CHAPTER - 1

REAL NUMBERS

CARD-1

I. Write the following division operations applying Euclids division algorithm.

1. 7 is divided by 2
2. 18 is divided by 5
3. 15 is divided by 4
4. 25 is divided by 12
5. 87 is divided by 11.

II. Find the HCF of the following numbers using Euclids division algorithm.

1. 455 and 42
2. 513 and 270
3. 1764 and 42
4. 40, 96 and 16
5. 117 and 7

III. Find the prime factors for the following numbers.

1. 35
2. 516
3. 31416
4. 4815
5. 363

IV. Find the LCM and HCF of the following numbers using prime factorisation method.

1. 18 and 15
2. 81 and 27
3. 2, 42 and 72
4. 9, 27 and 243
5. 49, 343 and 2401

V. Find the LCM and HCF of the following numbers and show that their product is equal to the product of their LCM and HCF.

1. 13 and 117
2. 17 and 119
3. 66 and 12
4. 13 and 17
5. 70 and 80

VI. Classify the following numbers into rational and irrational numbers.

1. $\sqrt{3}$
2. $\sqrt{11}$
3. 13
4. $\sqrt{25}$
5. $\sqrt[3]{8}$
6. $\sqrt{23}$

VII. Four alternatives are provided for each question choose the most appropriate alternative.

1. 18 is divided by 4. The correct method to write the operation using Euclid's division algorithm is
   (a) $18 = (4 \times 4) + 0$
   (b) $18 = (4 + 4) \times 2$
   (c) $18 = (4 \times 4) + 2$
   (d) $18 = (18 \div 4) + 2$
2. The greatest number that divides 45 and 30 without leaving any remainder is
   (a) 5
   (b) 15
   (c) 20
   (d) 10

3. An even number is always in the form of
   (a) 'n' (b) 2n (c) n + 1 (d) 2n + 1
4. An odd number is always in the form of
   (a) 'n' (b) 2n (c) n + 1 (d) 2n + 1
5. The least number that is divisible by 12, 8 and 16 is
   (a) 4 (b) 24 (c) 96 (d) 48

V. Define an irrational number and give an example.

VI. What is the HCF and LCM of two prime numbers?

CARD - 2

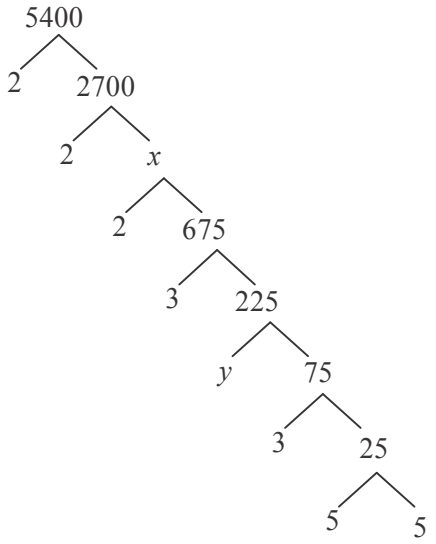
I. Solve the following problems

1. Find the least number, when it is divided by 39, 65 and 78 leaver 9 as remainder.
2. Find the greatest number that divides 48, 96, 108 without leaving any remainder.
3. Find the HCF of 96 and 404 by prime factorisation method and hence find their LCM.
4. Find the HCF of 4052 and 12576 using Eudid's algorithm.
5. A rectangular hall is 16m, 32 cm long and 8m, 40 cm broad. It is to be paved with square tiles of the same size. Find the least possible number of such tiles.
6. Prove that $\sqrt{7}$ is an irrational number.
7. Prove that $1+\sqrt{2}$ is an irrational number.
8. Prove that all even numbers are divisible by 2.
9. Prove that all odd numbers are in the form 2m + 1.
10. The LCM and HCF of 2 numbers are 180 and 6 respectively. If one of the numbers is 30 find the other number.

II. Four alternatives are provided for each question. Choose the appropriate alternative.

1. The exponent of 2 in the prime factorisation of 384 is
   (a) 4 (b) 7 (c) 6 (d) 3
2. The product of two numbers is 180. The product of their HCF and LCM is
   (a) 90 (b) 180 (c) 360 (d) 200
3. Which of the following is an irrational number?
   (a) $\frac{22}{7}$ (b) $\sqrt{289}$ (c) $\sqrt{13}$ (d) $\frac{44}{11}$
4. The largest number that divides 24, 64 and 128 is
   (a) 8 (b) 128 (c) 24 (d) 64
5. The factor tree of 5400 is given below. The value of x and y respectively is

3



(a) 2700 and 5 (b) 1350 and 3 (c) 675 and 5 (d) 375 and 15

CARD - 3

I. Solve the following

1. Find the HCF and LCM of 510 and 92 and verify that product of HCF and LCM is equal to product of them.
2. Two tankers contain 616*l* and 32*l* of petrol respectively. Find the maximum capacity container which can measure the petrol of either tanker the exact number of times.
3. The HCF of 65 and 117 is expressible in the form of 65m-117. Find the value of m and also find the LCM of 65 and 117 using prime factorisation method.
4. Prove that $2-\sqrt{3}$ is an irrational number.
5. If 'h' is the HCF of 56 and 72, find x and y satisfying $h = 56x + 72y$.
6. Find the largest number that divides 2053 and 967 and leaves a remainder of 5 and 7 respectively.
7. There is a circular track of 1000m in a stadium. Shalini takes 8 minutes to complete one round where as salma takes 18 minutes to complete one round. Suppose they both start at the same point and run in the same direction, after how many minutes will they meet again at the starting point?
8. The HCF of two numbers is 84 and their product is 14112. Find their LCM.
9. Prove that $\sqrt{9}+\sqrt{2}$ is an irrational number.

10. There are 3 signals in a straight road of length 5 km. Red light appears after 8 seconds in the first signal, after 12 seconds in the second signal and after 24 seconds in the third signal. Find out after how many seconds red light appears in all the three signals at a time.

11. If p and q are two odd positive integers then prove that $p^2 + q^2$ is an even number but is not divisible by 4.

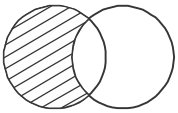
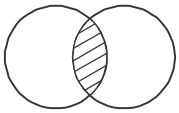
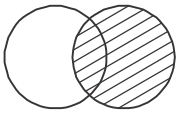
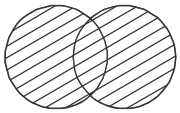
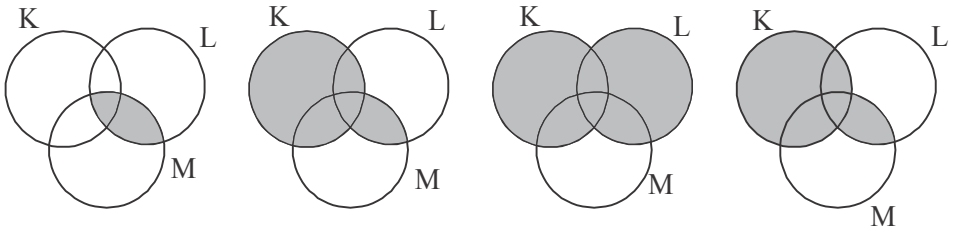
12. If the LCM of two numbers is twice their HCF and their product is 800, then find the numbers.

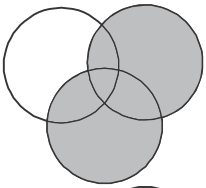
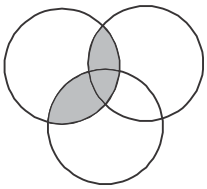
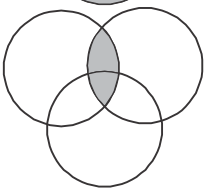
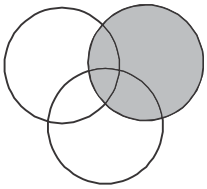
* * * *

5

SETS

Question for below Average Students

1. If A = {2, 4, 6, 8}, B = {4, 8, 12} then A ∩ B in
   (a) {2, 4, 6} (b) {4, 6} (c) {4, 8} (d) {2, 4, 6, 8, 12}
2. If A = {6, 7, 8}, B = {4, 8, 12} and if A ∪ B = {4, 6, 7, 8, 12} then B ∪ A in
   (a) {4} (b) {8} (c) ϕ (d) {4, 6, 7, 8, 12}
3. Which venn diagram represents B ∪ C is
   (a)  (b)  (c)  (d) 
4. Which following diagram represent K∪(L∩M)
   

5. If A and B on two disjoint sets then (A∪B)' is
   (a) A'∪B' (b) A'∩B' (c) A ∪ B' (d) A' ∩ B
6. If A and B are two disjoint sets then (AnB)' is
   (a) A' ∩ B (b) A' ∩ B' (c) A' ∪ B' (d) A' ∪ B
7. According to De-morgan's law (A ∪ B)' in equal to
   (a) A'∪ B (b) A' ∪ B' (c) A' ∩ B' (d) A ∪ B'
8. If A and B are two disjoint sets then A n B is equal to
   (a) 0 (b) ϕ (c) U (d) None of these
9. Which of the following diagram represent K∩(L∪M)
   (a)  (b) 
   (c)  (d) 

10. Which of the following relation represent n(A∪B)'

(a) = n(A) – n(B) + n(A∪B) (b) = n(A) + n(B) – n(A∩B)

(c) = n(A) + n(B) + n(A∪B) (d) = n(A) – n(A∪B) + n(A∩B)

II. Answer the following question

1. If U = {0, 1, 2, 3,4 ,5, 6, 7, 8, 9, 10} and if A = {0, 2, 4, 8} then the value of A' is?
2. Write the distributive property for intersection of sets over ..... union of sets for the set AB and C
3. If A = {2, 3, 4}, B = {2, 4, 6} what is the value of (A – B).
4. n(A) + n(B) = ?

Two Marks Questions

1. Verify commutative property of union of sets. If A = {*l*, m, n, o, p, q} and B = {m, n, o, r, s, t}
2. If A = {1, 2, 3, 4}, B = {3, 4, 5, 6}, C = {6, 7}. Find the value of (A ∩ B) ∩ C.
3. If k = {3, 5, 7, 9}, L = {5, 8, 9}, M = {1, 2, 3, 9} then find the value of K ∪ (L ∩ M)
4. Draw venn diagram to represent A ∪ (B ∩ C).
5. If A and B are two sets such that n(A) = 27, n(B) = 35 and n(A∪B) = 50. Find n(A∩B).
6. If U = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {1, 4, 9}, B = {2, 4, 6, 8} show that (A∪B)' = A'∩B'.
7. In a group of 50 persons 30 like Tea, 25 like coffee and 16 like both. How many like

(1) Either tea or coffee (2) Only Coffee

CARD - 2

Multiple Choice Questions

1. If A = {2, 4, 6, 8}, B = {4, 8, 12} then A ∩ B is

(a) {2, 4, 6} (b) {4, 6} (c) {4, 8} (d) {2, 4, 6, 8}

2. According to distributive law P ∪ (Q ∩ R) is

(a) (P ∪ Q) ∪ (P ∪ R) (b) (P ∪ Q) ∩ (P ∪ R)

(c) (P ∩ Q) ∪ (P ∩ R) (d) (P ∩ Q) ∩ (P ∩ R)

3. If A and B are disjoint sets then (A ∩ B) =

(a) A (b) B (c) ϕ (d) A ∪ B

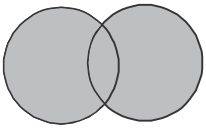
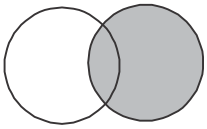
4. According to De-Morgon's low (A ∩ B)' equals

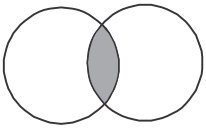
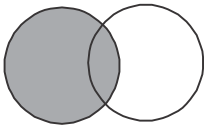
(a) A' ∩ B' (b) A' ∪ B' (c) A ∪ B' (d) A' ∪ B

5. If n(A) + n(B) = n(A ∪ B) then n(A ∩ B) is equal to

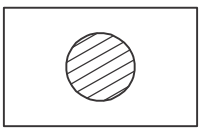
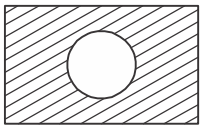
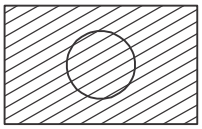
(a) 0 (b) ϕ (c) 1 (d) 2

6. If A and B are two sets if n(A) = 11, n(B) = 7 and n(A ∩ B) = 3 then n(A ∩ B) is
   (a) 21 (b) 15 (c) 8 (d) 10
7. If U = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9} and if A = {0, 2, 4} then A ' =
   (a) {4, 6, 8} (b) {1, 2, 3, 4} (c) {1, 3, 5, 6, 7, 8, 9} (d) ϕ
8. The venn diagram to illustrate A ∩ B is

(a)  (b) 

(c)  (d) 

9. If U = {2, 3, 5, 6, 10}, A = {5, 6} the diagram which represents A' is

(a)  (b)  (c)  (d) 

10. If A and B are two sets if n(A) = 11 n(B) = 7 and n (A ∩ B) = 3 then n(A ∩ B) is
    (a) 21 (b) 15 (c) 8 (d) 10

II. Answer the following questions

1. If A = {1, 2, 3, 4} and B = {3, 4, 5} then what is the value of A – B?
2. If U = {0, 1, 2, 3, 5} and A = {0, 2, 5} then the value of A' is?
3. If n(A) = 4, n (B) = 5 and n(A∩B) = 2 then the value of n(A∪B) is ?
4. Write the distributive property and union over intersection of sets. For the sets A, B and C.

Two Marks Questions

1. Given P = {a, b, c, d, e}, Q = {a, e, i, o, u} R = {a, c, e, g} verify associative property on intersection of sets.
2. If U = {4, 8, 12, 16, 20, 24, 28}, A = {8, 16, 24} and B = {4, 16, 20, 28} verify (A ∪ B)' = A' ∩ B'.
3. Draw venn diagram to illustrate A/B ≠ B/A.
4. Verify the data by each drawing venn diagram if n(A) = 37, n(B) = 26 and n(A ∪ B) = 51. Find n(A ∩ B).
5. In a class 70% students passed in Mathematic 60% passed in science and 28% failed find the percentage of passes.

Three Marks Question

1. If A = {–3, –1, 0, 4, 6, 8, 10}, B = {–1, –2, 3, 4, 5, 6} and C = {–6, –4, –2, 2, 4, 6} show that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.
2. If A = {1, 2, 3}, B = {2, 3, 4, 5}, C = {2, 4, 5, 6} are the sub set of U = {1, 2, 3, 4, 5, 7, 9, 11, 13, 15} verify De-morgan's law i.e., (1) $(A \cup B)' = A' \cap B'$ (2) $(A \cap B)' = A' \cup B'$
3. In a class of 50 students offer Mathematics 42 offered Biology and 24 offered both the subject. Find the number of students who offer

   (1) Mathematics only (b) Biology only (3) Find the total number of students.

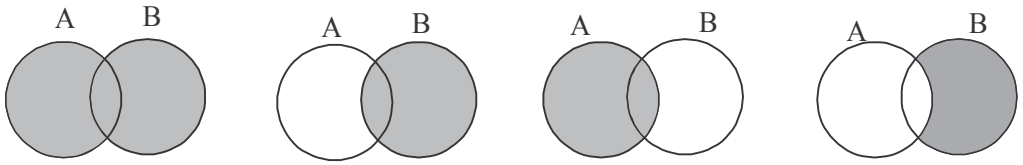
CARD - 3

1. If A = {a, b, c} and B = {b , c, e} then $n(A \cap B)$ in

   (a) 4 (b) 3 (c) 7 (d) 2
2. If U = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {x : x is multiple of 3 less than 10} then A can be listed as.

   (a) {0, 1, 2, 3, 4} (b) {0, 3, 6, 9} (c) {6, 9} (d) {0, 6, 9}
3. If A and B are line sets such that n(A) = 27 and n(B) = 35 and $n(A \cup B) = 50$ then $n(A \cap B)$ is

   (a) 12 (b) 2 (c) 22 (d) 15
4. The Venn diagram to illustrate $A' \cap B$ is



5. If A = {1, 2, 3, 4}, B = {3, 4, 5, 6} and C = {6, 7} then $A \cap B$ is

   (a) {1, 2, 3, 4, 5, 6} (b) {3, 4} (c) {1, 3, 5, 7} (d) {6}
6. Out of 40 players 30 play cricket 20 play both cricket and foot ball hockey play foot ball only is represent as

   (a) 40-30 (b) 50-40 (c) 40-20 (d) 30-20
7. If U = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {0, 1, 2, 3} and B = {7, 8, 9} then B' – A is

   (a) {4, 5, 6} (b) {0, 1, 2, 3} (c) {7, 8, 9} (d) ϕ
8. If A = {1 2 3 4 5} B = {4 5 6 7 8} C = {22, 23, 24, 25, 26} than $A \cup (B \cap C)$

   (a) {1 2 3 4 5} (b) {4 5 6 22 23} (c) {1 2 5 24 25 26} (d) {1 2 3 4 5 6 7 8}
9. In the sets A and B if A – B = A then $A \cap B$ is

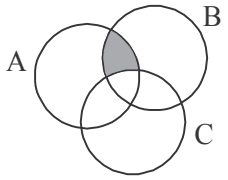
   (a) A (b) B (c) U (d) ϕ

10. In a class of 60 students 22 play volley ball, 12 of them play both volley ball and kho kho 17 of them do not take part in any of the games the number of students who play only kho-kho is

    (a) 32 (b) 28 (c) 33 (d) 21

II. Answer the following question.

1. Write the distributive property of union over intersection of sets.
2. What does the given venn diagram's shaded port refers to



3. If the set A = $\{x \in N, \leq x \leq 4\}$ and B = {3, 4, 5} then what in the value of A – B.
4. If $(A \cup B)' = \{2, 4, 6\}$ then what is the value of $A' \cap B'$
5. If A is a sub set of U then A – A' = ?

Two Marks Questions

1. If k = {3, 5, 7, 9}, L = {5, 8, 9} and M = {1, 2, 3, 9} find $K \cup (L \cap M)$
2. Using Venn diagram show that $(A \cap B) \cup (A/B) = A$
3. If A = {2, 4, 6, 8}, B = {1, 2, 3, 4} and C = {4, 5, 6, 7} verify by venn diagram (1) $(A \cap B) \cap C = A \cap (B \cap C)$
4. There are 50 students in a class 29 of them are members of science club. 11 of them are the members of both science and mathematics club. Find the number of students who are the members of maths club. Represent by Venn diagram.
5. In shopping mall 36 employee are wearing tie and 25 employee are wearing caps, if there are 55 employee in all, find the number of employee who are wearing tie as well are cap if 5 employee are wearing neither cap nor tie.

Three marks questions.

1. If U = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9} and A = {1, 3, 5, 7, 9} and B = {0, 2, 4, 6, 8} prove that (1) $(A \cup B)' = A' \cap B'$ (2) $(A \cap B)' = A' \cup B'$
2. In a medical examination in of 150 people it was found that 90 have eye problem, 50 had heart problem and 30 have both the complaint. What percentage of the people had either eye trouble or heart trouble.
3. In a village out of 120 farmers, 93 farmers have grown vegetables, 63 have grown flowers, 45 have grown sugar cane, 45 farmers have grown vegetables and flowers 24 farmers have grown flowers and sugar cane, 27 farmers have grown vegetable and sugar cane find how many farmers have grown vegetable, flowers and sugar cane.

Chapter -3
Progressions
CARD - 1

Below Average (One Mark and MCQ's)

1. Write the formula to find the n^{th} term of A.P?
2. Write the formula to find the n^{th} form of G.P?
3. Write the formula to find the n^{th} term of H.P?
4. Write the formula to find the sum of the n^{th} terms of A.P?
5. Write the formula to find the sum of the n^{th} terms of A.P when given the last term?
6. Write the formula to find the sum of n^{th} terms of GP, when $r > 1$?
7. Write the formula to find the sum of the n^{th} terms of GP, when $r < 1$?
8. Write the formula to find the A.M.
9. Write the formula to find the G.M.
10. Write the formula to find the H.M.
11. Write the Relation between AM, GM, HM.
12. Which one of the following is correct?

    (a) $A \le G \le H$ (b) $A \le G \ge H$ (c) $A \ge G \ge H$ (d) $A \ge G \le H$
13. 3, 8, 13 ..... the next two terms of sequence

    (a) 18, 23 (b) 15, 18 (c) 16, 21 (d) 17, 22
14. 2, 5, 8 ..... 10^{th} term of the sequence

    (a) 27 (b) 26 (c) 29 (d) 30
15. $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \ldots\ldots\ldots\ldots$ 10^{th} term of GP.

    (a) 1024 (b) 2048 (c) 2408 (d) 1028
16. 3, 6, 12 ..... 12^{th} term of GP.

    (a) $\frac{1}{15}$ (b) $\frac{1}{20}$ (c) $\frac{1}{30}$ (d) $\frac{1}{40}$
17. 8, 12 are in AP, then AM is?

    (a) 10 (b) 9 (c) 11 (d) 13
18. 16, 4 are in G.P then GM is?

    (a) 7 (b) 8 (c) 9 (d) 10

19. 2, 8, are in H.P then HM is?

(a) 1.2 (b) 3.2 (c) 4.2 (d) 5.2

20. Which of the following is true?

(a) $H = \sqrt{GA}$ (b) $G = \sqrt{AG}$ (c) $A = \sqrt{GH}$ (d) $G = \sqrt{GH}$

21. $\sum_{1}^{n} n =$ .....

