DALMIA HIGHER SECONDARY SCHOOL, DALMIAPURAM. TRICHY DT.

STD XI MATHEMATICS – IMPORTANT QUESTIONS

Chapter – 1 TWO MARKS

1.Example 1.1 Find the number of subsets of A if A = $\{x : x = 4n+1, 2 \le n \le 5, n \in N\}$

2.Example 1.7 If n(A) = 10 and $n(A \cap B) = 3$, find $n((A \cap B)' \cap A)$.

3.Example 1.9 If $\rho(A)$ denotes the power set of A, then find $n\left(\rho\left(\rho\left(\rho(\phi)\right)\right)\right)$.

4.Example 1.21 Find the largest possible domain for the real valued function f defined by f(x) = $\sqrt{x^2 - 5x + 6}$

5.Er(1.1) 5. Justify the trueness of the statement: "An element of a set can never be a subset of itself."

6.Er(1.1) 7. If n(A $\cap$ B) = 3 and n(A $\cup$ B) = 10, then find n(P(A Δ B)).

7.Er(1.1) 8. For a set A, A $\times$ A contains 16 elements and two of its elements are (1,3) and (0, 2). Find the elements of A.

8.Er(1.2) 8. Let A = $\{a, b, c\}$. What is the equivalence relation of smallest cardinality on A? What is the equivalence relation of largest cardinality on A?

9. Er(1.3) 9. Show that the relation xy = -2 is a function for a suitable domain. Find the domain and the range of the function.

10.Er(1.3) 13. The weight of the muscles of a man is a function of his body weight x and can be expressed as W(x) = 0:35x. Determine the domain of this function.

Chapter – 1 THREE MARKS

1.Example 1.10 Check the relation R = {(1, 1), (2, 2), (3, 3),….., (n, n)} defined on the set S = $\{1, 2, 3, \ldots\ldots, n\}$ for the three basic relations.

2.Example 1.11 Let S = $\{1, 2, 3\}$ and ρ = {(1, 1), (1, 2), (2, 2), (1, 3), (3, 1)}

(i) Is ρ reflexive? If not, state the reason and write the minimum set of ordered pairs to be included to ρ so as to make it reflexive.

3.Example 1.13 In the set Z of integers, define mRn if m- n is a multiple of 12. Prove that R is an equivalence relation.

4.Example 1.22 Find the domain of f(x) = $\frac{1}{1 - 2\cos x}$

5.Example 1.23 Find the range of the function f(x) = $\frac{1}{1 - 3\cos x}$

6.Example 1.27 Let f and g be the two functions from R to R defined by f(x) = 3x - 4 and g(x) = x^2 + 3. Find g $\circ$ f and f $\circ$ g.

7.Example 1.30 If $f : R \to R$ is defined by f(x) = 2x - 3 prove that f is a bijection and find its inverse.

8.Er(1.1) 6. If n(P(A)) = 1024; n(A $\cup$ B) = 15 and n(P(B)) = 32, then find n(A $\cap$ B).

9.Er(1.2) 1. Discuss the following relations for reflexivity, symmetricity and transitivity:

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(i) The relation R defined on the set of all positive integers by "mRn if m divides n". (iii) Let A be the set consisting of all the members of a family. The relation R defined by "aRb if a is not a sister of b".

10.Er(1.2) 5. On the set of natural numbers let R be the relation defined by aRb if 2a + 3b = 30. Write down the relation by listing all the pairs. Check whether it is (i) reflexive (ii) symmetric (iii) transitive (iv) equivalence

11.Er(1.3) 8. From the curve y = sin x, draw y = sin $|x|$ (Hint: sin(-x) = -sin x.)

12.Er(1.3) 19. The formula for converting from Fahrenheit to Celsius temperatures is $y = \frac{5x}{9} - \frac{160}{9}$ .Find the inverse of this function and determine whether the inverse is also a function.

