 5.

Reason (R): Standard deviation (S.D) = $\sum D$, where D=|x-$\bar{x}$|

Subjective type questions:

Q6**.** Find the mean deviation of first five natural numbers.

Q7. If a is a positive integer and the frequency distribution

x	a	29	39	49	59	69
f	2	1	1	1	1	1

has a variance of 160. Determine the value of a

Q8. Mean and standard deviation of 100 observations were found to be 40 and 10 respectively. If at the time of calculation two observations were wrongly taken as 30 and 70 in place of 3 and 27respectively,find the correct standard deviation.

Q9. Calculate mean, variance & standard deviation for the following distribution,

Classes	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

Q10. **Case Study: Read the following passage and answer the questions given below**:

For a group of 200 candidates, the mean and the standard deviation of scores were found to be 40 and15, respectively. Later on it was discovered that the scores of 43 and 35 were misread as 34 and 53, respectively

i. The sum of correct scores.

ii. Find the correct mean

CHAPTER 14 -PROBABILITY

Multiple choice questions:

Q1. What is the total number ofsamplespaceswhenadieisthrown2 times?

a.6 b.12 c. 18 d. 36

Q2. Three identical dice are rolled .What is the probability that the same number will appear on each of them?

a.1/6 b. 1/36 c.1/18 d.3/28

Q3. An urn contains 6 balls of which two are red and four are black. Two balls are drawn at random. What is the probability that they are of different colours ?

a. 2/15 b. 1/15 c. 8/15 d.4/15

Assertion –Reason type questions:

Two statements are labeled as Assertion(A) and Reason(R).Select the most appropriate answer from the options given below:

a. Both A and R are true and R is correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

Q4. **Assertion (A)**: Probability of getting a head in a toss of an unbiased coin is $\frac{1}{2}$.

Reason (R): In a simultaneous toss of two coins, the probability of getting 'no tails' is $\frac{1}{4}$.

Q5. **Assertion (A)**: In tossing a coin, the exhaustive number of cases is 2.

Reason (R): If a pair of dice is thrown, then the exhaustive number of cases is 6x6.

Subjective type questions:

Q6. Findtheprobabilitythataleapyearselectedatrandomwillcontain53Sunday.

Q7. If A, B, C are three mutually exclusive and exhaustive events of an experiment such that 3P(A)= 2P(B) = P(C) then find P(A).

Q8. If the letters of the word ATTRACTION are written down at random, find the probability that:

i. All the T's occur together ii. No two T's occur together

Q9. An experiment consists of rolling die until a 2 appears.

i. How many elements of the sample space correspond to the event that 2 appears on the k^{th} roll of the die?

ii. How many elements of the sample space correspond the event that 2 appears not later than the k^{th} roll of die?

Q10 **Case Study: Read the following passage and answer the questions given below.**

In a class of 60 students, 30 opted for NCC, 32 opted for NSS and 24 opted for both NCC and NSS.One of these students is selected at random.

i. Find the probability that the student opted for NCC or NSS

ii. Find the probability that the student has opted NSS but not NCC .