(a) $\frac{n(n-1)}{2}$ (b) $\frac{n(n+1)}{2}$ (c) $\frac{(n+1)(n-1)}{2}$ (d) $\frac{n+1}{2}$

22. $\sum_{1}^{25} 25 =$ .....

(a) 225 (b) 425 (c) 325 (d) 525

23. $T_n = n^2 + 1$, 8^{th} term is .....

(a) 65 (b) 68 (c) 75 (d) 85

24. In GP, r = 2 the formula for sum of the n^{th} terms is

(a) $S_n = \frac{a(1-r^n)}{1-r}$ (b) $S_n = \frac{a(r^n-1)}{r-1}$

(c) $S_n = \frac{a(r^n+1)}{r+1}$ (d) $S_n = \frac{a(1+r^n)}{1+r}$

25. $S_\infty =$ .....

(a) $\frac{a}{1+r}$ (b) $\frac{a}{(r+1)r}$ (c) $\frac{a}{1-r}$ (d) $\frac{a}{r+2}$

Below Average (2 Marks)

26. In AP, a = 3 and d = 4. To find the sequence?

27. n^{th} term is 2n + 3, write the first three terms.

28. $T_n = 2n^2 + 5$, then to find the (i) T_3 (ii) T_{10}

29. 1 + 2 + 3 + ... in then series, to find the sum of first 20 terms.

30. $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}$..... are in HP the find out the T_n and T_{10}.

31. In G.P $a = 4$ and r = 2. Write the first 3 terms.

32. In G.P 3, 6, 12 ..... to find the T_5 and T_8?
33. Find AM between 7 and 13.
34. Find the GM between 4 and 16.
35. Find the HM between 1 and 9.

Three and Four Marks

36. In an A.P 8^{th} term is 17 and 19^{th} term is 39 then find the 25^{th} term.
37. Ramesh wants to buy a cell phone. He can buy it by paying ₹ 15,000 cash or by making 12 monthly installments as ₹ 1800 in the 1st month, ₹ 1750 in 2^{nd} month, ₹ 1700 in 3^{rd} month and so on. If he pays the money in installments. Find (i) Total amount paid in 12 months.

    (ii) How much extra he has pay over and above the cost price.
38. 5 + 10 + 15 + ... + 200. Find the sum of series.
39. In a GP third term is 13 and 6th term is 96. Find the sum of the 9 terms?
40. The sum of the how many terms is 1365 for 1 + 4 + 16 + ...

CARD - 2

One Marks and MCQ's

1. 8, x , 12 are in AP then x is

    (a) 8 (b) 12 (c) 10 (d) 14
2. In an A.P. If the sum of first 11 terms is 132 then the 11^{th} term is

    (a) 10 (b) 12 (c) 14 (d) 16
3. Rashmi puts 2 marbles in I^{st} box, 5 in second box 8 in third box and so on. The total number of marbles put in 10 boxes.

    (a) 150 (b) 145 (c) 155 (d) 140
4. If $2x + 1$, $4x$, $13 - x$ are in A.P them the value of x is

    (a) 7 (b) 8 (c) 10 (d) 12
5. If $(x + 1)$, $(x - 1)$ $(x + 1)$ are in GP, then the value of 'x' is

    (a) 6 (b) 8 (c) 10 (d) 2
6. $\frac{1}{7}, \frac{1}{4}, 1$..... are in HP, then T_{10} = ...

    (a) –10 (b) –20 (c) –30 (d) –40
7. If 5^{th} term of GP is 64, r = 2 then find the 12^{th} term of GP.

    (a) 7152 (b) 6152 (c) 8152 (d) 9152

8. $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$..... are in GP then the common ratio (r) is

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

9. If a = 1 and r = $\frac{1}{2}$ then T_4 =

   (a) $\frac{1}{16}$ (b) $\frac{1}{8}$ (c) $\frac{1}{4}$ (d) $\frac{1}{2}$

10. In AP 8th term is 17, 19th term is 39, then the common difference (d) is

    (a) 4 (b) 6 (c) 8 (d) 2

11. In AP, a = 12, d = 4, T_n = 76. Find 'n'?
12. In AP d = –2, T_{22} = –39 then find 'a'?
13. In AP a= 13, T_{15} = 55 then find d?
14. Find the sum of the 15 terms of AP 5, 8, 11, 14.....
15. $T_n = 5n - 2$ then find S_4?
16. In HP, $T_5 = \frac{1}{12}$ and $T_{11} = \frac{1}{15}$ then find 'd' in AP.
17. $\sqrt{3}, 3, 3\sqrt{3}$ ..... are an GP then find the common ratio?
18. $(a + b)^2$, $x(a - b)^2$ are in AP, then find the value of x?
19. $\sqrt{2}, x, \frac{1}{\sqrt{2}}$ are in GP then find the value of x?
20. Find the sum of infinite terms of $2 + \frac{2}{3} + \frac{2}{9} +$ .....

Two Marks Questions

21. In triangle, three angles are in AP, the smallest angles is 50° then find the remaining angles.
22. In AP, the sum of the 4th term and 8th term is 24 and the sum of the 6th term and 10th term is 44. Find the first three numbers.
23. The ratio of 7th term and 3th term of AP is 12 : 5. Find the ratio of 13th term and 4th term.
24. Find sum of Natural numbers between 200 and 300 which are divisible by 6.
25. The sum and product of three numbers of GP is 21 and 216 then find the three numbers.

26. In H.P $T_5 = \frac{1}{12}$ and $T_{11} = \frac{1}{15}$ and T_{25} = ?

27. $T_5 : T_{10} = 32 : 1$ and $T_7 = \frac{1}{32}$ Write the sequence of GP.

28. Which term of the sequence 3, 6, 12 ..... is 1536.

29. $S_6 : S_3 = 126 : 1$ and $T_4 = 125$, write the sequence of GP.

30. In GP. The sum of the infinite terms in 8 and first term in 6, then write the geometric progression.

31. Prove that AM, HM are between two number a & b in GP.

32. Verify $A \geq G \geq H$ when a = 4 and b = 16.

33. The product of two numbers is 119 and its AM 12. Find the numbers.

Three or Four Marks

34. AM between two numbers is $\frac{13}{2}$ and its GM 6. Find HM.

35. a, H, b are in HP, then prove that $H = \frac{2ab}{a+b}$.

36. The sum of the six terms of AP is 345 and the difference between first term and last term is 55, find the numbers.

37. The sum of the second and third term is 22 and the product of first and 4th term is 85 of AP. Find the first four terms.

38. The sum of three numbers is GP is $\frac{39}{10}$, their product is 1. Find them.

CARD - 3

One Marks and MCQ's

1. The correct sequence is

   (a) 4, 11, 28, 26..... (b) 48, 32, 22, 10.....

   (c) 27, 19, 40, 70..... (d) 7, 21, 63, 189 .....

2. $\frac{2}{3}, \frac{3}{4}, \frac{4}{5}$ the next two terms of the sequence

   (a) $\frac{3}{4} \& \frac{5}{4}$ (b) $\frac{5}{6} \& \frac{6}{7}$ (c) $\frac{6}{7} \& \frac{7}{8}$ (d) $\frac{4}{5} \& \frac{5}{6}$

3. $T_n = n^2 + 1$ the find the S_3
   (a) 17 (b) 19 (c) 21 (d) 24
4. In AP $S_5 = 65$ and $S_4 = 42$ then T_5 is
   (a) 24 (b) 21 (c) 23 (d) 25
5. Which of following sequence are in HP
   (a) $\frac{1}{2}, \frac{1}{6}, \frac{1}{8}$..... (b) 6, 4, 3.....
   (c) $\frac{1}{3}, \frac{1}{6}, \frac{1}{12}$..... (d) $1, \frac{2}{3}, \frac{1}{2}, \frac{2}{5}$.....
6. 25 terms in AP. Middle term of the sequences is 20. Find the sum of the 25 terms.
7. 16 terms in AP, first and last term are 204 and 294. Find the sum of series.
8. $T_4 = \frac{1}{11}$ and $T_{14} = \frac{3}{23}$ are in HP, find the common difference of AP?
9. Half life period of an radioactive element is 1 hour. Mass of the radioactive elements is 600, After 3 hours the mass of the radioactive element is.
10. Find the sum of the infinite terms of series is $0.6 + 0.06 + 0.006 + \ldots\ldots\ldots \infty$

Above Average questions (2 Mark)

11. In an A.P 6^{th} term is 20 and 20^{th} term is 6. Find the 26^{th} term.
12. In an AP, if $T_5 : T_{10} = 1 : 2$ and $T_{12} = 36$. Find AP.
13. Rani scored 18 runs in first over. He scores 2 runs less than that in previous over and continuous to score like this for 8 over. Find the runs scored by him (a) in 8^{th} over (b) In first 6 overs.
14. In a GP, common ratio is 5. Find the ratio between the sum of the 1^{st} 3 terms to the first six terms.
15. The first and last terms of GP is $\frac{3}{2}$ and 96 respectively, if the r = 2 find the number of terms?
16. In a GP, 10^{th} term is 8 times the 13^{th} term if the first term is 3. Find the sum upto infinite terms.
17. The H.M between the numbers is 10, if the first number is double the other find the two numbers.
18. In an AP, 7 times the 7^{th} term, equal to 11 times the 11^{th} term then find the 18^{th} term.

19. A company employed 400 persons in the year 2001 and each year increased by 35 persons. In which year the number of employees in the company will be 785?
20. In an AP whose first term is 2, the sum of first five terms is one fourth the sum of the next five terms. Show that $T_{20} = -112$.
21. In a HP $T_4 = \frac{1}{11}$ and $T_{14} = \frac{3}{23}$ find T_7.
22. Find the GP in which the 2nd term is $\sqrt{6}$ and 6th term is $9\sqrt{6}$.

Above Average questions (Three and Four Mark)

23. In an AP, the sum of first 10 terms is 175 and the sum of next 10 terms is 475. Find the first term and common difference.
24. The angles of a quadrilateral are in AP. The ratio between the product of first and fourth to the product of 2nd and 3rd is 27 : 28. Find the angles of quadrilateral.
25. S_1, S_2, S_3 are the sum of first n, 2n, 3n term of AP respectively P.T $S_3 = 3(S_2 - S_1)$.
26. In an A.P of 12 terms sum of two middle term is 54 and the sum of last three terms is 135. Find the AP.
27. The 10th terms of an AP is 15 and 15th term is 10. Find the 25th term of AP.
28. In an AP the sum of first 10 terms is 25 and the sum of first 25 terms is 10. Find the sum of first 35 terms.
29. In an AP, first term is 22, nth term is –1 and the sum of first n terms is 66. Find the number of terms and common difference.
30. In an A.P 12th term is –13 and the sum of first four terms is 24. Find the sum of first 10 terms.
31. In a G.P the 5th term is 4 times the third term and the sum of first two terms is –4. Find G.P.
32. Find the G.P if the sum of first two terms is 2 and the sum of first four terms is 20.
33. In a GP the second term is less than the first by 2 and sum to infinite is 50. Find the first term and common ratio.
34. Let a, ar, ar^2, ar^3 are in G.P. The sum of first and 3rd is 15 and the sum of the other two is 30. Find them.
35. The sum of first four term of GP is 30 and the sum of the 1st and the last is 18, find the numbers.
36. *a, b, c* are in G.P and $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$, then P.T *x, y* and *z* are in AP.
37. In an AP. p^{th} term is 'q' and q^{th} term is p, then prove that n^{th} term is $(p + q - n)$.

* * * *

CHAPTER - 4

PERMUTATIONS & COMBINATIONS

ONE MARK QUESTIONS

Card - 1

1. The value of 0! is _____ .

(a) 0 (b) 1 (c) –1 (d) 2

2. The relation between ${}^nP_r$ & ${}^nC_r$ is _____.

(a) ${}^nP_r = {}^nC_r$ (b) ${}^nC_r = \frac{{}^nP_r}{\lfloor r}$ (c) ${}^nP_r = \frac{{}^nC_r}{\lfloor r}$ (d) ${}^nP_r - r! = {}^nC_r$

3. Value of ${}^nP_n$ is _____ .

(a) n ! (b) n (c) 0 (d) 1

4. The number of combinations of the letters of the word 'MILK' is _____ .

(a) 1 (b) 0 (c) 4 (d) 4!

5. The number of permutations of the letters of the word 'MATHS' is _____ .

(a) 4 (b) 0 (c) 1 (d) 120

6. If ${}^nP_2 = 56$ then n is equal to _____.

(a) 8 (b) 7 (c) 6 (d) 5

7. The value of ${}^8C_0$ is _____ .

(a) 8 (b) 0 (c) 1 (d) 8!

8. If ${}^5P_r = 60$ then the value of r is _____ .

(a) 2 (b) 3 (c) 5 (d) 60

9. ${}^nP_1 + {}^nP_r$ (b) n (c) 2 (d) n + 1

10. The value of $\lfloor 1 \quad \lfloor 0$.

(a) 0 (b) 2 (c) 1 (d) –1

1. What is the meaning of ${}^nP_r$.
2. What is the meaning of ${}^nC_r$.
3. State fundamental principle of counting.
4. Write the valued of ${}^nP_n$.
5. Express ${}^nC_r$ in terms of ${}^nP_r$.
6. Write the formula of ${}^nC_r$.

10th standard

TWO MARKS QUESTIONS

1. How many 3-digit numbers can be formed using the digits 1, 2, 3, 4, 5 without repeatition.
2. Find the value of ${}^{4}P_{3}$ using formula.
3. If ${}^{n}P_{2} = 90$ find 'n'.
4. Find the value of ${}^{5}P_{2} - {}^{4}P_{0} + {}^{3}P_{1}$.
5. If ${}^{n}P_{n} = 5040$ find n.
6. If ${}^{n}C_{2} = 10$ find n.
7. How many diagonal can be drawn in a pextagon.
8. In how many ways can 5 sportsmen be selected from a group of 10?
9. 4 friends shake hands mutually. Find the number of hand shakes.
10. Find r if ${}^{11}P_{r} = 990$.
11. How many (a) 3-digit (b) 2-digit numbers can be formed using 1, 2, 3, 5 with out repeatition? How many of them are even?

THREE MARKS QUESTIONS

1. There are 10 points such that any 3 points of them are non collinear. How many (a) straight lines (b) Triangles (c) Quadrilateral can be formed by joining these points.
2. A committee of 6 is to be formed from 8 boys and 5 girls.In how many ways can be done so that the committee contains at least 3 girls?

Question Paper

ONE MARK QUESTIONS

Card - 2

1. **If $\lfloor n = 120$ then the value of n is _____ .**
   (a) 4 (b) 6 (c) 5 (d) 8
2. **The formula for ${}^nC_r$ is _____.**
   (a) $\frac{\lfloor n}{\lfloor n\ r}$ (b) $\frac{\lfloor n}{\lfloor n\ r} \cdot \lfloor r$ (c) $\frac{\lfloor n}{\lfloor n\ r . \lfloor r}$ (d) $\frac{\lfloor n}{\lfloor n\ r . \lfloor r}$
3. **Value of $\lfloor 5\ \ \lfloor 3$ is _____ .**
   (a) 10 (b) 126 (c) 30 (d) 60
4. **Number of triangles can be formed by using 10 non collinear points _____ .**
   (a) 100 (b) 110 (c) 120 (d) 140
5. **The value of ${}^8C_3 + {}^7C_3 - {}^8C_5 - {}^7C_4$ is _____ .**
   (a) 0 (b) 112 (c) 35 (d) 70
6. **If ${}^5P_r = 5!$ then the value of r is _____.**
   (a) 1 (b) 5 (c) 0 (d) 10
7. **The value of ${}^{20}C_{18}$ is _____ .**
   (a) 360 (b) 300 (c) 180 (d) 190
8. **There are 8 girls in a classroom. Sheela is one of them. Number of committees that can be formed of 5 including sheela is _____ .**
   (a) 35 (b) 30 (c) 42 (d) 40

1. Express ${}^nP_r$ is factorial notation.
2. Evaluate ${}^{12}P_4$ using formula.
3. Find the total number of 2-digit numbers.

TWO MARKS QUESTIONS

1. If ${}^nC_8 = {}^nC_{12}$ find the value of n.
2. If ${}^nP_r = 3024$ and ${}^nC_r = 126$ find n and r.
3. If $(n + 1)! = 12\ (n - 1)!$ find n.
4. In how many ways can 7 different books be arranged in a shelf so that 3 particular books are always together?
5. How many 3 digit numbers can be formed using the digits 2, 3, 4, 5 and 6 without repetition? How many of these are even numbers?

6. If ${}^nP_4 = 20\ {}^nP_2$ find the value of 'n'.
7. Show that ${}^{10}P_3 = {}^9P_3 + 3.\ {}^9P_2$
8. How many permutations of all the letters of the word 'CHEMISTRY' begin with m?
9. Verify the formula ${}^nC_r = {}^nC_{n-r}$ for the values of n = 5 and r = 3.
10. Find ${}^nP_n = 5040$ find n.
11. If the number of diagonals in a polygen is 20 then find the number of sides in the polygon.

THREE MARKS QUESTIONS

1. A school has 8 teachers one of whom is the Head master (a) How many committees of five can be formed? (b) How many of these has the head master?
2. A box has 5 red and 4 blue marbles (a) In how many ways 4 marbles can be drawn?
   (b) In how many ways can 4 marbles be drawn so as to contain 2 red marbles?
3. A committeee of 5 is to be formed out of 6 men and 4 ladies. In how many ways can this be done where
   (a) at least 2 ladies are included
   (b) at most 2 ladies are included.
4. If $\frac{1}{8!}\ \frac{1}{9!}\ \frac{x}{10!}$ find x.

Question Paper

ONE MARK QUESTIONS

Card - 3

1. **The value of ${}^nC_0 - {}^nC_n$ is equal to _____ .**
   (a) n (b) $\lfloor n$ (c) –1 (d) 0
2. **If ${}^nP_5 = {}^nP_4$ then n is equal to _____.**
   (a) 5 (b) 4 (c) 10 (d) 1
3. **If ${}^5P_r = 5!$ then the value of r is _____ .**
   (a) 1 (b) 5 (c) 0 (d) 10
4. **The number of ways we can arrange two books among 4 different in a shelf so that they are always together is .**
   (a) ${}^7P_2$ (b) ${}^3P_3 \times {}^2P_2$ (c) ${}^4C_2$ (d) ${}^3C_3 \times {}^2C_2$
5. **The number of 2 digit even numbers that can be formed using the digits 1, 2,3, 4, 5 without repetitions is _____ .**
   (a) 8 (b) 5! (c) 64 (d) 16
6. **There are 4 men and 3 women in a group. The number of ways to form a committee of 2 men & 1 women is given by _____ .**
   (a) ${}^4P_2 \times {}^3P_1$ (b) ${}^4P_2 \times {}^3C_1$ (c) ${}^4C_2 \times {}^3C_1$ (d) ${}^4C_2 \times {}^3P_1$
7. **If ${}^nC_r = 10$ and ${}^nP_r = 20$ than the value of r is _____ .**
   (a) 200 (b) 30 (c) 10 (d) 2
8. **The correct relation is _____ .**
   (a) ${}^nP_r = {}^nC_r \times \lfloor r$ (b) ${}^nC_r = {}^nP_r \times \lfloor r$ (c) ${}^nP_r = {}^nC_r \div \lfloor r$ (d) ${}^nC_r = {}^nP_r + \lfloor r$
9. **${}^nC_3 = {}^nC_8$ then the value of ${}^nC_1 =$ _____ .**
   (a) 3 (b) 11 (c) 24 (d) 336
10. **A boy has 4 shirts 3 pants and 2 caps. The different ways of wearing these items is _____.**
    (a) 9 (b) 24 (c) 6 (d) 5

TWO MARKS QUESTIONS

1. A polygon has 44 diagonals. Find the number of sides.
2. Verify that ${}^8C_4 + {}^8C_5 = {}^9C_4$
3. Prove that $\frac{{}^nC_r}{{}^{n-1}C_{r-1}} = \frac{n}{r}$ when $1 \le r \le n$
4. Out of 7 consonants and 4 vowels, how many words of 3 consantants and 2 vowels can be formed.

5. Find n if ${}^{n}P_{3} = 210$
6. If ${}^{2n+1}P_{n-1} : {}^{2n-1}P_{n} = 3:5$ find n
7. Calculate the number of rectangles in a chess board.
8. How many numbers can be formed to lie between 4000 and 8000 using 0,1,2,3,4,5,6,7,8,9, with out repetition of the digit in a numbers?

THREE MARKS QUESTIONS

1. Form a group of 12 students 8 are to be chosen for an excursion there are 3 students who decide that either of them will join or none of them will join. In how many ways can the 8 be chosen?
2. A sports team of 11 students is to be constiheted choosing at least 5 from class IX and at least 5 from class X. If these are 8 students in each of these classes. In how many ways can the team be constituted?
3. There are 16 cricket players of whow 4 are batsman, 5 are bowlers and 2 wicket keepers the rest are all rounders. In how many ways a team of eleven can be selected so as to contain 3 batsme, 4 bowlers, one wicket keepers and 3 allrounders.
4. How many words can be made from the letters in the word LASER assuming that no letter is repeated if such that.
    1. All letters are used at a time.
    2. 3 letters are used at a time.
    3. All letters are used such that it should beign with letter R.