13.Er(1.4) 7. From the curve y = $|x|$, draw (i) y = $|x-1|$ + 1 (ii) y = $|x+1|$ -1 (iii) y = $|x+2|$ -3.

Chapter – 1 FIVE MARKS

1.Example 1.2 In a survey of 5000 persons in a town, it was found that 45% of the persons know Language A; 25% know Language B; 10% know Language C; 5% know Languages A and B; 4%know Languages B and C; and 4% know Languages A and C. If 3% of the persons know all the three Languages, find the number of persons who knows only Language A:

2.Example 1.5 If A and B are two sets so that $n(B-A)2n(A-B) = 4n(A\cap B)$ and if $n(A\cup B) = 14$, then find $n(\rho(A))$

3.Example 1.30 If $f : R \rightarrow R$ is defined by f(x) = 2x - 3 prove that f is a bijection and find its inverse.

4.Er(1.2) 2. Let X = $\{a,b,c,d\}$ and R = {(a, a), (b, b), (a, c)}. Write down the minimum number of ordered pairs to be included to R to make it (i) Reflexive (ii) symmetric (iii) transitive (iv) equivalence

5.Er(1.2) 3. Let A = $\{a,b,c\}$ and R = {(a, a), (b, b), (a, c)}. Write down the minimum number of ordered pairs to be included to R to make it (i) Reflexive (ii) symmetric (iii) transitive (iv) equivalence

6.Er(1.2) 5. On the set of natural numbers let R be the relation defined by aRb if 2a + 3b = 30. Write down the relation by listing all the pairs. Check whether it is (i) reflexive (ii) symmetric (iii) transitive (iv) equivalence

7.Er(1.3) 10. If $f, g : R \rightarrow R$ are defined by f(x) = $|x| + x$ and g(x) = $|x| - x$, find g o f and f o g.

8.Er(1.3) 12. If $f : R \rightarrow R$ is defined by f(x) = 3x - 5, prove that f is a bijection and find its inverse.

9.Er(1.4) 6 From the curve y = x, draw (i) y = -x (ii) y = 2x (iii) y = x + 1 (iv) y = $\frac{1}{2}$x + 1

10.Er(1.4) 7. From the curve y = $|x|$, draw (i) y = $|x-1|$ + 1 (ii) y = $|x+1|$ -1 (iii) y = $|x+2|$

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11.Er(1.3) 2. Write the values of at -4, 1,-2, 7, 0 if f(x) $=\begin{cases} -x+4 & if\ -\infty < x \le -3 \\ x+4 & if\ -3 < x < -2 \\ x^2 - x & if\ -2 \le x < 1 \\ x - x^2 & if 1 \le x < 7 \\ 0 & otherwise \end{cases}$

12.Er(1.3) 3. Write the values of f at -3, 5, 2,-1, 0 if (x) $=\begin{cases} x^2 + x - 5 & , x \in (-\infty, 0) \\ x^2 + 3x - 2 & , x \in (3, \infty) \\ x^2 & , x \in (0, 2) \\ x^2 - 3 & , otherwise \end{cases}$

Chapter – 2 **TWO MARKS**

1.Example 2.1 Solve $|2x-17| = 3$ for x.
2.Example 2.2 Solve $3|x-2|+7=19$ for x.
3.Example 2.4 Solve $|x-9| < 2$ for x.
4.Example 2.10 If a and b are the roots of the equation x^2- px + q = 0, find the value of $\frac{1}{a}+\frac{1}{b}$.
5.Example 2.11 Find the complete set of values of a for which the quadratic x^2- ax + a + 2 = 0has equal roots.
6.Example 2.32 Rationalize the denominator of $\frac{\sqrt{5}}{(\sqrt{6}+\sqrt{2})}$
7.Example 2.38 Solve $x^{\log_3 x} = 9$
8.Er(2.1) 5. Find a positive number smaller than $\frac{1}{2^{1000}}$ Justify.
9.Er(2.4)1. Construct a quadratic equation with roots 7 and -3.
10.Er(2.4)2. A quadratic polynomial has one of its zeros $1+\sqrt{5}$ and it satisfies p(1) = 2.
11.Er(2.4)3. If α and β are the roots of the quadratic equation $x^2+\sqrt{2}$ x+3 = 0, form a quadratic polynomial with zeroes $\frac{1}{\alpha},\frac{1}{\beta}$.
12.Er(2.11) 2. Evaluate $\left(\left((256)^{\frac{-1}{2}}\right)^{\frac{-1}{4}}\right)^{3}$