*****

1

PROBABILITY

CARD - 1

I. 1. The probability of getting a perfect square number from the numbers 1 to 10 is.....

(a) $\frac{3}{10}$ (b) $\frac{1}{2}$ (c) $\frac{2}{5}$ (d) $\frac{1}{5}$

2. The probability of an impossible event is

(a) 1 (b) –1 (c) 2 (d) 0

3. A dice is thrown once. The probability of getting a prime number is

(a) $\frac{2}{3}$ (b) $\frac{1}{2}$ (c) $\frac{5}{6}$ (d) $\frac{1}{6}$

4. The probability of picking a non defective item from a sample is $\frac{7}{12}$ the probability of picking a defective item is

(a) $\frac{7}{12}$ (b) $\frac{5}{12}$ (c) $\frac{12}{12}$ (d) $\frac{5}{7}$

II.

1. Write the sample space when a coin is tossed.
2. Write the sample space when a coin is tossed twice.

Two and Three Marks question

1. Write the given events as subsets of S

   S = {2, 3, 4, 5, 6}

   A = The number is a prime number

   B = The number is even

   C = The number is multiple of 3

   D = The number is a perfect square.
2. Give one example for each

   1. Mutually exclusive event (2) Complementary events
3. A coin is tossed repeatedly twice. Find probability of

   A = The faces shown up are identical

   B = Head appears only once

   C = Tail appears at least once

   D = Getting tail both times.

4. An unbiased coin is tossed 50 times with the following frequencies head = 15, tail = 35 compute the probability for each event (1) P(H) (2) P(T).
5. A dice is rolled. Find the probability of getting (a) the number 5 (b) a number greater than 2.
6. Nine rotten mangoes are mixed with 30 good ones one mango is chosen at random what is the probability of choosing a (1) good mango (2) rotten mango.
7. A child has a block in the shape of a cube with one letter written on each face as shown below :

A	B	C	D	E	A

The cube is thrown once. What is the probability of getting (1) A (2) E (3) D

CARD - 2

1. In a single throw of a dice the probability of getting a non multiple of 3 is .....

(a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{6}$

2. A pair of dice is tossed once the probability of getting a doublet is

(a) $\frac{1}{6}$ (b) $\frac{5}{36}$ (c) $\frac{5}{6}$ (d) $\frac{1}{2}$

3. A box contains 3 red and 5 black balls 4 balls are picked randomly the probability of 2 red balls is

(a) $\frac{3}{7}$ (b) $\frac{4}{7}$ (c) $\frac{5}{7}$ (d) $\frac{2}{7}$

Explain the following

1. Random experiment
2. Trial
3. Sample space
4. Event
5. Impossible experiment
6. Sure event.

Two and Three Marks

1. Write the given events as subset of S

S = {(a, b) / a , b = 1, 2, 3, 4, 5, 6}

A = The sum of numbers is 10

B = The product of numbers is 6

C = The number are multiple of 3

2. In tossing a fair coin twice find the probability of getting (i) Two heads (ii) Atleast one head (iii) No head (iv) Exactly one tail
3. Two unbiased dice are rolled once what is the probability of getting (i) a doublet (ii) a sum equal to 7.
4. A box has two coins - a gold coin and a silver coin A coil is drawn twice repeatedly. If the coin drawn first is put back into the box before the second draw. Find the probability of getting

   (a) A = The gold coin both times

   (b) B = The silver coin each time

   (c) C = The coins drawn are different.
5. A Letter is chosen at random from the letters of the word MATHEMATICIAN. Find the probability that the chosen letter is M or A.
6. Cards marked with the numbers 2 to 101 are placed in a box and mixed thoroughly. One card is drawn from this box. Find the probability that the number on the card is

   (a) an even number (b) a number less then 14 (c) a number which is a perfect square.

CARD - 3

1. If A and B are mutually exclusive events such that $p(A) = \frac{3}{5}$ and $p(B) = \frac{2}{7}$ then $P(A \cup B)$ is

   (a) $\frac{7}{12}$ (b) $\frac{1}{2}$ (c) $\frac{5}{35}$ (d) $\frac{31}{35}$
2. One ticket is drawn at a random from a bag containing tickets numbered 1 to 40. The probability that the selected tickets has a number which is multiple of 5 is

   (a) $\frac{1}{5}$ (b) $\frac{1}{8}$ (c) $\frac{13}{40}$ (d) $\frac{3}{6}$
3. An unbiased die is thrown, what is the probability of getting an even number

   (a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $\frac{1}{6}$
4. Two unbiased coins are tossed simultaneously the probability of getting two heads

   (a) $\frac{1}{2}$ (b) $\frac{3}{4}$ (c) $\frac{1}{4}$ (d) 1

5. Three unbiased coin are tossed together the probability of getting one head

   (a) $\frac{1}{8}$ (b) $\frac{3}{8}$ (c) $\frac{4}{8}$ (d) $\frac{2}{8}$

6. The probability that a leap year selector at random will contain 53 sundays

   (a) $\frac{2}{7}$ (b) $\frac{1}{7}$ (c) $\frac{3}{7}$ (d) $\frac{4}{7}$

Two or Three Mark question

1. A coin is tossed repeatedly thrice. Write the following events as subset of the sample.

   (a) Two heads occur consequently (b) Two heads occur

   (c) The same face does not appear consequently

   (d) at least one tail

2. What is the probability that a leap year selected will contain 53 Sundays.
3. A bag certains 6 red balls and some blue balls of the probability of drawing a blue ball is twice that of drawing a red ball then find the number of blue balls in the bag.
4. A two digit number is formed with the digits 2, 5 and 7 where repetation of digits is not allowed. find the probability that the number so former (i) Square number (ii) Divisible by 3 (iii) less than 57
5. One number card is chosen randomly from the number cards 1 to 25. Find the probability that it is divisible by 3 or 11.
6. A commitee of five persons is selected from 4 men and 3 women. What is the probability that the committee will have

   (i) one men (ii) two women (iii) at least two men

7. Sri Raksh is one among 7 badminton players. What is the probability that a team of 5 players is formed.

   (a) with Sriraksha as a player

   (b) Without Sriraksha in that team.

* * * *

Chapter - 6
STATISTICS
CARD - 1

Stage - I

1. Formula used to calculate the mean for ungrouped data is .....
2. Formula used to calculate the mean for grouped data is .....
3. Formula used to calculate the variance for ungrouped data is .....
4. Formula used to calculate the variance for grouped data is .....
5. The square root of variance is .....
6. If the variance of given scores of ungrouped data is 81, then the value of standard deviation is .....
7. If the value of standard deviation of given scores is 0.02 then the variance of the same is .....
8. Formula used to calculate the coefficient of variation is .....
9. If the coefficient of variations of two cricket players A and B are 1.8 and 0.7 respectively, then the player ..... is a more consistent one.
10. While constructing a pie chart, to calculate the central angle, quotient of magnitude of each component to the sum of all the components, should be multiplied by .....

Two or Three Mark Questions

II.

11. The number of salpings planted by 8 students during the year are 2, 6, 12, 5, 9, 10, 7, 4. Calculate the standard deviation for the data.
12. Calculate the standard deviation for the following data

C.I	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
f	7	10	15	8	10

13. The following table shows how 36 students usually come to school:

Walk	Bicycle	Bus	Car	School Van
12	8	3	4	9

Draw a pie chart

14. Average and standard deviation of scores Arun and Bharath are given below. Find the C.V of them.

Player	Average ($\bar{x}$)	Standard deviation (σ)
Arun	70	4.2
Bharath	60	3.0

CARD - 2

1. The mean of squared deviation is called
   (a) Mode (b) Median (c) Variance (d) S.D
2. Formula used to calculate S.D for grouped data is
   (a) $\sqrt{\frac{N}{\Sigma fD^2}}$ (b) $\sqrt{\frac{\Sigma fD^2}{N}}$ (c) $\sqrt{\frac{\Sigma D^2}{N}}$ (d) $\sqrt{\frac{N}{\Sigma D^2}}$
3. The mean of 6, 7, 10, 11 and 16 is .....
   (a) 52 (b) 5 (c) 10 (d) 17
4. The mean of first five even natural number is .....
   (a) 6 (b) 16 (c) 30 (d) 45
5. If $\Sigma x = 150$, and N = 10 then A.M is .....
   (a) 15.5 (b) 20 (c) 15 (d) 12
6. Formula used to calculate the S.D by assumed mean method is
   (a) $\sqrt{\frac{\Sigma D^2}{N} - \left(\frac{\Sigma D}{N}\right)^2}$ (b) $\sqrt{\frac{\Sigma D}{N} - \frac{\Sigma D^2}{N}}$
   (c) $\sqrt{\left(\frac{\Sigma D}{N}\right)^2 - \frac{\Sigma D^2}{N}}$ (d) $\sqrt{\frac{(\Sigma D)^2}{N} - \frac{\Sigma D}{N}}$
7. If $\Sigma \bar{x} = 300$, N = 10 then $\bar{x}$ = ...
   (a) 30 (b) 3000 (c) 300 (d) 30,000
8. If the variance of a collection of data is 16 then S.D is .....
   (a) 4 (b) 4.5 (c) 32 (d) 256
9. The C.V of 4 food grains, namely rice, Wheat, Jowar and Ragi are 9.2, 9.9, 9.8 and 9.0 respectively, then which food grain rate is more consistent?
   (a) Rice (b) Ragi (c) Jowar (d)
10. If $\bar{x} = 20$, and C.V = 0.1 then S.D is .....
    (a) 2 (b) 0.2 (c) 20 (d) 0.02

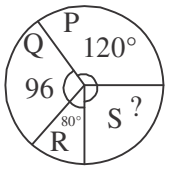
II. One Mark questions.

11. Write the relationship between C.V, $\bar{x}$ and σ.
12. If the mean of 2, 8, x, 12 is 8 then find x.
13. If the mean of a collection of data is ten times that of S.D., then find the C.V.

14. Write the formula used to calculated by step deviation method.
15. What is dispersion?
16. What is a pie - chart?
17. State any one application of a pie chart.

III. Two or Three marks questions.

1. The coefficient of variations of two series are 58 and 69. Their standard deviations are 21.2 and 51.6. What are their arithmetic means?
2. A pie chart representing the population of four cities is shown below. Read the pie chart and find the population of city.



3. Calculate the standard deviation of the following data by assumed mean method.
   x : 2, 4, 6, 8, 10, 12, 14, 16
4. If the coefficient of variation of a collection of data is 45 and the standard deviation is 2.5, then. Find the mean.

CARD - 3

1. The value of standard deviation of 5, 5, 5, 5 and 5 is
   (a) 5 (b) 1 (c) 0 (d) 25
2. The average of 5 items was 8. It was later found that an item 13 was mis-read as 18. Find the correct mean.
   (a) 6 (b) 7 (c) 8 (d) 9
3. For two or more series with equal S.D which series will be more consistent?
   (a) A series with lesser mean (b) A series with greater mean
   (c) A series whose mean is equal to its S.D
   (d) Can not be predicted.
4. The average of the square of the deviation of each data item from the mean is
   (a) S.D (b) Q.D (c) M.D (d) Variance
5. While we calculating S.D of ungrouped data, the sum of deviation of each data item from the mean is equal to .....
   (a) 0 (b) 1 (c) –2x (d) Can not be predicted

II. One Mark questions

6. The mean of x, $x + 3$, $x + 6$, $x + 9$ and $x + 12$ is 10. Find the value of x.

7. Which is the median of the first 10 prime numbers?
8. What is the average the first n natural number?
9. When to use the direct method of calculating σ?
10. Who was the first to use the term 'standard deviation?

III. Two or Three Marks Questions:

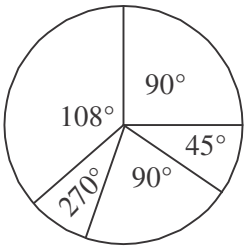
11. The performance of a student in 3 subject is given. In which subject his performance is most consistent?

Subject	Physics	Maths	Chemistry
Mean	15	30	25
S.D	2.7	5.7	3.7

12. Find the difference between variance and S.D in the following data.

C.I	4-8	8-12	12-16	16-20
f	3	6	4	7

13. A group of people were interviewed and asked which T.V channel they like the most. The results are shown in the pie chart. Answer the following questions.



(i) What fraction of the people who were interviewed watch
   (a) Channel 3
   (b) Channel 5
   (c) Channel 1
   (d) Channel 2
   (e) Channel 9

(ii) If therewere 200 people, how many viewed each of the channels.

14. Find the S.D for the following data:

x	10	12	17	21	26
f	2	4	8	5	1

* * * *

Chapter -7
SURDS

I. Multiple choice questions.

1. The order of $\sqrt{3}$ is

   (a) 1 (b) 2 (c) 3 (d) 4

2. The radicand of $2\sqrt{5}$ is

   (a) 5 (b) 4 (c) 3 (d) 2

3. Binomial surd among the following is

   (a) $\sqrt{2}+\sqrt{3}$ (b) $\sqrt{2}\times\sqrt{3}$ (c) $\sqrt{2}\div\sqrt{3}$ (d) None of them

4. The product of $\sqrt{5}\times\sqrt{3}$ is

   (a) $\sqrt{8}$ (b) $\sqrt{2}$ (c) $\sqrt{15}$ (d) $\sqrt{151}$

5. Rationalising factor of $\sqrt{xy}$ is

   (a) $\sqrt{x}$ (b) $\sqrt{y}$ (c) $\sqrt{x+y}$ (d) $\sqrt{xy}$

II. One Mark questions.

1. Simplify $3\sqrt{2}+5\sqrt{2}$
2. Write the rationalising factor of $\sqrt{a}+\sqrt{b}$
3. Simplify by rationalising the denominator $\frac{8}{\sqrt{3}}$.
4. What is the simplified form of $\sqrt{75}$
5. Write the index form of $\sqrt[3]{7}$
6. Write the orders of the following surds

   (i) $\sqrt{41}$ (ii) $2\sqrt[3]{4}$ (iii) $\sqrt[x]{y}$ (iv) $\sqrt[5]{\frac{2}{3}}$

7. Write the radicards of the following

   (i) $x\sqrt{y}$ (ii) $\sqrt{p+q}$ (iii) $\frac{2}{3}\sqrt{5}$

8. Write the index form of the following surds

   (i) $\sqrt{2}$ (ii) $5\sqrt{p+q}$ (iii) $3\sqrt[3]{4}$

9. Simplify

(i) $\sqrt{3} \times \sqrt{7}$ (ii) $\sqrt{6} \times \sqrt{5}$ (iii) $\sqrt[6]{2} \times \sqrt[6]{5}$

10. Write the rationalising factor of the following

(i) $3\sqrt{p} - 2\sqrt{q}$ (ii) $\sqrt{5} + \sqrt{3}$ (iii) $x\sqrt{a} + y\sqrt{b}$

III. Two Marks questions

1. Find the value of $\sqrt{2} + 3\sqrt{2} + 5\sqrt{2}$
2. Simplify $\sqrt{45} - 3\sqrt{20} + 3\sqrt{5}$
3. Find the sum of $5\sqrt[3]{P}$, $3\sqrt[3]{P}$, $2\sqrt[3]{P}$.
4. Find the product of $\sqrt{2}$ and $\sqrt[3]{3}$.
5. Multiply $(\sqrt{6} + \sqrt{2})$ by $(\sqrt{6} + \sqrt{2})$.
6. Multiply $(\sqrt{6} - \sqrt{2})$ by $(\sqrt{6} - \sqrt{2})$.
7. Multiply $(\sqrt{6} + \sqrt{2})$ by $(\sqrt{6} - \sqrt{2})$.
8. Rationalise the denominator and simplify $\sqrt{\frac{3}{5}}$.
9. Rationalise the denominator and simplify $\frac{2}{\sqrt{3} + \sqrt{2}}$.
10. Find the sum of $(\sqrt{3} + \sqrt{2}), (2\sqrt{2} + 3\sqrt{3})(4\sqrt{2} - 3\sqrt{3})$.

I. Multiple choice questions.

1. The order of $2x\sqrt{3}$ is

(a) 2 (b) 3 (c) 2x (d) 3x

2. The radicand of $2\sqrt{3x^2}$ is

(a) 2 (b) 3 (c) 3x (d) $3x^2$

3. Binomial surd among the following is

(a) $6\sqrt{x} - 5\sqrt{y}$ (b) $6\sqrt{x} \times 5\sqrt{y}$

(c) $6\sqrt{xy}$ (d) $5\sqrt{x + y}$

4. The value of $\sqrt{2} + 3\sqrt{2} + 5\sqrt{2}$ is

(a) $\sqrt{2}$ (b) $9\sqrt{2}$ (c) $3\sqrt{2}$ (d) $5\sqrt{2}$

5. $2\sqrt[3]{7} \times 3\sqrt[3]{4}$, the product is

   (a) $6\sqrt[3]{7}$ (b) $3\sqrt[9]{28}$ (c) $6\sqrt[3]{28}$ (d) $2\sqrt[9]{7}$

6. Conjugate of $5+\sqrt{3}$ is

   (a) $5-\sqrt{3}$ (b) $5+\sqrt{3}$ (c) $3-\sqrt{5}$ (d) $3+\sqrt{5}$

7. Simplified form of $2\sqrt[3]{16}$ is

   (a) $8\sqrt[3]{4}$ (b) $4\sqrt[3]{4}$ (c) $8\sqrt[3]{2}$ (d) $4\sqrt[3]{2}$

II. One marks questions

1. Write the conjugate of $4\sqrt{p+q}$
2. Write the conjugate of $x\sqrt{mn}$
3. Rationalise the denominator and simplify $\frac{3\sqrt{5}}{\sqrt{6}}$.
4. What are like surds?
5. What are unlike surds?
6. Simplify $2\sqrt{2a}+3\sqrt{8a}-\sqrt{2a}$.
7. Subtract $3\sqrt{a}$ from the sum of $2\sqrt{a}$ and $4\sqrt{a}$.

I. Multiple choice questions.

1. The order of $(4)^{5/6}$ is

   (a) 5 (b) 6 (c) $\frac{5}{6}$ (d) 4

2. The radicard of $\frac{5\sqrt[3]{p}}{q}$ is

   (a) p (b) $\frac{p}{q}$ (c) 3 (d) 5

3. The product of $\sqrt{2} \times \sqrt[3]{3}$ is

   (a) $(6)^{1/2}$ (b) $(72)^{3/2}$ (c) $(3^3)^{1/2}$ (d) $(72)^{1/6}$

4. $\sqrt{p+q}$ can also be written as

   (a) $\sqrt{p}+\sqrt{q}$ (b) $(p)^{1/2}+(q)^{1/2}$ (c) $(p+q)^{1/2}$ (d) $\sqrt{p}-\sqrt{q}$

5. Rationalising factor of $\sqrt{\frac{x}{y}+\frac{p}{q}}$ is

   (a) $\sqrt{\frac{x}{y}+\frac{p}{q}}$ (b) $\sqrt{\frac{x}{y}-\frac{p}{q}}$ (c) $\sqrt{\frac{x}{y}}+\sqrt{\frac{p}{q}}$ (d) $\sqrt{\frac{x}{y}}-\sqrt{\frac{p}{q}}$

6. The value of $\sqrt{27}+\sqrt{75}+\sqrt{48}$ is

   (a) $12\sqrt{3}$ (b) $\sqrt{150}$ (c) $3\sqrt{12}$ (d) None of them

II. One Mark questions:

1. Rationalise the surd $(5\sqrt{x}-3\sqrt{y})$
2. Simplify $(6\sqrt{a}-5\sqrt{b})(6\sqrt{a}+5\sqrt{b})$.
3. Find the product of $\sqrt[3]{4}$ and $\sqrt[5]{2}$
4. Write the simplified form of $\sqrt[n]{b^{n+1}a^{n-1}}$

II. Two Mark questions.

1. Find the rationalising factor of $5^{1/3}+5^{-1/3}$
2. Simplify the express the answer in the index form $8\sqrt{\frac{1}{2}}-\frac{1}{2}\sqrt{8}$
3. Write the ascending order $\sqrt[6]{10}, \sqrt[4]{3}, \sqrt[12]{25}$

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Chapter - 8
POLYNOMIALS
CARD - 1

I. Multiple choice questions.

1. If f(–1) is a zero of polynomials $f(x) = x^2 – 72 – 8$ then other zero is
   (a) 6 (b) 8 (c) –8 (d) 1
2. The maximum number of zeroes that a polynomial of these degree 3 can have is
   (a) 1 (b) 2 (c) 3 (d) 4
3. The degree of $4x^3 + 3x^2 + x + 1$ is
   (a) 3 (b) 4 (c) 2 (d) 1
4. The value of polynomial $p(x) = 7x^2 + 2x + 14$ when $x = 1$ is
   (a) 20 (b) 23 (c) 24 (d) 28
5. If a and b are any two integers where $0 \le r \le b$ then the dividend is
   (a) $a = bq – r$ (b) $a = bq + r$ (c) $a = \frac{b}{q} + r$ (d) $a = br + q$

One Mark Questions.

1. What are polynomials?
2. Name the polynomial $ax^3 + bx^2 + cx + d$.
3. Define zero of a polynomial.
4. Find the degree of polynomial $x^6 – a^6$.
5. Write Euclied's division lemma for polynomials.
6. The heighest exponent of a variable in a polynomial is called _____ .

Two Mark Questions.

1. If $f(x) = x^2 + 7x + 12$ then find the value of
   (i) $f(0)$ (ii) $f(1)$ (iii) $f(2)$
2. Find the zeroes of the polynomial $x^2 + 4x + 4$.
3. Find the value of polynomial $g(x) = 7x^2 + 2x + 14$ when $x = 1$.
4. Find the reminder using reminder theorem when $(2x^3 + 3x^2 + x + 1)$ is divided by $x – 1$.
5. Find the quotient and remainder using synthetic division.
   (a) $(x^3 + x^2 – 3x + 5) \div x – 1$ (b) $(4x^3 – 16x^2 – 9x – 36) \div (x + 2)$

Three or Four Mark Questions:

Solve the following:

1. If $p(x) = x^3 + 3x^2 - 5x + 8$ and $g(x) = x - 3$ then divide using actual division method.
2. Find the zero of the polynomial $x^2 + 5x - 14$ and verify
3. Without actual division find the remainder using remainder theorem $(3p^3 - 4p^2 + 7p - 2)$ by $(p - 5)$
4. $p(x) = x^3 - 6x^2 + 11x - 6$ find the value when $x = 1$, $x = 2$ and $x = 3$.

CARD - 2

I. Multiple choice questions.

1. A quadratic polynomial whose zeroes are 5 and – 2 is
   (a) $x^2 + 5x - 2$ (b) $x^2 - 2x + 5$ (c) $x^3 + 3x - 10$ (d) $x^2 - 3x - 10$
2. If one of the zeroes of the quadratic polynomial $ax^2 + bx + c = 0$, then the other zero is
   (a) $\frac{-b}{a}$ (b) 0 (c) $\frac{b}{a}$ (d) $\frac{-c}{a}$
3. If 1 is the zero of the polynomial $x^2 + kx - 5$ then the value of k is
   (a) 4 (b) – 4 (c) 0 (d) 5
4. The degree of $3y^2 + 4y + 1$ is
   (a) 2 (b) 3 (c) 4 (d) 1
5. If $f(x) = x^2 - 4x$ then the value of $f(0)$ is
   (a) 4 (b) 0 (c) 8 (d) –4

II. One Mark Questions:

1. State reminder theorem.
2. If $f(x) = x^3 + x^2 - 4x$ then what is the value and $f(-2)$.
3. Find the zeroes of polynomial $x^2 - 3$.
4. Find the degree of $x^3 + 17x - 21 - x^2$.
5. Find the reminder when $p(x) = x^3 - 4x^2 + 3x + 1$ is divided by $(x - 1)$.
6. Define synthetic division.

II. Two Mark questions.

1. If $f(x) = 2x^3 + 3x^2 - 11x + 6$ then find (i) $f(-1)$ (ii) $f(-3)$
2. Find the zeroes of the polynomial $x^2 + 9x - 36$.
3. Find the value of polynomial $g(x) = 2x^2 - 9x + 9$ when $x = -1$.
4. If $x = 1$ is a zero of the polynomial $f(x) = x^3 - 2x^2 + 4x + k$ find the value of k.
5. Find the reminder using reminder theorem when $(2x^3 + 3x^2 + x + 1)$ is divided by $2x + 3$.

IV. Three or Four Marks Questions

Solve the following.

1. Divide $p(x) = 4x^3 - 10x^2 + 12x - 3$ by $g(x) = x + 1$ by actual division method.
2. What must be subtracted from $6x^4 + 13x^3 + 30x + 20$ so that the resulting polynomial is exactly divisible by $3x^2 + 2x + 5$?
3. The polynomials $(2x^3 - 5x^2 + x + a)$ and $(ax^3 + 2x^3 - 3)$ when divided by $(x - 2)$ leave the remainder R_1 and R_2 respectively. Find the value of a if (i) $R_1 = R_2$ (ii) $2R_1 + R_2 = 0$.
4. If both $(x - 2)$ and $\left(x - \frac{1}{2}\right)$ are factor of $ax^2 + 5x + b$, show that $a = b$.
5. If the quotient obtained on dividing $(x^4 + 10x^3 + 35x^2 + 50x + 29)$ by $x + 4$ is $(x^3 - ax^2 + bx + 6)$, then find a, b and also the remainder.

CARD - 3

I. Multiple choice questions.

1. The quadratic polynomial whose zeroes are $\sqrt{15}$ and $-\sqrt{15}$ is

   (a) $x^2 - \sqrt{15}$ (b) $x^2 - 15$ (c) $15x^2 - 1$ (d) $x^2 - 225$

2. The number to be added to the polynomial $x^2 - 5x + 4$, so that 3 is the zero of the polynomial is

   (a) 2 (b) –2 (c) 0 (d) 3

3. The general form of linear polynomial is

   (a) $ax^3 + bx^2 + cx + d$ (b) $ax^2 + bx + c$

   (c) $ax + b$ (d) x^2

4. The value of polynomial $p(x) = 2x^2 + \frac{1}{4}x + 13$ when $x = -1$ is

   (a) $\frac{58}{4}$ (b) $\frac{57}{2}$ (c) $\frac{56}{4}$ (d) $\frac{59}{4}$

5. If the divident is $4x^2 - 7x + 9$, divisor is $x - 2$ and quotient is $4x + 1$, then the reminder is

   (a) –11 (b) 11 (c) 13 (d) –13

One Mark Questions

1. Write the factor theorem of polynomials.
2. Write the general form of polynomial in 'x'.
3. Find the degree of polynomial $2x^3y^2 + xy + y^2$.
4. Write the degree of polynomial $\sqrt{3}x^3 + 19x + 14$

5. If $f(x) = 3x + 1$ then what is the value of $f\left(-\frac{1}{3}\right)$

6. For what value of k, -4 is a zero of the polynomials $x^2 - x - (2k + 1)$?

Two Marks questions

1. If f(x) = 5x – 8 then find

   (i) $f\left(\frac{4}{5}\right)$ (ii) $f(-3)$ (iii) $f\left(\frac{3}{5}\right)$

2. Find the zeroes of polynomial $2a^2 - 2\sqrt{2}a + 1$

3. Find the remainder using reminder theorem when $(2x^3 + 3x^2 + x + 1)$ is divided by $x + \frac{1}{2}$.

5. Write the standard form of polynomial expression.
6. What real number should be subtracted form the polynomial $3x^3 + 10x^2 - 14x + 9$. Show that $(3x - 2)$ divides it exactly.
7. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, then quotient and remainder are $(x - 1)$ and $(-2x + 4)$ respectively. Find $g(x)$.
8. Find the zero of the polynomial $f(x) = x^3 - 125$.
9. Obtain all zeros of the polynomial $3x^4 - 15x^3 + 13x^2 + 25x - 30$ if two of its zeros are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$.
10. Find a quadratic polynomial whose zeros are 1 and – 3 verify Euclid algorithm.

CARD - 3

Three or Four Mark Question

1. Divide $p(x) = 2x^4 - 5x^2 + 15x - 6$ by $g(x) = x - 2$ using actual division method.
2. Find the zeros of the quadratic polynomial $x^2 + 3x - 10$ and verify the relation between its zeros and co-efficients.
3. Find the quadratic polynomial, the sum of two zeroes is – 5 and the product is 6. Hence find the zeroes of the polynomial.
4. Find the zero of the polynomial $f(x) = x^2 + 7x + 12$ and verify the relation between its zeros and its coefficient.
5. Find the quadratic polynomial the sum of two zeros is 5/2 and their product is 1. Hence find the zeroes of the polynomial.

* * * *

MODEL QUESTION PAPERS

QUADRATIC EQUATIONS

Card - 1

I. Choose the correct answers from the following.

1. Among the following a pure quadratic equation is

(a) $x^2 = 36$ (b) $x^2 + x = 3$ (c) $x + \frac{1}{x} = 5$ (d) $x^2 + 2x + 1 = 0$

2. Among the following an adfected quadratic equation is

(a) $x^2 = 100$ (b) $2x^2 = 72$ (c) $x^2 + 2x + 1 = 0$ (d) $7x = \frac{35}{x}$

3. If $V = \pi r^2 h$ then r is equal to

(a) $\pm\sqrt{\frac{Vh}{\pi}}$ (b) $\pm\sqrt{\frac{\pi h}{V}}$ (c) $\pm\sqrt{\frac{V}{\pi h}}$ (d) $\pm\sqrt{\frac{\pi V}{h}}$

4. The value of x in the equation $ax^2 + bx + c = 0$ is

(a) $\frac{+b \pm \sqrt{b^2 - 4ac}}{2a}$ (b) $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$ (c) $\frac{-b - \sqrt{b^2 - 4ac}}{2a}$ (d) $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

5. If $x^2 = 25$ the value of x is _____ .

(a) 5 (b) – 5 (c) ± 5 (d) 25

6. The roots of the eqution $x^2 - 3x = 0$ are _____.

(a) 0, 3 (b) 0, –3 (c) –3, 1 (d) 2, 3

7. If $k = \frac{1}{2}mv^2$ then v is equal to_____ .

(a) $\pm\sqrt{\frac{2k}{m}}$ (b) $\pm\sqrt{\frac{m}{2k}}$ (c) $\pm\sqrt{\frac{k}{2m}}$ (d) $\pm\sqrt{\frac{2m}{k}}$

8. The sum of the roots of the equation $x^2 - 5x + 9 = 0$ is _____ .

(a) 9 (b) – 9 (c) 5 (d) – 5

9. Parabola is a curve obtained from _____ .

(a) Linear Equation (b) Quadratic Equation

(c) Cubic Equation (d) Simultaneous Equation

10. Standard form of a quadratic equation is

(a) $ax^2 + bx = 0$ (b) $ax + bx + c = 0$ (c) $ax^2 + c = 0$ (d) $ax^2 + bx + c = 0$

11. The equation $4a = \frac{81}{a}$, the value of a is

(a) $\frac{9}{2}$ (b) $\pm\frac{9}{2}$ (c) $\frac{81}{4}$ (d) $\pm\frac{81}{4}$

12. Nature of the roots of a quadratic equation depends on

(a) $b^2 - 4ac$ (b) $b^2 - ac$ (c) $b^2 + 4ac$ (d) $b^2 + ac$

13. In an equation $ax^2 + bx + c = 0$, if $b = 0$ then the equation is

(a) Linear equation (b) Simultaneous equation

(c) Adfected quadratic equation (d) Pure quadratic equation

14. If $3a^2 - 27 = 0$, then the value of a is

(a) ± 9 (b) ± 3 (c) ± 27 (d) ± 1

15. Roots of the equation $x^2 - 2x + 1 = 0$ are

(a) Real and equal (b) Real and distinct (c) Imaginary (d) None of them

16. The product of the roots of the equation $x^2 - 5x + 8 = 0$

(a) -5 (b) 5 (c) -8 (d) 8

17. If the roots of a quadratic equation are real and distinct then which of the following is correct?

(a) $\Delta > 0$ (b) $\Delta < 0$ (c) $\Delta = 0$ (d) $\Delta \leq 0$

18. The sum of the roots of the quadratic equation $2x^2 - 5x + 6 = 0$

(a) $\frac{-5}{2}$ (b) 3 (c) $\frac{5}{2}$ (d) $\frac{2}{5}$

19. The graph or $y = x^2$ is

(a) A straight line (b) a parabola (c) An oval (d) A polygon

20. Sum of a number and twice its square is 105, it can be represented in quadratic equation form as

(a) $x^2 + 2x = 105$ (b) $2x^2 + x = 105$ (c) $2x^2 - x = 105$ (d) $2x^2 + x + 105 = 0$

21. The product of the roots of the equation $6k^2 - 3k = 0$ is

(a) 2 (b) $\frac{-1}{2}$ (c) $\frac{1}{2}$ (d) 0

22. The sum of the roots of quadratic equation $ax^2 + bx + c = 0$ is

(a) $\frac{b}{a}$ (b) $\frac{-b}{a}$ (c) $\frac{c}{a}$ (d) $\frac{-c}{a}$

23. The product of the root of quadratic equation $ax^2 + bx + c = 0$ is

(a) $\frac{b}{a}$ (b) $\frac{-b}{a}$ (c) $\frac{c}{a}$ (d) $\frac{-c}{a}$

24. The nature of the roots of $ax^2 + bx + c = 0$ depends on the value of

(a) a only (b) b and c (c) a and c (d) $b^2 - 4ac$

25. If in $ax^2 + bx + c = 0$, $b^2 - 4ac > 0$ the roots are

(a) Real (b) Complex
(c) Real and distinct (d) Real distinct and unequal

26. If in $ax^2 + bx + c = 0$, $b^2 - 4ac > 0$ the roots are

(a) Real and equal (b) Complex (c) Real and distinct (d) non of them

27. The quadratic equation whose roots are 5 and - 6 is

(a) $x^2 - 30x - 1 = 0$ (b) $x^2 - x - 30 = 0$ (c) $x^2 + x - 30 = 0$ (d) $x^2 - x + 30 = 0$

28. The nature of the roots of the equation $x^2 - 5x + 6 = 0$ is

(a) Real and distinct (b) Real and equal (c) Imaginary (d) Equal

29. If m and n are the roots of the quadratic equation $x^2 - 6x + 2 = 0$, then the value of mn (m + n) is

(a) 12 (b) 6 (c) 2 (d) 3

30. Select the pure quadratic equation

(a) $2x + 5 = 13$ (b) $x^2 + 5x = 26x$ (c) $x^2 = 5x$ (d) $x^2 + 2x^2 = 3$

31. The discriminant of the equation $ax^2 + bx + c$ is

(a) $\frac{-b}{a}$ (b) $b^2 - 4ac$ (c) $\frac{c}{a}$ (d) $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

32. The sum and product of the roots of the equation $2x^2 = 3x$ respectively are

(a) $\frac{3}{2}$ and 0 (b) 0 and $\frac{3}{2}$ (c) $\frac{+15}{2}$ and 0 (d) 0 and $\frac{-15}{2}$

33. The sum and product of the roots of the quadratic equation $4x^2 + 1 = 0$ are respectively

(a) 1 and 4 (b) 0 and 1 (c) 0 and $\frac{-1}{4}$ (d) 0 and $\frac{1}{4}$

34. If $a^2 = b^2 + c^2$ then C is given by

(a) $\sqrt{b^2 \quad a^2}$ (b) $\sqrt{a^2 \quad b^2}$ (c) $\sqrt{a \quad b}$ (d) $\sqrt{a^2 \quad b^2}$

35. If $A = \pi\ 4r^2$, then r is given by

(a) $\sqrt{\frac{A}{4}}$ (b) $\frac{A}{4}$ (c) $4A$ (d) $\sqrt{\frac{A}{4}}$

36. If $F = \frac{mv^2}{r}$ then v =

(a) $\sqrt{\frac{Fm}{r}}$ (b) $\sqrt{\frac{mr}{F}}$ (c) $\sqrt{\frac{Fr}{m}}$ (d) $\sqrt{\frac{F}{m}}$

37. If an equation has anly one root, then the equation is

(a) Quadratic equation (b) Linear equation

(c) Cubic equation (d) Simultaneous equation

ONE MARK QUESTIONS

1. Solue $x^2 - 225 = 0$
2. Solue $5x^2 = 625$
3. Write the formula of the roots of the quadratic Equation $ax^2 + bx + c = 0$
4. What is the nature of roots of quadratic equation is $\Delta = 0$
5. What is the nature of roots of the quadratic Equation if $\Delta > 0$
6. What is the nature of roots of the quadratic equation if $\Delta < 0$
7. What is the formula of sum of the roots of the quadratic equation $ax^2 + bx + c = 0$
8. Write the formula of product of the roots of the quadratic equation $ax^2 + bx + c = 0$
9. If 'm' and 'n' are the roots of Q.E then write the standard form of the quadratic Equation.
10. Form the equation whose roots are

    (i) 3, 5 (ii) 6, – 5 (iii) $\frac{2}{3}, \frac{3}{2}$ (iv) $\left(2+\sqrt{3}\right)\left(2-\sqrt{3}\right)$

11. Find the sum of the roots of the Q.E

    (i) $x^2 - 5x + 8 = 0$ (ii) $3a^2 - 10a - 5 = 0$

12. Find the product of the roots of the Q.E

    (i) $x^2 - 5x + 8 = 0$ (ii) $3a^2 - 10a - 5 = 0$

Question Paper

TWO MARKS QUESTIONS

1. If $r^2 = l^2 + d^2$ solve for d and find the value of d is r = 5 and l = 4
2. If $v^2 = u^2 + 2as$ solve for v and find the value of v if u = 0 a = 2, and s = 100
3. If $c^2 = a^2 + b^2$ solve for b and find the value of b is a = 8 and c = 17.
4. If $a = \pi r^2$ solve for r and find the value of r if A = 77 and $\pi = \frac{22}{7}$
5. Solve : $a^2 - 3a + 2 = 0$
6. Solve : $2x^2 + 7x - 9 = 0$
7. Solve : $(x + 4)(x - 4) = 6x$.
8. Solve $x^2 + 15x + 50 = 0$ the Q.E by factorisation Method.
9. Discuss the nature of roots of Q.E $y^2 - 7y + 12 = 0$
10. If m and n are the roots of the equation $x^2 - 6x + 2 = 0$ find the value of (m + n) mn.
11. Draw the graph of $y = x^2$
12. Draw the graph of $y = 2x^2$

THREE MARKS QUESTIONS

1. Draw the graph of $y = 2x^2$ and find the value of $\sqrt{5}$ using the graph.
2. If 'a' and 'b' are the roots of the equation $3m^2 = 6m + 5$ find the value of (a + 2b) (2a + b)
3. Find the value of 'k' so that the equation $x^2 + 4x + (k + 2) = 0$ has one root equal to zero.
4. Solve $x^2 - 4x + 2 = 0$ by using formula method.
5. Solve $4x^2 - 20x + 9 = 0$ by completing the square.
6. If $v = \pi r^2 h$, then solve for 'r' and find the value of 'r' when v = 176 and r = 14

FOUR MARK QUESTIONS

1. Find two consecutive positive odd numbers such that the sum of their squares is equal to 130.
2. Draw the graph of $y = x^2 - x - 2$.
3. For what positive value of 'm' roots of the equation $r^2 - (m + 1) r + 4 = 0$ are
   (i) equal (ii) distinct (iii) imaginary.

ONE MARK QUESTIONS

I. Multiple choice questions:

1. Among the following, a quadratic equation is

(a) $x^2 = 6x + 4$ (b) $x^2 - 6x = 4$ (c) $x^3 - 1 = 7$ (d) $5x = 20$

2. If ${}^nC_5 = {}^nC_4$ then n is equal to _____.

(a) $5x^2 = 3 + x$ (b) $x^2 \quad \frac{1}{x^2} \quad 0$

(c) $x^2 - 6x + 5 = 0$ (d) $6x^2 + 7 = 10$

3. Among the following an adfected Q.E. is

(a) $P(P - 3)$ (b) $P(P^2 + 3) = 0$ (c) $P(P - 3) = 0$ (d) $P^3 = 27$

4. The positive root of the equation $(2x - 1)(x + 3) = 0$ is

(a) 3 (b) -3 (c) $\frac{1}{2}$ (d) $\frac{1}{2}$

5. If $\frac{x^2}{2} \quad \frac{3}{4} = \frac{29}{4}$ we can write.

(a) $x^2 = 16$ (b) $2x^2 = 8$ (c) $\frac{x^2}{2} \quad 16$ (d) $\frac{x^2}{2} \quad 32$