Chapter – 2 **THREE MARKS**

1.Example 2.8 Solve the following system of linear inequalities. $3x-9 \ge 0, 4x-10 \le 6$
2.Example 2.12 Find the number of solutions of $x^2+|x-1|=1$
3.Example 2.11 Find the complete set of values of a for which the quadratic x^2- ax + a + 2 = 0 has equal roots.

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4.Example 2.21 Solve x = $\sqrt{x+20}$ for x $\in$ R.

5.Example 2.33 Find the square root of 7 - 4 $\sqrt{3}$

6.Example 2.37 If $\log_2 x + \log_4 x + \log_{16} x = \frac{7}{2}$ find the value of x.

7.Er(2.3)4(i). Solve: $\frac{3(x-2)}{5} \le \frac{5(2-x)}{3}$ **8.Er(2.3)**4 (ii) Solve: $\frac{5-x}{3} < \frac{x}{2} - 4$

9.Er(2.3)7. Find all pairs of consecutive odd natural numbers both of which are larger than 10 and their sum is less than 40.

10.Er(2.4)1. Construct a quadratic equation with roots 7 and -3.

11.Er(2.4)4. If one root of k(x- 1)^2 = 5x - 7 is double the other root, show that k = 2 or- 25.

12.Er(2.11)3. If $\left(x^{\frac{1}{2}} + x^{\frac{-1}{2}}\right)^2 = \frac{9}{2}$, then find the value of $\left(x^{\frac{1}{2}} - x^{\frac{-1}{2}}\right)$ for x > 1.

13.Er(2.12) 2. Compute $\log_9 27 - \log_{27} 9$

14.Er(2.12)5. If a^2 + b^2 = 7ab, show that $\log\frac{a+b}{3} = \frac{1}{2}(\log a + \log b)$

15.Er(2.12) 9. Prove log a + log a^2 + log a^3 + _ _ _ + log a^n = $\frac{n(n+1)}{2}\log a$

16.Er(2.12)8. Prove $\log_{a^2} a . \log_{b^2} b . \log_{c^2} c = \frac{1}{8}$.

Chapter – 2 **FIVE MARKS:**

1.Example 2.12 Find the number of solutions of $x^2 + |x-1| = 1$

2.Example 2.26 Resolve into partial fractions: $\frac{2x}{(x^2+1)(x-1)}$

3.Example 2.27 Resolve into partial fractions: $\frac{x+1}{x^2(x-1)}$

4.Example 2.36 Prove $\log\frac{75}{16} - 2\log\frac{5}{9} + \log\frac{32}{243} = \log 2$

5.Er(2.8)1. Find all values of x for which $\frac{x^3(x-1)}{(x-2)} > 0$

6.Er(2.8)2. Find all values of x that satisfies the inequality $\frac{2x-3}{(x-2)(x-4)} < 0$

7.Er(2.8)3. Solve $\frac{x^2-4}{x^2-2x-15} \le 0$

8.Er(2.8)4. Solve $\frac{x-2}{x+4} \ge \frac{5}{x+3}$

9.Er(2.9) Resolve the following rational expressions into partial fractions.9. $\frac{x^1+12}{(x+1)^2(x-2)}$

10.Er(2.9) Resolve the following rational expressions into partial fractions. 12. $\frac{7+x}{(1+x)(1+x^2)}$