6. Sum of a number and twice its square is 105. It can be represented in quadratic equation form

(a) $x^2 + 2x = 105$ (b) $2x^2 - x = 105$

(c) $2x^2 + x = 105$ (d) $2x^2 + x + 105 = 0$

7. The equation $4a \quad \frac{81}{1}$ is satisfied by

(a) $a = 20.25$ (b) $a = 10.50$ (c) $a = -4.5$ (d) $a = 2\frac{1}{2}$

8. In a Q.E. if one root is reciprocal to other then product of roots is

(a) 1 (b) 2 (c) 100 (d) 50

9. The Q.E with roots $2 + \sqrt{3}$ and $2 \quad \sqrt{3}$ is

(a) $x^2 + 4x + 1 = 10$ (b) $x^2 - 4x + 1 = 0$

(c) $x^2 + 2x + 3 = 0$ (d) $x^2 - 2x - 3 = 0$

10. For which value of m the equation $x^2 - mx + 4 = 0$ has equal roots?

(a) ± 4 (b) ± 2 (c) 0 (d) ± 1

11. In an equation $ax^2 + bx + c = 0$ if b = 0 then the equation is

(a) Pure Q.E (b) Adfected Q.E (c) Linear equa (d) Simultaneous equ

12. If zero (0) is one root of the equation $x^2 - 5x = 0$, then the other root is

(a) 0 (b) -5 (c) $+5$ (d) ± 5

13. If one root of the equation $ax^2 + bx + c = 0$, $a \neq 0$ is the reciprocal of the other, then

(a) $b = c$ (b) $a = c$ (c) $a = 0$ (d) $b = 0$

14. If the product of the roots of the equation $x^3 + 3x + q = 0$ is zero then q is equal to

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

15. The mathematical form of "The product of two consecutive integers is 182" is

(a) $x(x + 2) = 182$ (b) $x(x - 1) = 182$

(c) $x \cdot y = 182$ (d) $(x + 2)(x - 1) = 182$

16. If m and n roots of the equation $x^3 - 6x + 2 = 0$ then the value of $m^{-1} + n^{-1}$ is

(a) 6 (b) 1.5 (c) 3 (d) 2

17. If in $ax^2 + bx + c = 0$, $a = 0$ the roots are

(a) Additive Inverse (b) Multiplicative

(c) Equal (d) Zero

18. One root $ax^3 + bx + c = 0$ will be the negative of the other when

(a) $c = 0$ (b) $b = 0$ (c) $a = 0$ (d) $a = 0$

19. The Q.E whose roots are $\frac{5}{3}$ & $\frac{3}{5}$ is

(a) $(3x + 5)(5x + 3) = 0$ (b) $(3x - 5)(5x + 3) = 0$

(c) $(3x + 5)(5x + 3) = 0$ (d) $(3x - 5)(5x - 3) = 0$

20. $x = 7$ is one root of $x^2 - px - 28 = 0$ the other root is

(a) 4 (b) -4 (c) $\frac{P}{7}$ (d) $\frac{P}{7}$

21. The height of a triangle is 4cm more than the base. It area is 30sq units. This relation can be represented as

(a) $x(x + 4) = 30$ (b) $2x(x + 4) = 40$

(c) $x(x + 4) = 15$ (d) $x(x + 4) = 60$

22. The roots of the equation are +2 and –2, then the equation is a 1 an

(a) Adfected Q.E (b) linear equation

(c) Simple linear equation (d) pure Q.E

23. Q.E with $3 + 2\sqrt{2}$ & $3 \quad 2\sqrt{2}$ is

(a) $x^2 + 6x + 1 = 0$ (b) $x^2 + 6x - 1 = 0$

(c) $x^2 - 6x + 1 = 0$ (d) $x^2 + 6x - 1 = 0$

24. In an equation $ax^2 + bx + c = 0$ if $a = 0$ then it becomes

(a) Pure Q.E (b) Adfected Q.E

(c) Simple linear equation (d) Second degree equation

10th standard

ONE MARK QUESTIONS

1. Check whether the following are Q.E

   (i) $x^2 \quad \frac{1}{2}x \quad 0$

   (ii) $5 \quad 6x \quad \frac{2}{5}x^2$

   (iii) $x^3 - 10x + 74 = 0$

   (iv) $x^2 - y^2 = 0$

2. "The product of 2 consecutive integers is 306" represent it in quadratic form

3. Solve (i) $(x + 8)^2 - 5 = 31$ (ii) $7x = \frac{64}{7x}$

4. If $K = \frac{1}{2}$ mv^2 solve for v and find the value of v if $K = 100$ and $m = 2$

5. What is the nature of roots of Q.E if $b^2 - 4ac = 0$

6. What is the nature of roots of Q.E if $b^2 - 4ac > 0$

7. What is the nature of roots of Q.E if $b^2 - 4ac < 0$

8. Find the sum of roots Q.E $6K^2 - 3 = 0$

9. Form the Q.E. whose roots are $\frac{p}{q} \& \frac{q}{p}$

10. Find the product of roots of Q.E $3a^2 - 10a - 5 = 0$

TWO MARKS QUESTIONS

1. If $V = \pi r^2 h$then solve for 'r' and find the value of 'r' when $V = 176$ and $h = 14$.

2. Find the roots of $3x^2 \quad 2\sqrt{6}x \quad 2 \quad 0$.

3. Solve the Q.E by factorisation method

   (i) $x \quad \frac{1}{x} \quad 2.5$ (ii) $0.2t^2 - 0.4t = 0.03$ (iii) $m \quad \frac{7}{m} \quad 6$

4. Solve $4x^2 + x - 1 = 0$ by completing the square.

5. Solve $a(x^2 + 1) = a(a^2 + 1)$ by formula method.

6. Find the value of P for which the Q.E $PK^2 - 12K + 9 = 0$ have equal roots.

7. If a and b are the roots of the equation $3m^2 = 6m + 5$ find the value of $\frac{a}{b} \quad \frac{b}{a}$.

8. Draw the graph of $y = 3x^2$

Question Paper

THREE MARKS QUESTIONS

1. Draw the graph of $y = 2x^2$ and find the value of $\sqrt{7}$
2. If p and q are the roots for the equation $2a^2 - 4a + 1 = 0$. Find the value of $(p + q)^2 - 4pq$
3. Find the value of 'q' so that the equation $2x^2 - 3qx + 5q = 0$ has one root which is twice the other.
4. If $A = \frac{\sqrt{3a^2}}{4}$ solve for 'a' and find the value of a if $A = 16\sqrt{3}$.

FOUR MARKS QUESTIONS

1. If one root of the equation $x^2 + px + q = 0$ is 3 times the other P.T. $3p^2 = 16q$.
2. A man travels a distance of 196km by train and returns in a car which travels at a speed of 21km/hr faster than the train. If the total journey take s11hrs find the speed of the train and the car.
3. Draw the graph of $y = -x^2 + 8x - 16$.

ONE MARK QUESTIONS

I. Choose the correct answers from the following:

1. $x \quad \frac{1}{x} \quad 2$ **is same as**

(a) $x \quad \frac{1}{x}^{2} \quad 2^2$ (b) $x^2 + 2x + 1 = 0$

(c) $x^2 - 3x - 1 = 0$ (d) $x^2 + 2x = 0$

2. $x^2 - 2x + 1 = 0$ **is same as**

(a) $x \quad \frac{1}{x} \quad 3$ (b) $x \quad \frac{1}{x} \quad 3$

(c) $x \quad \frac{1}{x} \quad 3$ (d) $x \quad \frac{1}{x} \quad 3$

3. If ∝, B are the roots of $x^2 - 2x + 2 = 0$, then $\propto^2 + B^2 = 2$

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

4. If the roots of $ax^2 + bx + 2 = 0$ are equal in magnitude but opposite in sign, then

(a) $a = 0$ (b) $b = 0$ (c) 1 (d) none

5. $x = 2$ is one root of $3x^2 - 5x - 2 = 0$ the other root is

(a) –2 (b) $\frac{5}{2} \quad 2$ (c) $\frac{5}{3} \quad 2$ (d) 1

6. **The equation $(b - c)\,x^2 + (c - a)x + (a - b) = 0$ has**
   (a) equal roots (b) irrational roots (c) rational roots (d) none
7. **Value of discriminant factor in the equation $2x^2 = 5x$ is**
   (a) 27 (b) 25 (c) 23 (d) 10

TWO MARKS QUESTIONS

1. A train travels a distance of 480km at a uniform speed. If the speed had been 8km/hr less, then it would have taken 3 hours more to cover the same distance.
2. In $6x^2 - x - 2 = 0$; $x \quad \frac{1}{2}$ and $x \quad \frac{2}{3}$ determine whether the given values of 'x' is a solution of the quadratic equation or not.
3. Solve $(2x - 3) = \sqrt{2x^2 \quad 2x \quad 21}$ by factorisation method.
4. Solve $P = 5 - 2P^2$ by formula method.
5. Draw the graph of $y = 1/2\,x^2 - 2$.

THREE MARKS QUESTIONS

1. Solve by using formula method: $\frac{3}{5 \quad b} \quad \frac{2}{4 \quad b} \quad \frac{8}{b \quad 2}$
2. In an isoceles traingle ABC, AB = BC and BD is the altitude to base AC. If DC = x, BD = $2x - 1$ and BC = $2x + 1$, find the lengths of all the three sides of the traingle.

FOUR MARKS QUESTIONS

1. Draw the graph of $y = x^2 - 8x + 7$.
2. Nandana takes 6 days less than the number of days taken by Shobha to complete a piece of work. If both Nnadana and Shobha together can complete the same work in 4 days, in how many days will shobha alone complete the work?
3. Draw the graph of $y = -x^2 + 8x - 16$.

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Chapter-10

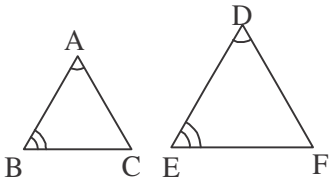
SIMILAR TRIANGLES

CARD - 1

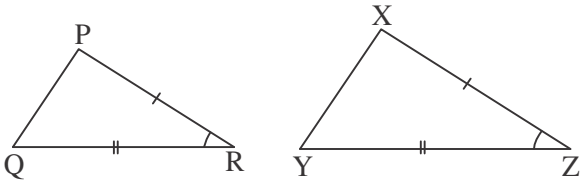
I. Solve the following problems.

1. Write the corresponding sides and angles of the following similar triangles.

(i)



(ii)



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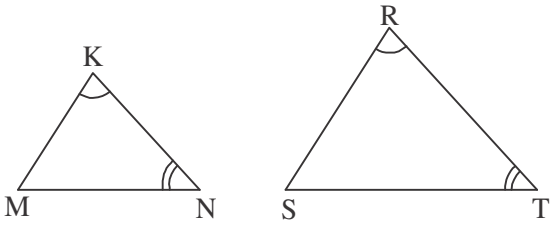

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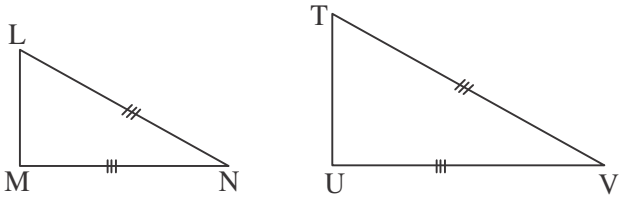
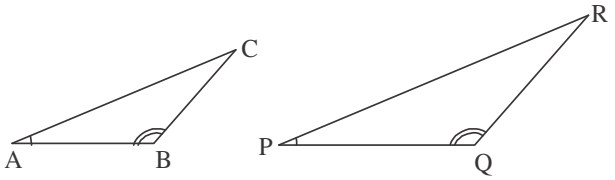
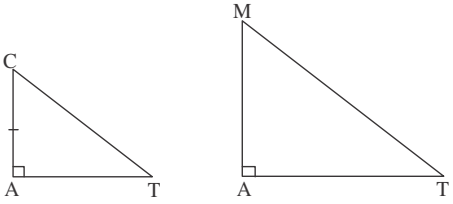


(v)

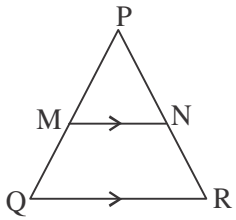


(vi)

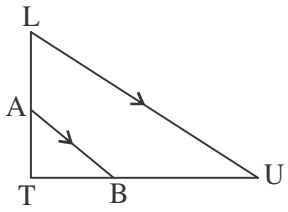


2. Write the two conditions for which two given polygons are similar.
3. State Thale's thoerem.
4. State the converse of Thales theorem.
5. Apply Thale's theorem for the following figures.

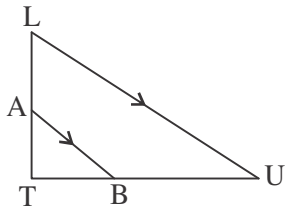
(i)



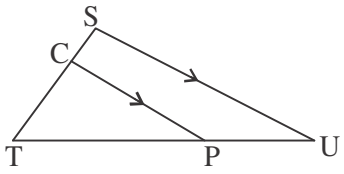
(ii)



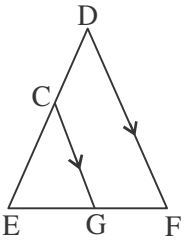
(iii)



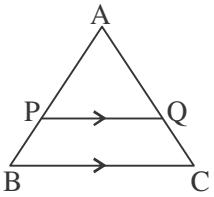
(iv)



(v)



6. Identify the correct statements for the following figure.



(i) $\frac{AP}{PB} = \frac{QC}{AQ}$

(ii) $\frac{AP}{AB} = \frac{AQ}{AC}$

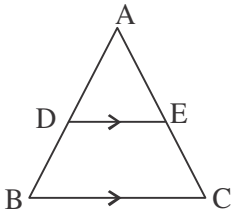
(iii) $\frac{PQ}{BC} = \frac{AP}{AB}$

(iv) $\frac{PQ}{BC} = \frac{AP}{PB}$

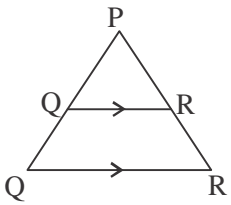
(v) $\frac{AP}{PB} = \frac{AQ}{QC}$

(vi) $\frac{AB}{AP} = \frac{AC}{AQ} = \frac{BC}{PQ}$

7. In the figure DE || BC. If AD = 2cm, BD = 3cm and AE = 3cm, then find EC.



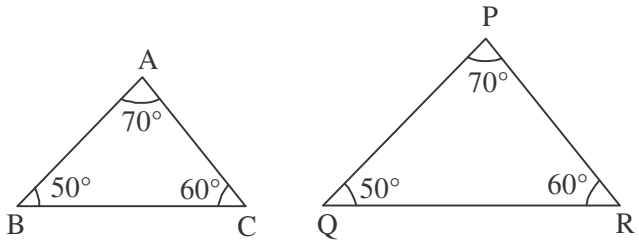
8. In the above figure if AB = 6c, AD = 2cm and AC = 12 cm then find AE.

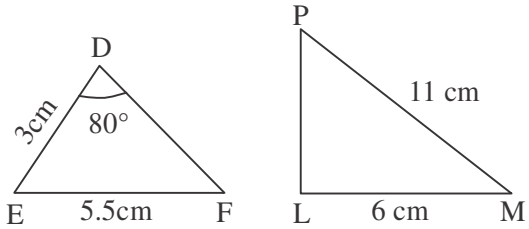
9. 

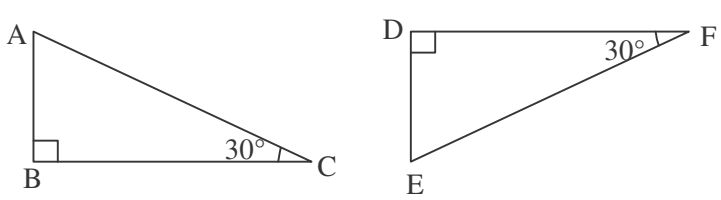
In the figure if $\frac{PQ}{QS} = \frac{3}{5}$, and PT = 48 cm, then find the length of PR.

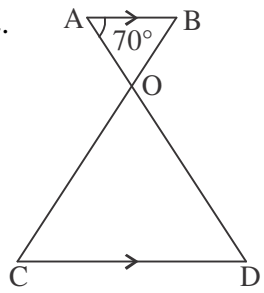
10. What is the condition for two triangles to be similar?

11. Find which pair of triangles are similar in the following figures and state the reason.

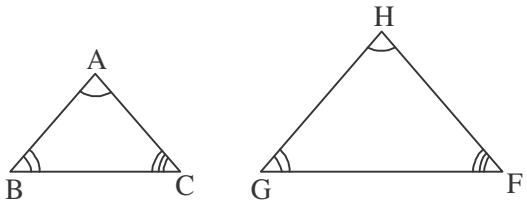
(i) 

(ii) 

(iii) 

12. 

In the figure $\angle BAO = 70°$ and AB || CD $\angle OCD = 60°$.
Find all the angles of the triangles. Are the two triangles similar? Why?

13. 

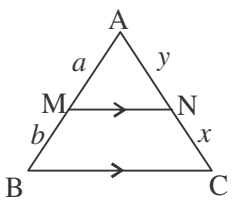
In the figure AB = 4.5 cm, HG = 6.75 m and BC = 6 cm.

Find the measure of GF.

14. What is the realtionship between the corresponding sides of two similar triangles and their areas?
15. Δ ABC ~ Δ DEF. If the area of triangle ABC is 225 cm^2 and the corresponding sides of the triangles are 5cm and 7.5 cm respectively, then find the area of Δ DEF.
16. Δ LMN ~ Δ PQR and their areas are respectively 64cm^2 and 121 cm^2. If LM = 15.4 cm then find PQ.
17. Prove that if two triangles are equiangular, then their corresponding sides are proportional.
18. Prove that the straight line drawn parallel to one of the sides of the triangle divides the other two sides proportionately.
19. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

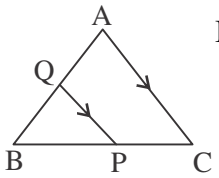
CARD - 2

I. Four alternatives are provided for each questions. Choose the most appropriate alternative.

1. Which of the following statements is correct?
   (a) All equilateral triangles are similar
   (b) All rhombuses are similar
   (c) All right angled triangles are similar
   (d) All rectangles are similar.
2. A straight line drawn parallel to a side of triangle divides the other two sides proportionately is the statement of
   (a) Pythagoras theorem
   (b) Thales theorem
   (c) Converse of thales theorem
   (d) Converse of pythagoras theorem.
3. 

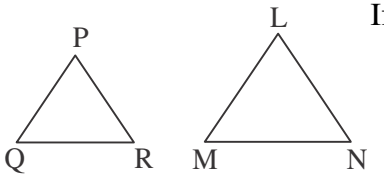
In the figure $\frac{a}{a+b}$ =

(a) $\frac{y}{x}$ (b) $\frac{x}{x+y}$ (c) $\frac{x+y}{y}$ (d) $\frac{y}{x+y}$

4. 

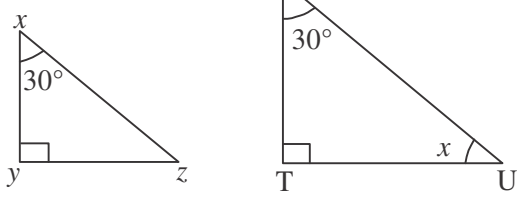
In the figure if $\frac{BP}{PC} = \frac{2}{3}$, then $\frac{BQ}{AQ}$ =

(a) $\frac{3}{2}$ (b) $\frac{2}{3}$ (c) $\frac{2}{5}$ (d) $\frac{5}{3}$

5. 

If $\frac{PQ}{LM} = \frac{PR}{LN} = \frac{QR}{MN}$ and $\angle P = 75°$ then $\angle L$

(a) 150° (b) 75° (c) 37.5° (d) 105°

6. 

The value of x in the adjoining figure is

(a) 30° (b) 90° (c) 60° (d) 45°

7. Which of the following figures are alwyas similar?

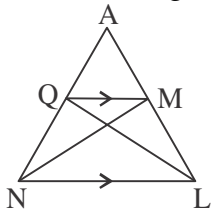
(a) Two squares (b) Two right angled triangles

(c) Two rectangles (d) Two shombuses

8. Which of the following figures are not always similar?

(a) Two equilateral triangles (b) Two circles of different radii

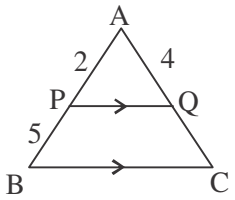
(c) Two rectangles (d) Two squares.

9. 

In the give figure AM : ML =

(a) AQ : AN (b) AQ : QN

(c) QM = NL (d) AM : AL

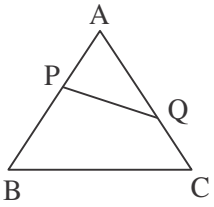
10. 

In the figure the valueof AC is

(a) 10 cm (b) 8 cm

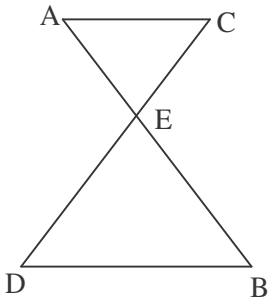
(c) 14 cm (d) 7 cm

II. Solve the following questions / problems.

1. 

In the triangle ABC, P and Q are the points on AB and AC such that $\angle APQ = \angle ACB$ prove that AP . AB = AQ . AC.

2. ABC is triangle in which $\angle A = 90°$ and AD ⊥ BC. If $\angle DAB = \angle ABC$, then show that AD = DC.

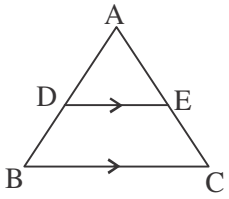
3. 

In the given figure $\angle CAE = \angle EBD$ and DE = 3CE. Find $\frac{BD}{AC}$.

4. In Δ ABC, BE ⊥ AC, and CF ⊥ AB. BE and DF intersect at 'O' show that $\frac{DBOF}{DCOF} = \frac{BF^2}{CE^2}$.

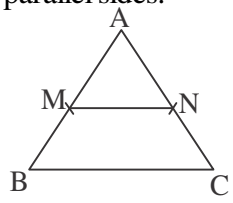
5. In Δ ABC, $\angle A = 90°$, AD ⊥ BC. Show that $\frac{DABD}{DACD} = \frac{AB^2}{AC^2}$.

6. In a trapezium ABCD, AB || CD and AB = 2CD. If diagonals intersect at ' O'. Show that area of ΔAOB = 4 × Area of ΔCOD.

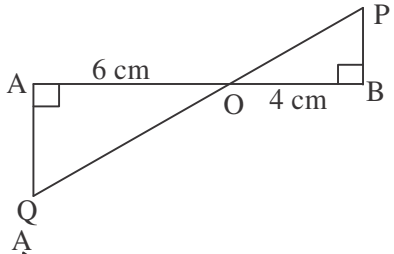
7. 

Given that AD = ½ BD. Calculate BC if DE = 1.5 cm.

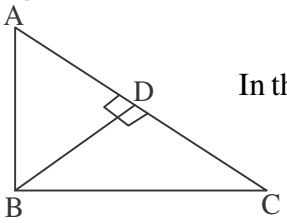
8. Prove that the line joining the midpoints of non-parallel sides of a trapezium is parallel to the parallel sides.

9. 

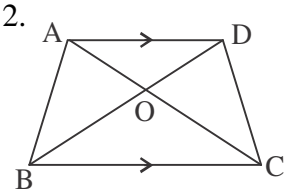
M and N are the midpoints of AB and AC respectively. Prove that MN = ½ BC.

10. 

In the figure prove that ΔAQO ~ ΔBPO. If the area of ΔAQO = 100cm^2, Find the area of ΔBPO.

11. 

In the figure AC = 8cm, AD = 2cm, BD ⊥ AC find AB.

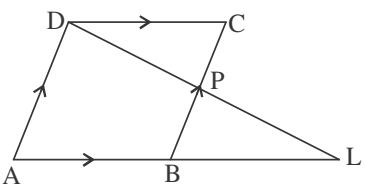
12. 

ABCD is a trapezium in which AD || BC. Diagonals AC and BD intersect at 'O'.
If AO : OD = 2 : 5 and OD = 8cm, then find BO.

13. If the vertex angles of two isosceles triangles triangles are equal then prove that the triangles are similar.
14. In triangle PQR, E and F are the points on PQ and PR respectively. If PE = 3.9 cm, EQ = 3cm, PF = 3.6 cm and FR = 2.4 cm. Verify whether EF || QR.
15. The areas of two similar triangles are 81cm^2 and 256 cm^2. If the circum radius of smaller triangles is 1.8 cm, then find the circum radius of the bigger triangle.

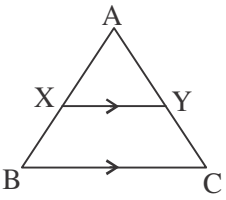
CARD - 3

I. Solve the following problems.

1. 

In the adjoining figure, ABCD is a parallelogram. 'P' is a point on BC. DP and AB are produced to meet at L. Prove that DP : PL = DC : BL.

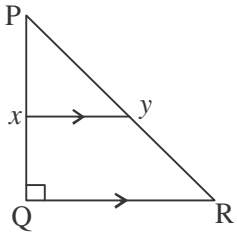
2. Δ ABC has sides of length 5, 6 and 7 units, while ΔPQR has a perimeter of 360 units. Is ΔABC ~ ΔPQR. Give reason.

3. 

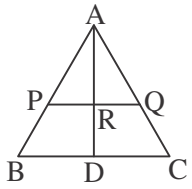
In the figure XY || BC and ΔAXY : Trapezium XBCY is 4 : 5, show that AX : XB = 5 : 1.

4. Prove that areas of similar triangles have the same ratio as the square of the corresponding mediuans.

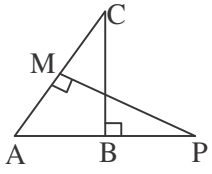
5. Prove that areas of similar triangles have the same ratio as the square of their circum radii.

6. 

In the figure, if PQ = 6cm, PY = 40cm and PX : XQ = 1 : 2, then calculate the length of PR and QR.

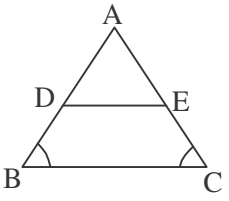
7. 

In the figure PQ || BC, AP = 3cm, AR = 4.5 cm, AQ = 6cm, AB = 5cm and AC = 10 m then find the length of AD.

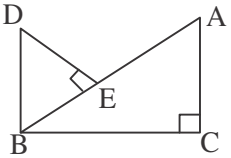
8. 

In the given figure: $\lfloor B = 90°$ and $\lfloor M = 90°$ prove that (i) Δ ABC ~ ΔAMP

(i) $\frac{CA}{PA} = \frac{BC}{MP}$

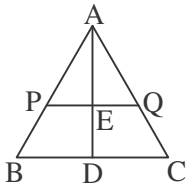
9. 

In the figure $\lfloor B = \lfloor C$ and BD = CE. prove that DE || BC.

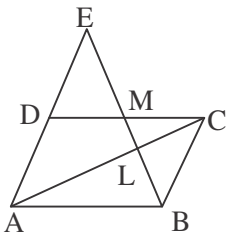
10. 

In the given figure, DB ⊥ BC, DE ⊥ AB and AC ⊥ BC. Prove that $\frac{BE}{DE} = \frac{AC}{BC}$.

11. D, E and F are the midpoints of AB : BC and CA in a ΔABC. Show that area of $\Delta DEF = \frac{1}{4}$ Area of ΔABC.

12. 

In the triangle PQ || BC and BD = DC. Then prove that PE = EQ.

13. 

Through the mid point M of the side of a parallelogram ABCD, the line BM is drawn intersecting at L and AD produced to E. Prove that EL = 2 BL.

14. Prove that any two medians of a triangle divides in the ratio 2 : 1.

* * * *

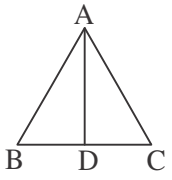
Chapter -11

PYTHAGORAS THEOREM

CARD - 1

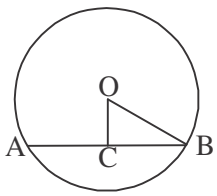
I. Four alternatives are provided for each question. Choose the most appropriate alternative.

1. In triangle ABC, $\angle ABC = 90°$, $AC^2 =$
   (a) $AB^2 + BC^2$ (b) $AB^2 - BC^2$ (c) $BC^2 - AB^2$ (d) $AB^2 - 2BC^2$
2. In a triangle PQR, $QR^2 = PQ^2 + PR^2$. The triangle is right angled at
   (a) P (b) Q (c) R (d) None of the above
3. In a triangle ABC, if $AB^2 = AC^2 + BC^2$, then $\angle ACB$ is equal to
   (a) 50° (b) 40° (c) 90° (d) 60°
4. In a triangle LMN, $\angle LMN = 90°$. If LN = NM, then $\angle LMN$ =
   (a) 50° (b) 45° (c) 90° (d) 30°
5. Which of the following is a pythagorean triplet?
   (a) 8, 7, 11 (b) 8, 6, 10 (c) 5, 6, 9 (d) 5, 8, 12
6. If the diagonal of a square is $3\sqrt{2}$ cm, then its side is
   (a) 3 cm (b) $\sqrt{2}$ cm (c) $12\sqrt{2}$ cm (d) $\sqrt{3}-2$ cm
7. The side of a square is x cm. The diagonal of the square is
   (a) $x+\sqrt{2}$ cm (b) $\sqrt{2}x$ cm (c) $\frac{x}{\sqrt{2}}$ cm (d) $x-\sqrt{2}$ cm
8. The length and breadth of a rectangle is 80 cm and 60 cm respectively. The diagonal of the rectangle is
   (a) 140 cm (b) 20cm (c) 100 cm (d) 120 cm
9. ABC is an equilateral triangle with side x. The length of the altitude is



   (a) $\frac{3x^2}{4}$ (b) $x\sqrt{3}$ (c) $\frac{2\sqrt{3}}{2}$ (d) $\frac{x\sqrt{3}}{4}$

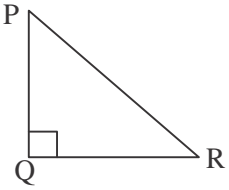
10. In the figure AB = 12cm, OB = 13 cm, then length of OC is



   (a) 5cm (b) 10 cm (c) 8 cm (d) 20 cm

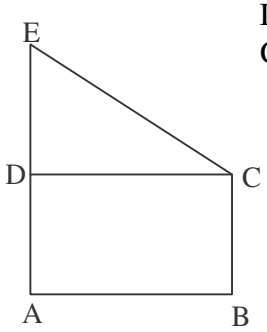
II. Solve the following problems

1. In the figure $\angle PQR = 90°$. If PR = 25 cm, PQ = 20cm then find QR.



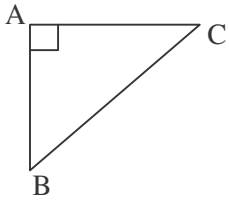
2. ABCD is a square where AC = $5\sqrt{2}$ units. Find the perimeter of the square.

3. In the figure AC = 13cm, BC = 5cm, and DC = 6cm, find the value of CE.



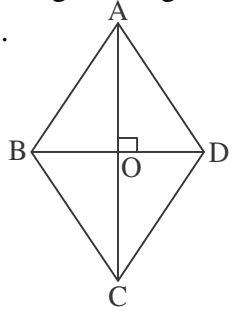
4. In a right angled triangle if the base is 2 units and altitude is 3 units then find the length of the hypotenuse.
5. Write any four pythagorean triplets.
6. State pythagoras theorem.
7. State the converse of pythagoras theorem.

8. Apply pythagoras theorem for the adjoining figure.



9. The hypotenuse of an isosceles right angled triangle is 10 cm. Find the length of equal sides.
10. The sides of a triangle are $\sqrt{2}, \sqrt{3}$ and $\sqrt{5}$ respectively. Verify whether the triangle is a right angled triangle.

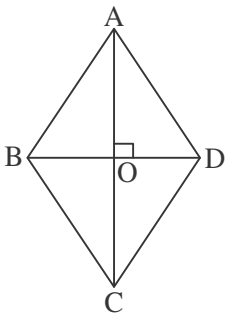
11. In the figure BO - AO. If AO = 6cm and BO = 8cm then find the length of the side of the triangle.

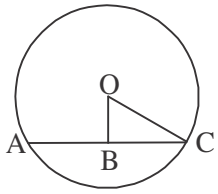


12. Prove that in a right angled triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.

CARD - 2

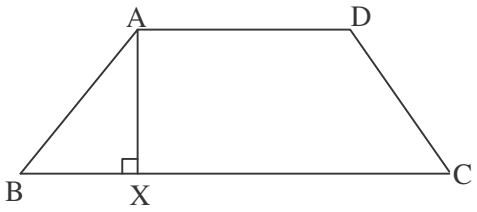
I. Solve the following problems

1. A ladder of 5m long rests against a wall at a height of 4m from the ground. Calculate the distance of thefoot of the ladder from the wall.
2. A man walls 8 km from the point 'A' towards north, and reaches pint B. From point 'B, he travels 6 km east and reaches point 'C'. Calculate the shortest distance between A and C.
3. If the diagonal of a square is $6\sqrt{2}$ cm, then find the length of the square and its peimeter.
4. The perimeter of a square is 36 cm. Find the length of its diagonal.
5. 

ABCD is a rhombus. Find the length of AD if the length of AC and BD is $2\sqrt{2}$ and $2\sqrt{3}$ respectively.
6. Area of an equilateral triangle is $\frac{8\sqrt{3}}{4}$ cm^2. Find its perimeter.
7. The triangle ABC is right angled at $\underline{|C}$. A square ABXY is constructed on AB. If AB = $5\sqrt{2}$ cm, show that the area of square ABYX is 50 cm^2
8. ΔABC is an equilateral triangle. AD $\perp$ BC. AD = $6\sqrt{3}$ cm show that the perimeter of ΔABC is 36 cm.
9. PQRS is a rhombus. Diagonals PR and QS itnersect at 'O'. Show that $PR^2 + QS^2 = 4PQ^2$.
10. 

'O' is the centre of the circle and the radius of the circle is 25 cm. If the length of the perpendicular drawn from the centre to the chord measures 7cm, then find the length of the chord.
11. A boy 60 cm tall stands erect in front of light source. If the length of the shadow is 80cm, then what is the distance of the top of his head from the farthest end of the shadow.
12. In a trapezium ABCD, if AB = 5cm, BC = 14 cm and AD = 7cm. Caclulate the length of AC.

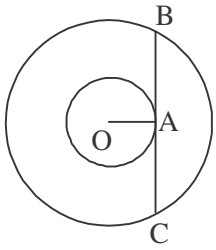
13



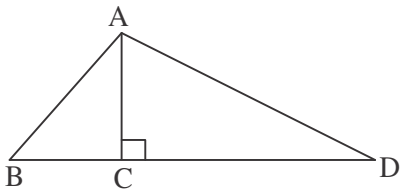
13. ABC is an isosceles triangle in which AB = AC. If AD ⊥ BC then prove that $AB^2 = 2AC^2$.
14. In ΔABC, AD ⊥ BC. Prove that $AB^2 + CD^2 = BD^2 + AC^2$.
15. In ΔABC, AD ⊥ BC. Prove that $AB^2 - BD^2 = AC^2 - CD^2$.
16. In a triangle if sum of the squares on any two sides is equal to the square on the third side, then prove that these two sides contain a right angle.

CARD - 3

I. Solve the following questions.

1. If *x, y, z* are pythagorean triplets, then prove that *kx, ky* and *kz* are also pythagorean triplets.
2. In an isosceles triangle the sum of two equal sides is 20 cm. The length of the altitude drawn from the vertical angle to the base is 8cm. Find the base of the triangle.
3. In a circle a chord of length 18 cm is at a distance of 12 cm from its centre. Find the diameter of the circle.
4. 

In the figure the radii of smaller and bigger circles are 5cm and 13 cm respectively. Find the length of the chord BC.
5. A ladder is kept obliquely against a vertical wall of height 20m above the ground. The foot of the ladder rests at a distance of 15m from the ground. The same ladder is turned in the opposite direction keeping the foot of the ladder at the same point. The top of the ladder rests against a vertical wall of height 15 m. Calculate the horizontal distance between the 2 walls.
6. Prove that the area of an equilateral triangle is $\frac{\sqrt{3}a^2}{4}$ where a is the measure of the side.
7. AD is the altitude from A to BC in triangle ABC and DB : CD = 3 : 1. Prove that $BC^2 = 2(AB^2 - AC^2)$.
8. The hypotenuse of a right angled triangles is 4 m more than the shortest side. If the third side of the triangle is 2 m more than the shortest side then find the sides of the triangle.

9. 

In the figure prove that $AB^2 - CD^2 = BC^2 - CD^2$.

10. The length of a pole is 15m and the length of its shadow is 36m. Find the distance between the top of the pole and the end point of the shadow.
11. ABC is right angled triangle. Three squares are constructed on the three sides of the triangle. If the area of two squares are $25cm^2$ and $9\ cm^2$ then find the area of the remaining square and also find the measure of the three sides of the triangle.
12. In Δ ABC, AD $\perp$ BC and $AD^2 = BD \cdot CD$. Prove that ΔABC is right angled at 'A'.
13. The measues of three angles of a triangle are in the ratio 1 : 2 : 3, which type of triangle is this?

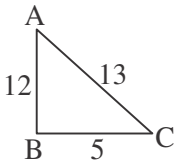
Chapter-12

TRIGNOMETRY

CARD - 1

Multiple Choice questions

1. The value of π^C = ...
   (a) 90° (b) 180° (c) 270° (d) 360°
2. In a right angled triangle, for the given acute angles the ratio between any two sides is always .....
   (a) a whole no. (b) Constant (c) Irrational (d) An integer
3. In the fig. $\sin\theta$ = ..., $\cos\theta$ = ..., $\tan\theta$ = ...



   (a) $\frac{12}{5}$ (b) $\frac{5}{12}$
   (c) $\frac{12}{13}$ (d) $\frac{5}{13}$
4. If $\sin\theta = \frac{3}{5}$ then cosec = ..., cos

   $\theta = \frac{4}{5}$ then cosec θ = ...,

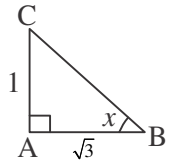
   $\cos\theta = \frac{4}{5}$ the sec θ = ...,

   $\tan\theta = \frac{3}{4}$ then cot θ = ...
5. If $\sin A = \frac{3}{5}$, $\cos A = \frac{4}{5}$ then tan = ...
6. If $\cot A = \frac{8}{15}$, $\sin A = \frac{15}{17}$, $\cos A$ = ...

   If $\tan A = \frac{15}{8}$, $\cos A = \frac{8}{17}$, $\sin A$ = ...
7. If $\tan A = \frac{3}{4}$, $\sin A$ = ..., $\cos A$ = ...

8. In the following, what trignometric ratios of angles from 0° to 90° equal to '0'.
   (a) sin 90°, cos 90°, tan 90° (b) sin 0, cos 0, tan 0
   (c) sin 0, cos 90, tan 0 (d) sin 0, tan 0, cot 0
9. Choose the trignometric ratios of angles from 0° to 90° chose value equal to 1.
   (a) sin 90°, cos 0, tan 45° (b) sin 0, cos 0, cos 0
   (c) sin 45, cos 45, tan 45° (d) sin 90°, cos 90°, tan 90°
10. Which of the following trignometric ratios of angles. from 0° to 90° are not defined?
   (a) tan 90°, sin 90°, cot 90° (b) cosec 90°, sec 90°, cot 90°
   (c) cosec 0°, cot 0°, sec 0° (d) cosec 0°, cot 0°, sec 90°
11. cos 60°, cos 30° – sin 60°, sin 30° = ...
   (a) $\frac{2\sqrt{3}}{4}$ (b) $\frac{6}{4}$ (c) $\frac{1}{4}$ (d) 0
12. If $\sqrt{2}$ cos θ = 1, then θ = ...
   (a) 30° (b) 45° (c) 60° (d) 90°
13. If $\sqrt{3}$ tan θ = 1, then θ = ...
14. $\sec^2 A - 1$ = ...
   (a) $\sin^2 A$ (b) $\cos^2 A$ (c) $\tan^2 A$ (d) $\cot^2 A$
15. $\sin^2 A + \cos^2 A$ = ...
   (a) 1 (b) 0 (c) ND (d) –1
16. $\sin^2 28° + \sin^2 62°$ = ...
   (a) 1 (b) 0 (c) –1 (d) $2 \sin^2 68°$
17. $\frac{\sin 19°}{\sin 71°} - \frac{\cos 11°}{\cos 19°}$ = ...
   (a) 0 (b) 1 (c) 2 (d) 9
18. Which of the following equal to sin 25° + cos 75° .....
   (a) cos 25 + cos 75° (b) cos 65° + sin 75°
   (c) cos 65° + sin 15° (d) sin 25° + sin 75°
19. While viewing the object above, the anlge formed by the horizontal line and line of sight is called .....
   (a) Angle of incident (b) Angle of elevation
   (c) Angle of depression (d) Angle of reflection.
20. While viewing the object below. the analog formed by the horizontal line and line of sight is called.....
21. If the height of a tower is 75m and it cast shadow of 75 m long then if a person stand at the tip of the shadow and observe the top of the tower then angle of elevation.
   (a) 30° (b) 45° (c) 60° (d) 90°

22. The value of x in the fig.



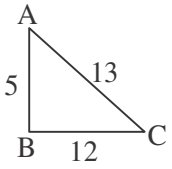
(a) 30° (b) 45°
(c) 60° (d) 90°

One Marks Questions

1. If $3 \tan \theta = 1$ then find $\sin \theta$ and $\cos \theta$.
2. If $2 \sin \theta = \sqrt{3}$ find $\cos \theta, \tan \theta$
3. Prove that $\sin 35° \sin 55° - \cos 35° \cos 55° = 0$
4. Prove that $\tan 10° \tan 150° \tan 75° \tan 80 = 1$
5. If $\sec 4A = \text{cosec}(A - 2C)$ where 4A is an acute angle find the vlaue of A.
6. Prove that $\sin^2 \theta + \cos^2 \theta = 1$
7. Prove that $1 + \cot^2 A = \text{cosec}^2 A$
8. Prove that $1 + \tan^2 A = \sec^2 A$
9. Prove that $\cos \theta \,.\, \text{cosec}\, \theta = \cot \theta$
10. A tower stands vertically on the ground. A person observe the top of the tower from a point on the ground. Which is 50m away from the foot of the tower. If the angle of devatiin is 40°. Find the height of tower.
11. Find the value x, if $\cos x = \cos 60 \,.\, \cos 30 + \sin 60 + \sin 30$.
12. Show that $(1 + \tan^2 \theta) \cos^2 \theta = 1$.
13. If $\beta = 15°$ prove that $4 \sin 2\beta \cos 4\beta \sin 6\beta = 1$.

Two Marks Questions

1. If $\cot \theta = \frac{20}{21}$ determine $\cos \theta$ and $\text{cosec}\, \theta$.
2. If $5 \cos \theta = 4 = 0$ find $\sin \theta + \cos \theta$.
3. Show that $\frac{\sqrt{3}\cos 23° - \sin 23°}{2} = \cos 53°$
4. Find the value of all trignometric ratios for the following angle of ΔABC.



5. If $\tan A = \frac{7}{24}$ find the other trignometric ratios of angle A.
6. If $\theta = 30$, prove that $4 \cos^2 \theta - 3 \cos \theta = \cos 3\theta$.
7. Find the value of $(\sin \theta + \cos \theta)^2 + (\sin \theta - \cos \theta)^2$
8. If $A = 60°$, $B = 30°$ the prove that $\cos (A + B) = \cos A, \cos B - \sin A, \sin B$.
9. A person parked his car infront a building of height $25\sqrt{3}$. He observed his car from the top of that building. If angle of depression is 30° then find the distance of the sector from the building.
10. If $\sin 5\theta = \cos 4\theta$, where 5θ and 4θ are acute angles find the value θ.

Three Marks Questions

1. Show that $\frac{1+\cos q}{1-\cos q} - \frac{1-\cos q}{1+\cos q} = 4\cot q . \text{cosec } q$
2. Two windmills of height 5 cm and 40 cm are on either side of the field. A person observes the top of the windmills from a point in between the towers. The angle of elevation was found in both the cases. Find distance between the windmills.
3. The angles of elevation of the top of a chiff as seen from the top and bottom of a building are 45° and 60° respectively. If the height of the building is 24m, find the height of the cliff.
4. The angle of elevation of top of a flagpost from a point on a horizontal ground is found to he 30. On walking 6m towards the post, the elevation increased by 150 find the height of the flag post.
5. A tree broken over by the wind forms a right angled triangle with the ground. If the broken part makes an angle of 60° with the ground, and the top of the tree is now 20m from its base, how tall was the tree?