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11.Er(2.9) Resolve the following rational expressions into partial fractions. 2. $\frac{3x+1}{(x-2)(x+1)}$

12.Er(2.9) Resolve the following rational expressions into partial fractions. 8. $\frac{x^2+2x+1}{x^2+5x+6}$

13.Er(2.9) Resolve the following rational expressions into partial fractions .7. $\frac{x^2+x+1}{x^2-5x+6}$

14.Er (2.11)9. Simplify $\frac{1}{5-\sqrt{8}}-\frac{1}{\sqrt{8}-\sqrt{7}}+\frac{1}{\sqrt{7}-\sqrt{6}}-\frac{1}{\sqrt{6}-\sqrt{5}}+\frac{1}{\sqrt{5}-1}$

15.Er (2.11)10. If $x=\sqrt{2}+\sqrt{3}$ find $\frac{x^2+1}{x^2-2}$

16.Er(2.12)8. Prove $\log_{a^2} a.\log_{b^2} b.\log_{c^2} c=\frac{1}{8}$.

17.Er(2.12)5. If $a^2 + b^2 = 7ab$, show that $\log\frac{a+b}{3}=\frac{1}{2}(\log a+\log b)$

Chapter – 3 **TWO MARKS**

1.Example 3.3 Eliminate θ from a $\cos\theta$ = b and c $\sin\theta$ = d, where a, b, c, d are constants.

2.Example 3.4 Convert (i) 18^0 to radians (ii) -108^0 to radians

3.Example 3.12 Find the value of (iii) $\cot\left(\frac{-15\pi}{4}\right)$

4.Example 3.22 Find the value of $\sin\left(22\frac{1}{2}^o\right)$

5.Example 3.34 Express sum or difference as a product (i) $\sin 50^0 + \sin 20^0$

6.Example 3.43 Find the general solution of $\sin\theta=-\frac{\sqrt{3}}{2}$

7.**Example 3.15** Find the values of (i) $\cos 15^0$ and (ii) $\tan 165^0$

8.Example 3.21 A foot ball player can kick a football from ground level with an initial velocity of80 ft/second. Find the maximum horizontal distance the football travels and at what angle?(Take g = 32).

9.Example 3.42 Find the principal solution of

(i) $\sin\theta=\frac{1}{2}$ (ii) $\sin\theta=\frac{1}{2}$ (iii) cosecθ = -2 (iv) $\cos\theta=\frac{1}{2}$ cos θ

10.Er (3.2)3. What must be the radius of a circular running path, around which an athlete must run 5 times in order to describe 1 km?

11.Er (3.4)20. Show that(i) $tan\left(45^0+A\right)=\frac{1+\tan A}{1-\tan A}$

12.Er (3.6)2. Express each of the following as a product (iv) $\cos 35^0$ - $\cos 75^0$.

13.Er (3.8)1. Find the principal solution and general solutions of $\sin\theta=-\frac{1}{\sqrt{2}}$

Chapter – 3 **THREE MARKS**

1.Example 3.1 Prove that $\frac{\tan\theta+\sec\theta-1}{\tan\theta-\sec\theta+1}=\frac{1+\sin\theta}{\cos\theta}$

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2.Example 3.21 A football player can kick a football from ground level with an initial velocity of80 ft/second. Find the maximum horizontal distance the football travels and at what angle? (Take g = 32).

3.Example 3.26 Prove that $\frac{\sin\theta+\sin 2\theta}{1+\cos\theta+\cos 2\theta}=\tan\theta$

4.Example 3.29 Find the values of (i) sin 18^0 (ii) cos 18^0 (iii) sin 72^0 (iv) cos 36^0 (v) sin 54^0

5.Example 3.38 Show that cos 10^0 cos 30^0 cos 50^0 cos 70^0 $=\frac{3}{16}$

6.Example 3.43 Find the general solution of $\sin\theta=-\frac{\sqrt{3}}{2}$

7.Example 3.59 If the three angles in a triangle are in the ratio 1 : 2 : 3, then prove that the corresponding sides are in the ratio $1:\sqrt{3}:2$

8.Example 3.67 Find the area of the triangle whose sides are 13 cm, 14 cm and 15 cm.

9.Er (3.3)3.Find the values of other five trigonometric functions (ii) $\cos\theta=\frac{2}{3},\theta$ lies in the Qnt

10.Er (3.4)17. Prove that (ii) cos (A + B) cos (A - B) = $\cos^2$ A - $\sin^2$ B = $\cos^2$ B - $\sin^2$ A

11.Er (3.4)21. Prove that $cot(A+B)=\frac{\cot A\cot B-1}{\cot A+\cot B}$

12.Er (3.6)1. Express each of the following as a sum or difference (iv) cos 5θcos 2θ

13.Er (3.10)5. In a ΔABC, if a = 12 cm, b = 8 cm and C =30^0, hen show that its area24sq.cm

14. Write the identities of cos 2A

Chapter – 3 **FIVE MARKS:**

1.Er (3.3)4. Prove that $\frac{cot(180^0+\theta)\ sin(90^0-\theta)\ cos(-\theta)}{sin(270^0+\theta)\ tan(-\theta)cosec(360^0+\theta)}=cos^2\theta cot\theta.$

2.Er (3.4)2. If $\sin A=\frac{3}{5}$ and $\cos B=\frac{9}{41},0<A<\frac{\pi}{2},0<B<\frac{\pi}{2}$ find (i) sin(A + B) (ii) cos(A - B).

3.Er (3.7) 1(i). If A + B + C = 180^0, prove that sin 2A + sin 2B + sin 2C = 4 sinAsinB sinC

4.Er (3.7) 4(i). If $A+B+C=\frac{\pi}{2}$, prove that sin 2A + sin 2B + sin 2C = 4 cosA cosB cosC

5.Er (3.7)4(ii). If $A+B+C=\frac{\pi}{2}$, prove that cos 2A + cos 2B + cos 2C = 1 + 4 sinA sinB sinC.

6.Er (3.4)20. Show that(i) $tan(45^0+A)=\frac{1+\tan A}{1-\tan A}$

7.Er (3.5)6. If A + B = 45^0, show that (1 + tan A) (1 + tan B) = 2.

8.State and prove Napier Formula

9.State and prove sine Formula

Chapter – 4 **TWO MARKS**

1.Example 4.8(i) Find the number of strings of length 4, which can be formed using the letters of the word BIRD, without repetition of the letters.
(ii) How many strings of length 5 can be formed out of the letters of the word PRIME taking all the letters at a time without repetition.

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2.Example 4.14 In how many ways (i) 5 different balls be distributed among 3 boxes? (ii) 3 different balls be distributed among 5 boxes?

3.Example 4.16 Find the value of (i) 5! (ii) 6!-5! (iii) $\frac{8!}{5!-2!}$

4.Example 4.20 If $\frac{6!}{n!}$ then find the value of n.

5.Example 4.23 If $\frac{1}{7!}+\frac{1}{8!}=\frac{A}{9!}$ then find the value of A.

6.Example 4.44 Evaluate the following: (i) ${}^{10}C_3$ (ii) ${}^{15}C_{13}$ (iii) ${}^{100}C_{99}$ (iv) ${}^{50}C_{50}$.

7.Er (4.1)16. Find the value of n if (i) (n + 1)! = 20(n-1)! (ii) $\frac{1}{8!}+\frac{1}{9!}=\frac{n}{10!}$

8.Er (4.2)10. How many ways can the product $a^2b^3c^4$ be expressed without exponents?

9.Er (4.3)2. If ${}^{15}C_{2r-1} = {}^{15}C_{2r+4}$, find r.

10.Er (4.3)22. How many triangles can be formed by joining 15 points on the plane, in which no line joining any three points?