Four Marks Questions

1. From a point 50m above the ground the angle of elevation of a doud is 30° and angle of depression its reflection is 60°. Find the ht of the cloud above the ground.
2. From the top of a building 16mt high, the angular elevation of the top of a hill is 60° and the angular depression of the foot of the hill is 30°. Find the height of the hill.

CARD - 2

Multiple Choice questions

1. During a particular time in a day if height of a pillar is equal to length of he shadow cast by it. Then angle of elevation to sun is .....

   (a) 30° (b) 60° (c) 90° (d) 45°

2. During a particular time in a day if height of a building equal to $\sqrt{3}$ of shadow then angle of depression is equal .....

   (a) 30° (b) 45° (c) 60° (d) 90°

3. What is the value of tan 90° .....

   (a) 0 (b) 1 (c) ND (d) $\sqrt{3}$

4. $\frac{\sin 26°}{\sec 64°} + \frac{\cos 26}{\text{cosec } 64°} =$ .....

   (a) 0 (b) 2 (c) ½ (d) 1

5. $\frac{\cot 54°}{\tan 36} + \frac{\tan 20°}{\cot 70} - 2 =$ .....

   (a) 0 (b) 1

6. Which of the following are identities.
   (i) $\sin^2 x + \cos^2 x = 1$ (ii) $1 + \tan^2 x = \sec^2 x$ (iii) $1 + \cot^2 x = \operatorname{cosec}^2 x$
   (a) Only (i) (b) (i) and (ii) (c) all these (d) None of these
7. $\sec^2\theta - \tan^2\theta =$ .....
   (a) 1 (b) –1 (c) $\sec\theta$ (d) None

One Mark questions

1. Find the height of the wall, when a ladder of length 15m furman angle 60° with the wall.
2. Prove that $\sin^2\frac{p}{6} + \cos^2\frac{p}{3} - \tan\frac{p}{4} = \frac{1}{2}$.
3. If $\sqrt{3}\tan x = 3$. Find x.
4. If $\tan\theta + \cot\theta = z$, $\theta < 90°$. Find the valued of $\sin\theta$.
5. If $\tan\theta = \frac{7}{8}$ and $\theta < 90$ then find the value of $\sqrt{\frac{(1+\cos q)(1-\cos q)}{(1+\sin q)(1-\sin q)}}$.

Two Marks question

1. $\sec x = 2$, then find $\cot x + \operatorname{cosec} x$.
2. If $13\sin A = 5$ and A is acute find the value of $\frac{5\sin A - 2\cos A}{\tan A}$.
3. If $\cos\theta = \frac{5}{13}$ and q is a cute, find the value of $\frac{5\tan q + 12\cot q}{5\tan q - 12\cot q}$.
4. If $13\cos\theta - 5 = 0$. Find $\frac{\sin q + \cos q}{\sin q - \cos q}$.
5. If $\cot\theta = \sqrt{7}$ S.T $\frac{\operatorname{cosec}^2 q - \sec^2 q}{\operatorname{cosec}^2 + \sec^2 q} = \frac{3}{4}$.
6. If $A = \sqrt{2} - 1$ S.T $\frac{\tan A}{1+\tan^2 A} = \frac{\sqrt{2}}{4}$.
7. If $\sec\theta = \frac{4}{5}$ .S.T $\frac{\tan q}{1+\tan^2 q} = \frac{\sin q}{\sec q}$.
8. If $\tan\theta = \frac{4}{3}$. Find the value of $\frac{3\sin q + 2\cos q}{3\sin q - 2\cos q}$.

9. Evaluate $\frac{\cos 45°}{\sec 30° + \operatorname{cosec} 30°}$

10. Show that $\frac{\sin(90° - q)}{1 + \sin q} + \frac{\cos q}{1 - \cos(90° - q)} = 2 \sec q$

Three and Four Marks

1. If $\sec (1 + \sin \theta)(1 - \sin \theta) = k$. Find the value of k.

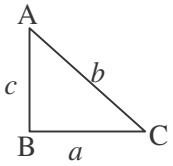
2. If $\tan(\theta_1 + \theta_2) = \frac{\tan q_1 + \tan q_2}{1 - \tan q_1 \tan q_2} q_1$ and $q_2 < 90°$ and if $\tan \theta_1 = \frac{1}{2}$, $\tan q_2 = \frac{1}{3}$ then find the value of $(\theta_1 + \theta_2)$.

CARD - 3

Multiple Choice questions

1. $a \sin \theta = b$ where θ is acute then the value of $\sqrt{a^2 - b^2}$ cot q is =.....

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

2. 

   In a rt $\angle d$ Δ ABC $\hat{B} = 90°$, AB = c, BC = a, AC = b then cot A + cot C = ...

   (a) $\frac{c^2}{ab}$ (b) $a + b$ (c) $\frac{c^2}{bc}$ (d) $\frac{b^2}{ac}$

3. $\sec^2 \theta \cdot \cos^2 \theta$ = ...

   (a) $(1 + \tan^2 \theta)$ (b) $\cot^2 \theta + \tan^2 \theta + 1$ (c) $\cot^2 \theta + \tan^2 \theta$ (d) $\cot^2 \theta + \tan^2 \theta + 2$

4. $\sin^2 \theta \cdot \cos^2 \theta$ = ...

   (a) 1 (b) $2 + \sin^2 \theta \cdot \cos^2 \theta$

   (c) $1 + \sin^2 \theta \cos^2 \theta$ (d) $1 - \sin^2 \theta + \cos^2 \theta$

5. If the height of a tree is $\sqrt{3}$ times the length of its shadow at one time and equal to its shadow at another time, then the angled elevation of sun.

   (a) 30°, 45 (b) 60, 45° (c) 30°, 60° (d) 45°, 90°

6. Angle of elevation is the angle formed between

   (a) Normal and Horizontal line (b) Normal and line to sigh

   (c) Line of sight and Horizontal line (d) Normal and normal

One Mark questions

1. If $4 \sin^2 \theta - 1 = 0$ and $\theta < 90°$ then find the value of θ.
2. If $\sin \theta = \frac{5}{13}$ find the value of other T - ratio.
3. If $\sin \theta = \frac{5}{13}$ for $\theta < 90°$ find the value of $\tan \theta + \frac{1}{2}$
4. Find the value of $\sin^2 45°$, $\cos 60°$, $\tan 30°$.
5. If $\cot \theta = a - \frac{1}{4a}$ then find the value of $\operatorname{cosec} \theta - \cot \theta$.
6. If $3x = \sec \theta$ and $\frac{3}{x} = \tan \theta$ then find the value of $x^2 - \frac{1}{x^2}$.
7. Find the value $\cot^2 q - \frac{1}{\sin^2 q}$
8. Find the value of $(\sin \alpha + \cos \alpha)^2 + (\cos \alpha + \sec \alpha)^2 - (\tan \alpha + \cot \alpha)^2$

Two Marks Questions

1. If $x = a \cos \theta$, $y = b \sin \theta$. Prove that $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
2. Prove that $\sec^2 \theta - 1 = 2 \tan^2 \theta + \tan^4 \theta$.
3. If $m = a \sec \theta + b \tan \theta$; $n = a \tan \theta + b \sec \theta$. Prove that $m^2 - n^2 = a^2 - b^2$.
4. Prove that $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A} = \sin A + \cos A$.
5. Prove that $(1 + \tan^2 \theta)(1 - \sin \theta)(1 + \sin \theta) = 1$.
6. Prove that $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$.

Three Marks Questions.

1. If $\sec \theta + \tan \theta = p$. prove that $\sin \theta = \frac{p^2 - 1}{p^2 + 1}$.
2. If $\operatorname{cosec} \theta - \sin \theta = l$ and $\sec - \cos \theta = m$ S.T $l^2 m^2 (l^2 + m^2 + 3) = 1$.
3. If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$ show that $m^2 - n^2 = 4\sqrt{mn}$.
4. If $\tan \theta = \frac{p}{q}$. S.T $\frac{p \sin q - q \cos q}{p \sin q + q \cos q} = \frac{p^2 - q^2}{p^2 + q^2}$.

5. If a sec α – 3 tan 4 and b sec α + 4 tab α = 3. Then find the value of $a^2 + b^2$.
6. If sec $\theta = \frac{5}{4}$ prove that $\frac{\tan q}{1+ \tan^2 q} = \frac{\sin q}{\sec q}$.
7. Angle of depression at point 100m above sec level is 30°. After some time and of depression is 45°. Find the distance travelled by the ship.

Four Mark Questions

1. A man at the top of a vertical observation tower observes a car moving at a uniform speed coming directly towards the tower. If it takes 12 minutes for the angle of depression to change from 30° to 45°, how much after this will the car reach the observation tower?
2. A ladder of length 3 meter makes an angle of 30° with the floor while leaning against one wall of room. If the foot of the ladder is kept fixed on the floor lean against the opposite wall of the room. It makes an angle of 60° with the floor. Find the distance between these two wall of the room.b

MODEL QUESTION PAPERS

COORDINATE GEOMETRY

MATCH THE FOLLOWING QUESTIONS

Card-1,2,3

1. **The branch of mathematics treats geometry algebraically is known as _____**

   (a) Geo algebra (b) Algebraic geometry

   (c) Co ordinate geometry (d) Algometry

2. **The angle formed by the linear graph with positive direction of x axis is called_____**

   (a) Inclination (b) Declination (c) Elevation (d) Depression

3. **In which of the below instances the slope of a staircase to a building reduces the strain of chambering**

   (a) Slope = 0.34 (b) Slope = 1 (c) Slope = 1.65 (d) Slope = ND

4. **Slope of a line demated by m = _____**

   (a) tan (b) sin (c) cos (d) cot

5. **Gradient of a straight line is defined as_____**

   (a) (b) (c) (d)

6. **Gradient of a straight line me thing but of a straight line _____**

   (a) Length (b) Slope (c) Inclination (d) Declination

7. **Slope of line passing thought the paints (x,y) and (x2 , y2) is given by_____**

   (a) (b) (c) (d)

8. **Slopes of parallel lines are _____**

   (a) Equal and operate (b) Not equal

   (c) Equal (d) perpendicular

9. **If two lines are mutually perpendicular to each other, then product of their slopes is _____**

   (a) 0 (b) 1 (c) – 1 (d) ND

10. **If the inclination of a line is 60°, then its slope _____**

    (a) $\frac{1}{\sqrt{3}}$ (b) 1 (c) ND (d) $\sqrt{3}$

10th standard

11. Slope of the line joining this points (5, –2) & (4, 5) _____

(a) 7 (b) – 7 (c) 3 (d) 7/4

12. If the product of the slopes of two lines is equal to – 1 then those two lines are____

(a) Parallel (b) Perpendicular (c) Equal (d) Not equal

13. If slope of line PQ = Z and Rs. = 2 then those two lines are ____

(a) Parallel (b) Perpendicular (c) Equal (d) Not equal

14. If the slope of a line is $1/\sqrt{3}$ then the angle of inclination is ____

(a) 30° (b) 45° (c) 60° (d) 90°

15. The distance between the points (a sin 25.0) and (0.a sin 65) is ____

(a) a (b) 2a (c) 3a (d) 4a

16. The line segment is of length 10 units. If the co ordinates of its one end are (2, – 3) and the abscissa of the other end is 10, then its ordinate is ____

(a) 9 or 6 (b) 3 or – 9 (c) – 3 or 9 (d) 9 or – 6

17. The permutes of the triangle formed by the points (0,0) (1, 0) and (0,1) is ____

(a) $1 \pm \sqrt{2}$ (b) $\sqrt{2}+1$ (c) 3 (d) $2+\sqrt{2}$

18. The coordinates of any point on x axis are _____

(a) (0,0) (b) $(x, 0)$ (c) $(0,x)$ (d) (x, y)

19. The distance between points P (x, y) & q (x_2, y_2) is given by PQ = _____

(a) $\sqrt{(x_1+x_2)^2+(y_1+y_2)^2}$ (b) $\sqrt{(x_2-x_1)^2-(y_2-y_1)^2}$

(c) $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ (d) $\sqrt{(x_2+x_1)^2-(y_2+y_1)^2}$

20. Distance between points (x, y) from the origin 0 (0,0) is given by op= _____

(a) $\sqrt{x^2-y^2}$ (b) x^2+y^2 (c) x^2-y^2 (d) $\sqrt{x^2+y^2}$

21. The coordinates of the points which divides the line joining the points P (x, y) and Q (x_2, y_2) internally in the ratio in are _____

(a) $\left(\frac{mx_2+nx_1}{m+n}, \frac{my_2+ny_1}{m+n}\right)$ (b) $\left(\frac{m+n}{mn}, \frac{m-n}{mn}\right)$

(c) $\left(\frac{mx_2+mx_1}{m}, \frac{ny_1+ny_2}{n}\right)$ (d) $\left(\frac{mx_1+ny_1}{m+n}, \frac{mx_2+ny_2}{m+n}\right)$

22. The coordinates of the mid points of the line segment joining the points $A(x_1, y_1)$ $B(x_2, y_2)$ are _____

(a) $\left(\frac{x_1 + x_1}{2}, \frac{y_1 + y_2}{2}\right)$ (b) $\left(\frac{x_1 - x_1}{2}, \frac{y_1 - y_2}{2}\right)$

(c) $\left(\frac{x_1 - y_1}{2}, \frac{x_2 - y_2}{2}\right)$ (d) $\left(\frac{x_1 + y_1}{2}, \frac{x_2 + y_2}{2}\right)$

ONE MARK QUESTIONS

Card-1

1. Define slope of a line.
2. What do meant by m = tan .
3. Define gradient of straight-line.
4. Find the slope of the line whose inclination is 45°
5. Find the angle of inclination of straight lines whose slopes are
6. Find the slope of the line joining the points (0, -8) (- 4, 0).
7. Write mid points formula.
8. What are the coordinates of a point which divide the line joining the points (x , y) & (x2 , y2) in the ratio m : n

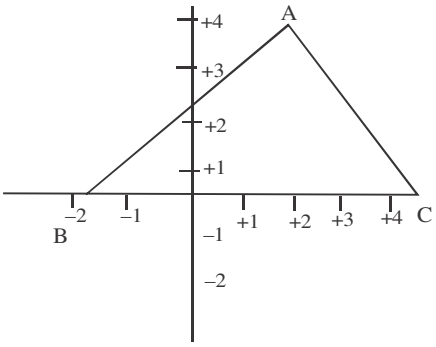
TWO MARK QUESTIONS

1. Find the slope of the lines drawn through the two pairs? points (4,5) and (–12, 3).
2. Find the distance between the origin and the points (–6, 8).
3. Find whether the line drawn through the two pairs of points are parallel or perpendicular. (3,3) (4,6) and (4,1) (6,7).
4. A line passing through the points (1,0) (4,3) is perpendicular to the line joining (–2, –1) and (m,0). Find the value of m.
5. Find the slope of the line
   (1) parallel (2) Perpendicular to the line joining the points (– 4,3) & (2,5)
6. The equation of a line is $3x + 2y + 1 = 0$ find its slope and y intercept.
7. If (0,0) (3, $\sqrt{3}$) and (3,k) are the coordinates of the equilateral triangle calculate the value of k.

10th standard

ONE MARK QUESTIONS

Card-2

1. There is no road laid straight up to the top of the will why?
2. Why slopes of parallel lines are equal?
3. Find the distance between the pair δ points (cosθ, –sinθ) (sinθ, cosθ).
4. 

In the figure what is coordinates of the vertices A,B & C.
5. If (3,4) and (5,k) are the coordinates of the endpoints of the line segment of length $\sqrt{5}$ find k.
6. Find the equation δ a line whose slope 1/2 and *y* - intercept is – 3.

TWO MARK QUESTIONS

1. The distance between the points (3,2*x*) and (0,*x*) is 5 units find *x*.
2. Find the value of 'a' if a point P(2, – 1) is equidistance from the points (a,7) and (– 3,a).
3. Find the perimeter of a triangle whose vertices have the following ordinates (3,0), (5,2) (14,12).
4. Prove that the points A (1, –3) B (–3,0) and C (4,1) and the vertices of a right isosceles triangle.
5. Find the radios of a circle whose centre is (–5,4) and passes through the point (–7, 1).
6. Prove that the following set of coordinates are the vertices of parallelograms (–5,3) (1,–11) (7, –6) (1,2).
7. Identify the types of triangle whose vertices have the following coordinates.
   (i) (2,1) (10,1) (6,9)
   (ii) (1,6) (3,2) (10,8)
   (iii) (3,5) (–1,1) (6,2)
   (iv) (3, –3) (3,5) (11, –3)
8. Show that the triangle whose vertices are (8, –4), (9,5) and (0,4) is an isosceles triangle.
9. Let A (–3,–2) B (5,–2) C (9,3) and D (1,3) are the vertices of a parallelogram find the length of the diagonals AC and BD.
10. In what ratio does the points (2, –3) divide the line segment joining the points (–3,5) and (4,–9).

11. If the point C (1,1) divides the line segments joining (–2,7) and B in the ratio 3:2 find the coordinates of B.
12. Find the coordinates of the midpoint of the line joining the points (–3,10) & (6,8).

THERR MARK QUESTIONS

1. Show that the points A (a,a) B (–a,a) and C (–a, $\sqrt{3}$) form an equilateral triangle.
2. If the point (x,y) be (equidistance) from the points (a + b, b – a) & (a – b, a+b) prove that $bx = ay$
3. Find the vertices of a triangle the midpoint of whose sides are (3,1) (5,6) & (– 3,2).

ONE MARK QUESTIONS

Card-3

1. What are the coordinates of the un trail of triangle formed by points (x_1,y_1) (x_2,y_2) (x_3, y_3)?
2. Show that the product of slopes of mutually perpendicular is – 1.
3. What are the slopes of line parallel x axis and y axis.
4. Find the angle of inclination of straight line whose slope is '0'?
5. What is the coordinates of the mid points of the line joining the points (3,4) & (5,6)

TWO MARK QUESTIONS

1. If A (–2,5) B (1, –3) and C (a,b) form an isosceles triangle show that 6 a – 16 b + 19 = 0 given BC = AC.
2. The centre of a circle is $(x, 5x + 3)$ Find x if the circle passer through (7,15) and the length of its diameter is 10 units.
3. The vertices of a triangle are (0,–3) (1,2) and (3, –1) find the coordinates of the circumventer of the triangle.
4. Find out if the points A (– 3,3), B (–1, –1) and C (2, –1) are collinear or not.
5. Verify whether the line $3x – 7 = –y$ pass through the trisection of the line segment joining points A (2,1) and B (5, –8)?
6. The points (3, –4) and (–6,2) are the extremities of a diagonal of a parallelogram if the third vertex
7. Plot the triangle ABC where A (1,2), B (3,4), C (0,7) with suitable units.

10th standard

THREE MARK QUESTIONS

1. Find the ratio is which the point (–1, k) divides the line segment joining the points (3,10) and (6,–8) and also find the value of K.
2. Three consecutive vertices of a parallelogram are A (1,2) B (2,3) and (8,5) find the fourth vertex [Hint diagonals of a parallelogram bisect each other]
3. Line APB meets the x - axis at A and y axis at B, P (–4, –2) is a point such that AP : PB = 3:2 white the coordinates of A and B.
4. The line segment joining A (2,3) and B (6, –5) is intersected by the x axis at a point k.
   (a) Write down the ordinates of K
   (b) Hence find the ratio in which K divides AB.
5. P (–5,–6) and Q (3,–4) are two fixed points line segment PQ is divided into five equal parts such that 5AP = 3PQ. Find the coordination of Part. A.
6. For what value of k will points (i) (k,6) (ii) (3,–k) lie on the mid point of the line $9x + 4y = 3$

******

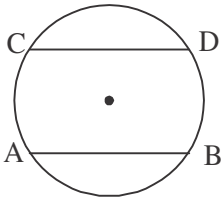
Chapter-14

CI RCLES

CARD - 1

Below Average Questions (MCQ's and One Marks Questions)

1. If the length of the chord increases, its perpendicular distance from the centre .....
   (a) Zero (b) Decreases (c) Increases (d) No Change

2. 

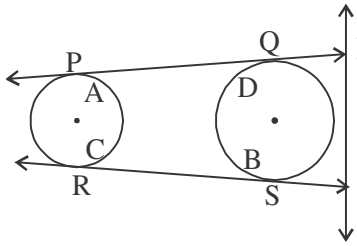
From the figure AB = CD = 8cm, perpendicular distance from the centre 'O' to 'AB' is 3cm. What is the perpendicular distance from the centre 'O' to CD is
   (a) 5cm (b) 8cm
   (c) 3cm (d) 6 cm

3. A straight line which touches the circles at only one point is called a .....
   (a) Tangent (b) Chord (c) Secant (d) Radius

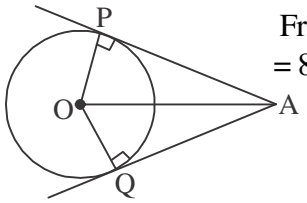
4. A straight line which intersects a circle at two distinct points is called a .....
   (a) Tangent (b) Secant (c) Diameter (d) Radius

5. Distance between the centre of the two circles touching externally is .....
   (a) R + r (b) R – r (c) 2R (d) 2r

6. Distance between the centres of the two circle touching internally is .....
   (a) 2R (b) 2r (c) R + r (d) R – r

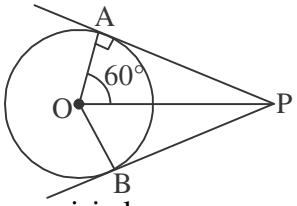
7. 