11.Er (4.3)24. There are 11 points in a plane. No three of these lies in the same straight line except 4 points, which are collinear. Find

(i) the number of straight lines that can be obtained from the pairs of these points?

(ii) the number of triangles that can be formed for which the points are their vertices

Chapter – 4 **THREE MARKS**

1.Example 4.25 Evaluate: (i) ${}^4P_4$ (ii) ${}^5P_3$ (iii)${}^8P_4$ (iv) ${}^6P_5$

2.Example 4.43 Find the sum of all 4-digit numbers that can be formed using the digits 1,2,4,6,8

3.Example 4.42 If the letters of the word IITJEE are permuted in all possible ways and the strings thus formed are arranged in the lexicographic order, find the rank of the word IITJEE.

4.Example 4.47 If ${}^nP_r = 11880$ and ${}^nC_r = 495$, Find n and r.

5.Example 4.56 An exam paper contains 8 questions, 4 in Part A and 4 in Part B. Examiners are required to answer 5 questions. In how many ways can this be done if

(i) There are no restrictions of choosing a number of questions in either part.

(ii) At least two questions from Part A must be answered.

6.Er (4.1)9. How many three-digit numbers, which are divisible by 5, can be formed using the digits 0, 1, 2, 3, 4, 5 if (i) repetition of digits are not allowed? (ii) repetition of digits are allowed?

7.Er (4.2)9. Find the distinct permutations of the letters of the word MISSISSIPPI?

8.Er (4.2)11. In how many ways 4 mathematics books, 3 physics books, 2 chemistry books and 1 biology book can be arranged on a shelf so that all books of the same subjects are together.

9.Er (4.3)14. There are 5 teachers and 20 students. Out of them a committee of 2 teachers and 3 students is to be formed. Find the number of ways in which this can be done. Further find in how many of these committees (i) a particular teacher is included? (ii) a particular student is excluded?

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10.Er (4.3)25. A polygon has 90 diagonals. Find the number of its sides?

Chapter – 4 **FIVE MARKS**

1.Example 4.61 By the principle of mathematical induction, prove that, for all integers

$n \geq 1, 1+2+3+........+n=\frac{n(n+1)}{2}$.

2.Example 4.50 If ${}^{(n+2)}C_7 : {}^{(n-1)}P_4 = 13 : 24$ find n.

3.Example 4.63 By the principle of mathematical induction, prove that, for all integers

$n \geq 1, 1^2+2^2+3^2+........+n^2=\frac{n(n+1)(2n+1)}{6}$

4.Example 4.56 An exam paper contains 8 questions, 4 in Part A and 4 in Part B. Examiners are required to answer 5 questions. In how many ways can this be done if (i) There are no restrictions of choosing a number of questions in either part.

(ii) At least two questions from Part A must be answered.

5.Example 4.64 Using the Mathematical induction, show that for any natural number n,

$\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+........+\frac{1}{n(n+1)}=\frac{n}{n+1}$

6.Example 4.35 If the letters of the word TABLE are permuted in all possible ways and the words thus formed are arranged in the dictionary order (alphabetical order), find the ranks of the words (i) TABLE, (ii) BLEAT

7.Example 4.24 Prove that $\frac{(2n)!}{n!}=2^n(1.3.5....(2n-1))$.

8.Er (4.3)14. There are 5 teachers and 20 students. Out of them a committee of 2 teachers and 3 students is to be formed. Find the number of ways in which this can be done. Further find in how many of these committees

(i) a particular teacher is included?

(ii) a particular student is excluded?

9.Er (4.3)15. In an examination a student has to answer 5 questions, out of 9 questions in which 2arecompulsory. In how many ways a student can answer the questions?

10.Er (4.4)1. By the principle of mathematical induction, prove that, for n ≥1,

$1^3+2^3+3^3+........+n^3=\left(\frac{n(n+1)}{2}\right)^2$

11.Er (4.4)4. By the principle of Mathematical induction, prove that, for n ≥1,

$1.2+2.3+3.4+........+n.(n+1)=\frac{n(n+1)(n+2)}{3}$

12.Er (4.2)18. If the letters of the word FUNNY are permuted in all possible ways and the strings thus formed are arranged in the dictionary order, find the rank of the word FUNNY.

13.Er (4.4)9. Prove by Mathematical Induction that

$1! + (2\times2!) + (3\times3!) +...........+ (n \times n!) = (n + 1)! - 1$.

14.Example 4.65 Prove that any natural number n, $a^n - b^n$ is divisible by a - b, where a > b

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Chapter – 5 **TWO MARKS**

1.Example 5.1 Find the expansion of $(2x + 3)^5$.
2.Example 5.2 Evaluate 98^4.
3.Example 5.3 Find the middle term in the expansion of $(x + y)^6$.
4.Example 5.14 Find seven numbers $A_1, A_2, ...A_7$ so that the sequence $4, A_1, A_2, ...A_7, 7$ is in arithmetic progression and also 4 numbers G_1, G_2, G_3, G_4 so that the sequence $12, G_1, G_2, G_3, G_4, \frac{3}{8}$ is in geometric progression.
5.Example5.17 Find the sum to first n terms of the series $\frac{1}{1+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+.........$
6.Er.(5.2)2. Write the first 6 terms of the sequences whose n^{th} term a_n is given below.

(i) $a_n = \begin{cases} n+1 \text{ if } n \text{ is odd} \\ n \text{ if } n \text{ is even} \end{cases}$

7.Er.(5.2)2. Write the first 6 terms of the sequences whose n^{th} term a_n is given below.

(iii) $a_n = \begin{cases} n \text{ if } n \text{ is } 1,2,\text{or}3 \\ a_{n-1}+a_{n-2}+a_{n-3} \text{ if } n>3 \end{cases}$

8.Example 5.24 Find $\sqrt[3]{65}$
9.Example 5.11 Find the last two digits of the number 7^{400}
10.Er.(5.1)3. Using binomial theorem, indicate which of the following two number is larger$(1.01)^{1000000}$,10000.

Chapter – 5 **THREE MARKS**

1.Er.(5.1)7. Find the constant term of $\left(2x^3-\frac{1}{3x^2}\right)^5$

2.**Er.(5.1)**8. Find the last two digits of the number 3^{600}.
Er. (5.1)9. If n is a positive integer, show that, $9^{n+1}-8n-9$ is always divisible by 64.
3.Example 5.24 Find $\sqrt[3]{65}$
4.Example 5.19 Find the sum: $1+\frac{4}{5}+\frac{7}{25}+\frac{10}{125}+,........$
5.Example 5.12 Prove that if a, b, c are in HP, if and only if a $\frac{a}{c}=\frac{a-b}{b-c}$.
6.Er. (5.1)2. Compute (i) 102^4
7.Er. (5.1).4. Find the coefficient of x^{15} in $\left(x^2+\frac{1}{x^3}\right)^{10}$

8.Er. (5.2)7. If a, b, c are in geometric progression, and if $a^{\frac{1}{x}}=b^{\frac{1}{y}}=c^{\frac{1}{z}}$,
then prove that x, y, z are in arithmetic progression
9.Er. (5.4)2. Find $\sqrt[3]{1001}$ approximately (two decimal places).

Chapter – 5 **FIVE MARKS**

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1.Example 5.25 Prove that $\sqrt[3]{x^3+7}-\sqrt[3]{x^3+4}$ is approximately equal to $\frac{1}{x^2}$ when x is large.

2.Er.(5.4)3. Prove that $\sqrt[3]{x^3+6}-\sqrt[3]{x^3+3}$ is approximately equal to $\frac{1}{x^2}$ when x is sufficiently large.

3.Er.(5.4)3. Prove that $\sqrt[3]{x^3+6}-\sqrt[3]{x^3+3}$ is approximately equal to $\frac{1}{x^2}$ when x is sufficiently large.