In figure, How many tangents are there .....
   (a) 3 (b) 4 (c) 5 (d) 6

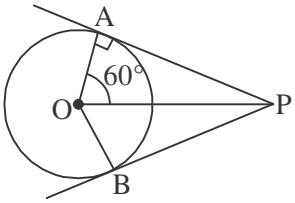
8. 

From the figure PA and QA are tangents from the external point 'A' PA = 8 cm and QA = ...
   (a) 6 cm (b) 10 cm
   (c) 8 cm (d) 7 cm

9. In Figure $\angle AOP = 60°$ and $\angle BOP$ is



(a) 90°
(b) 60°
(c) 30°
(d) 80°

10. Angles in semicircles are .....
    (a) Acute angles (b) Obtuse angles
    (c) Right angles (d) Straight angles.
11. What is meant by Direct common tangents.
12. What is meant by Transverse common tangents.
13. 

In figure, AC is diameter $\angle BAC = 45°$. Find the other angles.
14. If two circles at radio 5 cm and 3 cm touch each other externally. Find the distance between centres of circles.
15. If two circles of radio 5 cm and 3 cm touch each other internally, find the distance between centres of circles.

Below Average (2 Marks)

16. Draw a circles of radius 4 cm and construct a chord of 6cm length on it.
17. Draw a circles of radius 4 cm and construct a tangent at any point on them circle.
18. In a circles of radius 4.5 cm draw two radii such that the angle between the is 70 construct tangents at the non-centre ends of the radii.
19. Draw a circle of radius 4.5 cm and a chord PQ of length 7 cm in it, construct the tangents at the ends of the chord.
20. In a circle of radius 4.5 cm draw two equal chords of length 5 cm on either sides of the centre. Draw tangents at the end points of the chords.
21. Draw a circle of radius 6cm and construct tangents to it form an external point 10 cm away from the centre. Measure and verify the length of the tangents.
22. Construct a pair of tangents to a circle of radius 3.5 cm from a point 3.5 cm away from the circle.
23. Construct two circles of radii 4.5 cm and 2.5 cm whose centres are at 7cm apart. Draw Direct common tangent.

Below Avarage Questions (3 mark and 4 marks)

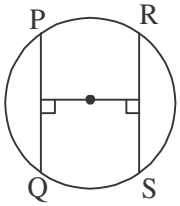
24. Construct a direct common tangent to two circle of radii 4 cm and 2cm, whose centres are 8 cm apart. Measure and verify the length of the tangent.
25. Draw a transverse common tangent to two congruent circles of radii 2.5 cm whose centres are 8 cm apart.
27. Draw two congruent circles of radii 3 cm, having their centres 10 cm apart, draw a direct common tangent.
28. Prove that, if two circles touch each other, the centres and the point of contact are collinear.
29. Prove that the tangents drawn from an external point to a circle (a) Are equal (b) Subtend equal angles at the centre (c) Are equally inclined to the line joining the centre and the external point.

CARD - 2

(MCQ's and 1Mark Questions)

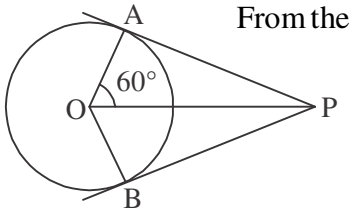
1. The perpendicular distance between the biggest chord and the centre is .....

   (a) Zero (b) Not equal to zero (c) Increases (d) Decreases.

2. 

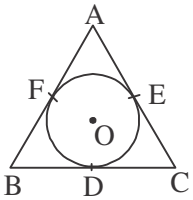
   In figure, chords PQ and RS are equidistant from centre of circle, PQ = 6 cm and RS = ...

   (a) 5cm (b) 6cm
   (c) 8 cm (d) 3 cm

3. 

   From the figure $\angle AOP = 60°$ and $\angle APO$ = ...

   (a) 60° (b) 50°
   (c) 90° (d) 30°

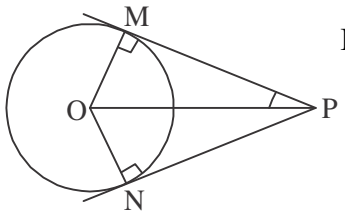
4. 

   In the given ΔABC, AB = 12 cm, BC = 5 cm, AE = ...

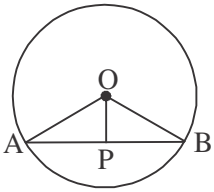
   (a) 5 cm (b) 6cm
   (c) 7 cm (d) 12 cm

5. Find the length of the tangent if the distance between the centre of circles to a point is 2.5 cm and the radius of circles is 1.5 cm.

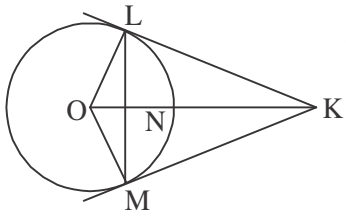
   (a) 3 cm (b) 4 cm (c) 5 cm (d) 2 cm

6. 

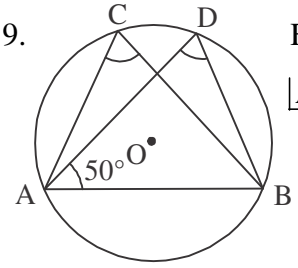
In the given figure $\angle MPO = 35°$. Find the measure of $\angle NOP$

7. 

From the given fig $\angle AOP = 55°$ and find the $\angle AOB$?

8. 

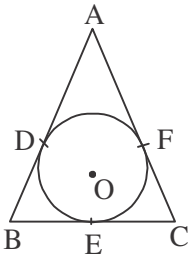
From the given figure $\angle NLO = 25°$, find the measure of $\angle LKN$

9. 

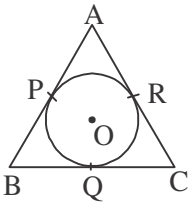
From the given figure $\angle ACB = 60°$, $\angle DAB = 50°$ find the measure of $\angle ABD$.

10. The radii of 3 circles are 3cm, 4cm, 5 cm and touch each other externally. Find the perimeter of triangle.

Average questions (Two Marks)

11. Three circles touch each other externally. Find the radii of the circles if the sides of the triangle formed by joining the centre are 7 cm, 8 cm and 9 cm respectively.
12. Construct a tangent to a circle of radius 5.5 cm from a point 3.5 cm a way from it.
13. 

In the given ΔABC, AB = 12 cm, BC = 8 cm and AC = 10 cm. Find AF, BD and CE.

14. In a circle radius 3.5 cm draw two mutually perpendicular diameters. Construct tangent at the ends of the diameters.
15. Draw a circles of radius 3 cm and construct a pair of tangents such that the angle between them is 40.
16. 

In the figure, Show the perimeter of $\Delta ABC = 2 (AP + BQ + CR)$.
17. Construct tangents to two concentric circles of radii 2 cm and 4 cm from a point 8 cm away from the centre.

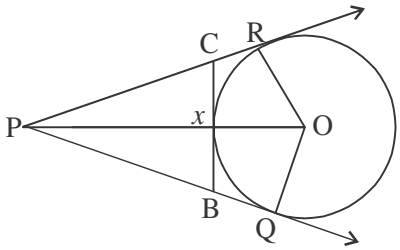
Average Question (Three and Four Mark Question)

19. Construct a direct common tangent to two externally touching circles of radii 4.5 cm.
20. Draw direct common tangents to two circles of radii 5 cm and 3 cm having their centres 5 cm apart.
21. Two circles of radii 4.5 cm and 2.5 cm touch each other externally. Draw a transverse common tangent.
22. Construct a trensverse common tangent to two circles of radii 4 cm and 3 cm whose centre are 10 cm apart. Measure and verify by calculation.
24. Prove that if two circles touch each other, the centres and the point of contact are collinear.

CARD - 3

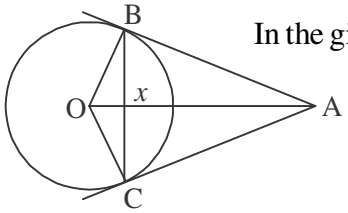
1. The distance between centres of two circles is 2 cm the radii of circles are 5 cm and 3 cm then the two circles touch each other .....

(a) Externally (b) Internally (c) Intersect (d) None of the above

2. 

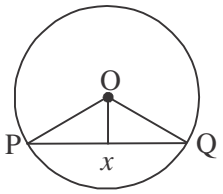
In the figure PQ, PR and BC are the tangents to the circles PQ = 8 cm, PB = 5 cm and BX = ...

(a) 8 cm (b) 5 cm
(c) 3 cm (d) 2 cm

3. 

In the given figure $\angle BOX = 65°$ then $\angle BAO$ = ...

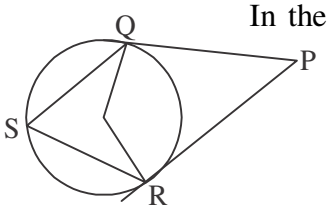
(a) 25° (b) 35°
(c) 45° (d) 55°

4. 

In the figure circles having radius 5 cm, OX is the perpendicular to the chord length is 4 cm, Find the length of the chord 'PQ'.

(a) 5 cm (b) 4 cm

(c) 6 cm (d) 10 cm

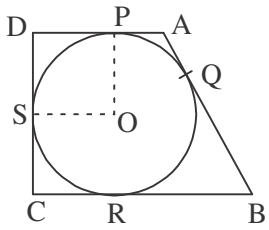
5. 

In the given figure $\angle QOR = 110°$ and $\angle QPR$ = ...

(a) 60° (b) 70°

(c) 50° (d) 55°

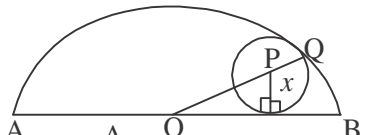
6. Two concentric circles of radii 13 cm and 5 cm are drwn. Find the length of the chord of the outer circle which touches the inner circle.
7. Draw a circle of radius 3.5 cm and construct a central angle of measure 80° and an inscribed angle subtended by the same arc construct tangents at the points on the circle. Extend tangents at the points on the circle. Extend tangents to interest. What do you observe?
8. Draw of circle of radius 3 cm and construct pair of tangents such that the angle between them is 40.
9. In the given quadrilateral ABCD BC = 38 cm, QB = 27 cm, DC = 25 cm and AD $\perp$ DC. Find the radius of the circle.



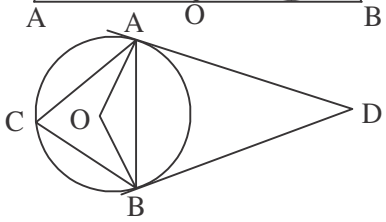
10. Draw a pair of perpendicular tangents of length 5 cm to a circle.

Above Average questions (3 Marks and 4 Marks)

11. Draw a direct common tangent to two internally touching circles of radii 4.5 cm and 2.5 cm.
12. Draw direct common tangents to two circles of radii 5 cm and 3 cm having their centres 5 cm apart and measure its length using formula.
13. Draw transverse common tangents of length 8 cm to two circles of radii 4 cm and 2 cm.
14. Construct two circles of radii 2.5 cm and 3.5 cm whose centres are 8 cm apart. Construct a transverse common tangent. Measure its length and verify by calculation.
15. In the fig. AB = 10 cm, AC = 6 cm and the radius of the smaller circle is '*x*' cm. Find *x*.



16. In the given figure AB = BC, $\angle ABC = 68°$ DA and DB are the tangents to the circle with centre O. Calculate the measure of (i) $\angle ACB$ (ii) $\angle AOB$ (iii) $\angle ADB$.



Chapter - 17
GRAPH AND POLYHEDRA
CARD - 1

Know this

* A set of points in which points are joined in pairs by lines is called a **Network** or **graph**.
* A point with atleast one path leading from it is called a 'node'.
* The line segments or curved lines joining the nodes in pairs are called **'Arcs'** of the network.
* In a network, the area of space bounded by an arc or arcs is called **'region**'.
* **'Loop'** is a single arc connecting a node to itself
* Euler's formula for networks or graph

  $N + R = A + 2$
* The number of arcs drawn from a node is called the 'order of the node'
* Euler's formula for polyhedra

  $F + V = E + 2$
* Condition for traversibility of a graph

  * It should have only even nodes

  * It should have only two odd nodes.

  Non traversible, If it has more than two odd nodes.

I. Choose the correct answer.

1. A set of points in which points are joined in pairs by lines is called

   (a) Graph (b) Triangle (c) Quadrilateral (d) Square

2. Number of nodes in this graph

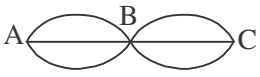
   (a) 2

   (b) 3

   (c) 4

   (d) 5

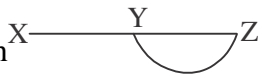
3. Number of arcs in this graph



   (a) 3 (b) 5

   (c) 6 (d) 7

4. Number of Regions in this graph



   (a) 1 (b) 2

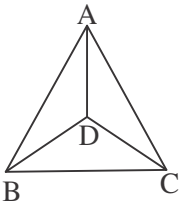
   (c) 3 (d) 4

5. Eulers formula for Network
   (a) N + A = R + 2 (b) R + A = N + 2
   (b) N + R = A + 2 (d) N + R + A = 2
6. Condition for traversable graph
   (a) If it has only odd nodes (b) If it has only even nodes
   (c) If it has minimum two odd nodes (d) If it has minimum two even nodes
7. Order of node 'A' in this graph A
   (a) 1 (b) 2
   (c) 3 (d) 4
8. Total number of regular polyhedrons
   (a) 5 (b) 10 (c) 15 (d) 20
9. Eulers formula for polyhedron
   (a) N + R = A + 2 (b) N + A = R + 2
   (c) F + V = E + 2 (d) F + E = V + 2
10. The number of faces and edges of a solid are 8 and 18 respectively then the vertices is
    (a) 10 (b) 12 (c) 14 (d) 16

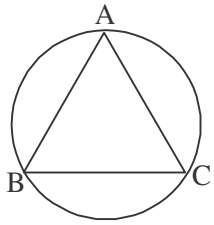
POLYHEDRA AND NETWORK

I. Verify Euler's formula for these network.

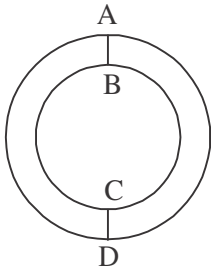
(1)



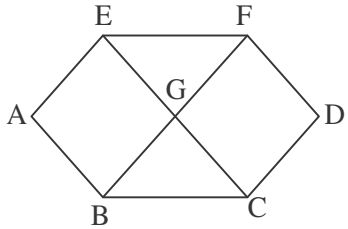
(2)



(3)



(4)

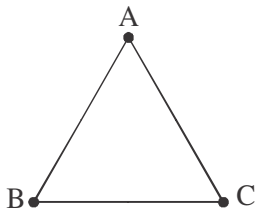


II. Draw the graph for the given values of N.A.R

Sl.No.	N	R	A
1	4	4	6
2	3	5	6
3	3	4	5
4	1	2	1
5	5	5	8
6	2	3	3
7	4	2	4
8	7	5	10

III. Find the order and types of each node in the following graph.

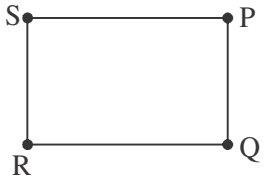
(1)



Node	Order	Type
A	2	Even
B	2	Even
C	2	Even

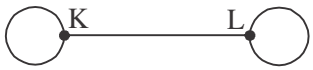
(2)

(3)

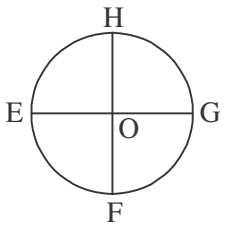


(4)

(5)



(6)

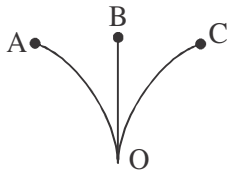


IV. Verify transversability of the following network.

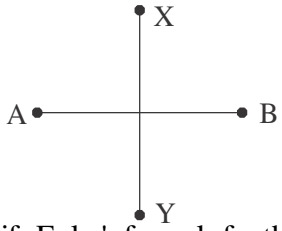
Note: Transversable network is which has all even nodes or maximum only two odd nodes.

(1)

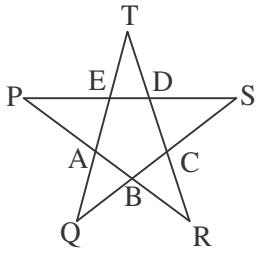
(2)



(3)

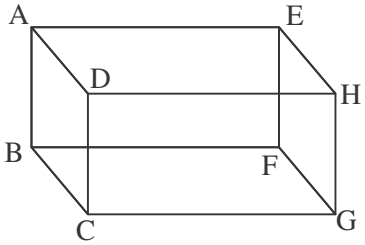


(4)

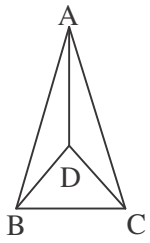


V. Verify Euler's formula for the following polyhedral.

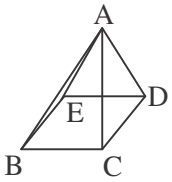
(1)



(2)



(3)



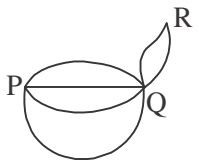
(4) Tetrahedron

(5) Hexagonal based prism.

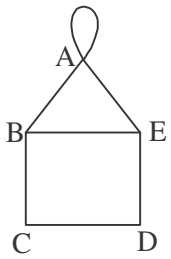
CARD - 2

I. Verify Euler's formula for these network.

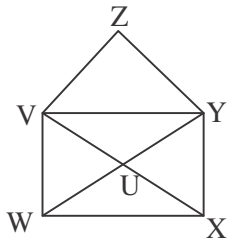
(1)



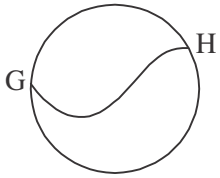
(2)



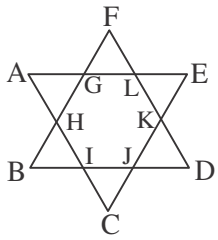
(3)



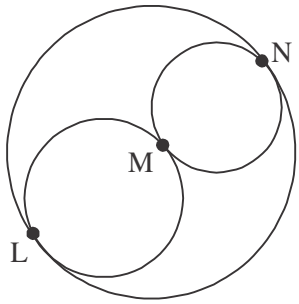
(4)



(5)



(6)

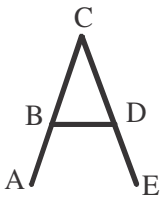


II. Draw the graph for the given value of N.A.R

Q.No.	N	A	R
1	4	7	5
2	3	6	5
3	3	4	3
4	6	10	6
5	5	7	4

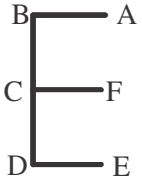
III. Find the order and types of each node in the following graph.

(1)

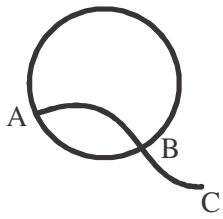


(2)

(3)

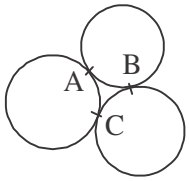


(4)

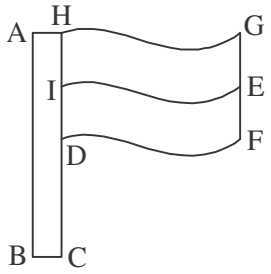


IV. Verify transversability

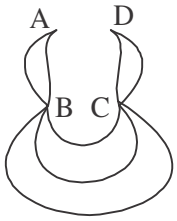
(1)



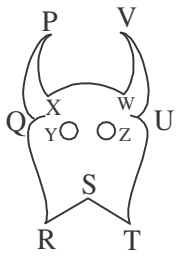
(2)



(3)

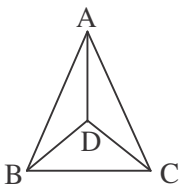


(4)

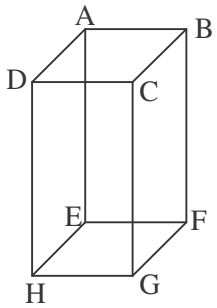


V. Verify Euler's formula for these polyhedra

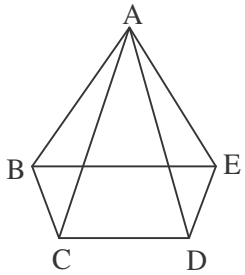
(1)



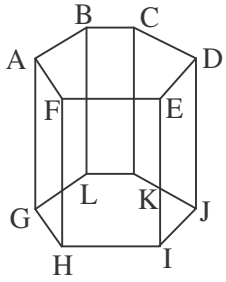
(2)



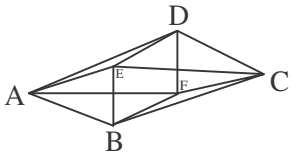
(3)



(4)



(5)



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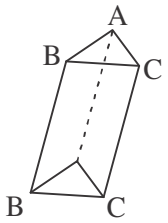

(7) Octahedron

(8) Dodecahedron

(9) Icosahedron

(10) Pentagonal based pyramid