4.Er.(5.4)4. Prove that $\sqrt{\frac{1-x}{1+x}}$ is approximately equal to $1-x+\frac{x^2}{2}$ when x is very small.

5.Er.(5.4)8. If p - q is small compared to either p or q, then show that

$\sqrt[n]{\frac{p}{q}} \approx \frac{(n+1)p+(n-1)q}{(n-1)p+(n+1)q}$ Hence find $\sqrt[8]{\frac{15}{16}}$

6.Er.(5.4)9. Find the coefficient of x^4 in the expansion of $\frac{3-4x+x^2}{e^{2x}}$.

Chapter – 6 **TWO MARKS**

1.Example 6.16 The length of the perpendicular drawn from the origin to a line is 12 and makes angle $150°$ with positive direction of the x-axis. Find the equation of the line.

2.Example 6.19 Express the equation $\sqrt{3}x - y + 4 = 0$ in the following equivalent form:
(i) Slope and Intercept form(ii) Intercept form(iii) Normal form

3.Er.(6.1) 3. If θ is a parameter, find the equation of the locus of a moving point, whose coordinates are $x = a\cos^3\theta$, $y = a\sin^3\theta$.

4.Er.(6.2)9. Find the equation of the straight lines passing through (8, 3) and having intercepts whose sum is 1

Chapter – 6 **THREE MARKS**

1.Example 6.19 Express the equation $\sqrt{3}x - y + 4 = 0$ in the following equivalent form:
(i) Slope and Intercept form (ii) Intercept form (iii) Normal form

2.Example 6.32 If a line joining two points (3, 0) and (5, 2) is rotated about the point (3, 0) in counter clock wise direction through an angle 15^0, then find the equation of the line in the new position.

3.Er. (6.2)9. Find the equation of the straight lines passing through (8, 3) and having intercepts whose sum is 1

4.Er. (6.4)8. The slope of one of the straight lines $ax^2 + 2hxy + by^2 = 0$ is twice that of the other, show that $8h^2 = 9ab$.

Chapter – 6 **FIVE MARKS**

1.Example 6.3 Find the locus of a point P moves such that its distances from two fixed points A(1, 0) and B (5, 0) ,are always equal.

2.Example 6.36 Show that the straight lines $x^2 - 4xy + y^2 = 0$ and $x + y = 3$ form an equilateral triangle.

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3.Example 6.38 If the equation $\lambda x^2 - 10xy + 12y^2 + 5x - 16y - 3 = 0$ represents a pair of straight lines, find (i) the value of λ and the separate equations of the lines (ii) point of intersection of the lines (iii) angle between the lines.

4.Er.(6.2)5. The normal boiling point of water is 100°C or 212°F and the freezing point of water is 0°C or32°F. (i) Find the linear relationship between C and F Find (ii) the value of C for 98.6°F and (iii) the value of F for 38°C

5.Er.(6.3) 8. Find the equations of straight lines which are perpendicular to the line $3x + 4y - 6 = 0$ and are at a distance of 4 units from (2, 1).

6.Er.(6.4)4. Show that the equation $2x^2 - xy - 3y^2 - 6x + 19y - 20 = 0$ represents a pair of intersecting lines. Show further that the angle between them is $\tan^{-1}(5)$

7.Er.(6.4)9The slope of one of the straight lines $ax^2 + 2hxy + by^2 = 0$ is three times the other, show that $3h^2 = 4ab$.

8.Er.(6.4)18. Prove that the straight lines joining the origin to the points of intersection of $3x^2 + 5xy - 3y^2 + 2x + 3y = 0$ and $3x - 2y - 1 = 0$ are at right angles.

9.Er (6.4)12. Find the value of k, if the following equation represents a pair of straight lines. Further, find whether these lines are parallel or intersecting, $12x^2 + 7xy - 12y^2 - x + 7y + k = 0$

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