10 th Mathematics

Syllabus wise

Below-20

Lesson	Heading	Marks
9	Practical geometry(Tangents,cyclic quadrilateral)	10
10	Graph(Rectangular hyperbola)	10
1	Sets and functions(venn diagrams,domains, Co-domains,image,pre-image)	14

34-marks

20+

Lesson	Heading	Marks
3	Algebra[synthetic division,factorization,square root]	19
12	Probability[coins,dice,cards,balls,fruits]	7

60-marks

40+

Lesson	Heading	Marks
2	Sequences and series of real numbers[AP,GP,tn,sn,$\sum n$,$\sum n^2$,$\sum n^3$]	12
4	Matrices[Addition,Subtraction,Multiplication(AB)^T, A^2-4A+5I_2=0,order of a matrix,transpose,no.of elements]	9

81-marks

60+

Lesson	Heading	Marks
8	Mensuration[combined figures,no.of items,melted and cast, TSA,CSA,Volume,ratios,radius,hight]	14
5	Coordinate geometry[mid point,forming equations, Perpendicular,parallel,area of triangles_quadrilaterals]	14

109-marks

80+

Lesson	Heading	Marks
6	Geometry[thales,pythagorus,anglebisector, tangent_th eorems Similar triangles]	7
11	Statistics[standard deviation,range,coefficient of range,Coefficient of variation]	7
7	Trigonometry[Exercise 7.2only]	9

132-marks

One mark Questions   15

147-marks

QUESTION WISE
BELOW 20

Question.No	Heading	Marks
46	9.practical geometry(tangent,cyclic quadrilateral	10
47	10.Graph(Rectangular hyperbola only)	10
29	12.probability(coins,cards,dice)	2
28	11.statistics(range,coefficient of range,SD,CV)	2
26,27	8.Mensuration(CSA,TSA,Volume,radius,hight, ratio)	2
20,21	4.Matrices(order,transpose,no.of elements)	2

32-marks

20+

Question.No	Heading	Marks
31,32	1.Sets and functions(venn diagrams,domain,co-domain,Image,pre-image)	5
35,36	3.Algebra(synthetic division,factorization,square Roots)	5
43	11.Statistics(standard deviation formula only)	5
44	12.Probability(coins,dice,cards, fruits,balls)	5

62-marks

40+

Question.No	Heading	Marks
38	5.coordinate geometry(areas of triangles and Quadrilaterals,equations)	5
41,42	8.Mensuration(combined shapes,No.of items Melted and cast)	5
16,17	1.sets and functions (venndiagrams,domain,codomainImage,pre-image)	2
18	2.Sequences and series(AP,GP,tn)	2
24	6.Geometry(theorem related problems)	2

85-marks

60+

Question.No	Heading	Marks
33	2.Sequences and series $(sn,6+66+666+6666\ldots,\sum n,\sum n^2,\sum n^3)$	5
34	3.Algebra(synthetic division,factorization,finding Square root,cross multiplication)	5
37	Matrices(Addition,subtraction,multiplication, $(AB)^T,A^2-4A+5I_2=0)$	5
19	3.Algebra(solve,roots,equations,nature of roots)	2
22,23	5.Coordinate geometry(centre of a circle,equations,parallel, Perpendicular)	2
25	7.Trigonometry(Exercise 7.2only)	2
30	COMPULSORY QUESTION	2

110-marks

80+

Question.No	Heading	Marks
39	6.Geometry(Theroms-Thales,angle bisector,pythagorus,tangent)	5
40	7.Trigonometry(Exercise 7.2 only)	5
45	COMPULSORY QUESTION	5
1-15	ONE MARK QUESTIONS	15

140-marks

All is well

1. Tangent drawing

1. Draw a circle of radius 3 cm. From an external point 7 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.

2. Draw a circle of diameter 10 cm. From a point *P,* 13 cm away from its centre, draw the two tangents *PA* and *PB* to the circle, and measure their lengths.

3. Draw the two tangents from a point which is 10 cm away from the centre of a circle of radius 6 cm. Also, measure the lengths of the tangents.

4. Take a point which is 9 cm away from the centre of a circle of radius 3 cm, and draw the two tangents to the circle from that point.

2. Cyclic quadrilateral drawing

5. Construct a cyclic quadrilateral *ABCD* in which *AB* = 6 cm, *AC* = 7 cm, *BC* = 6 cm, and *AD* = 4.2 cm.

6. Construct a cyclic quadrilateral *PQRS* with *PQ* = 4 cm, *QR* = 6 cm, *PR* = 7.5 cm, *QS*= 7 cm

7. Construct a cyclic quadrilateral *ABCD* when *AB* = 6 cm, *BC* = 5.5 cm, $<ABC = 80^o$ and *AD* = 4.5 cm.

8. Construct a cyclic quadrilateral *EFGH* with *EF* = 5.2 cm, $<GEF = 50^o$, *FG* = 6 cm and $<EGH = 40^o$.

9. Construct a cyclic quadrilateral *PQRS* with *PQ* = 4 cm, $<P = 100^o$, $<PQS = 40^o$ and $<SQR = 70^o$

10. Construct a cyclic quadrilateral *ABCD* when *AB* = 5.8 cm, $<ABD = 35^o$, *AD* = 4.2 Cm and *AB || CD*

11. Construct a cyclic quadrilateral *PQRS*, with *PQ* = 6.5 cm, *QR* = 5.5 cm, *PR* = 7 cm and *PS* = 4.5 cm.

12. Construct a cyclic quadrilateral *ABCD* where *AB* = 6 cm, AD = 4.8 cm, *BD* = 8 cm and *CD* = 5.5 cm.

13. Construct a cyclic quadrilateral *PQRS* such that *PQ* = 5.5 cm, *QR* = 4.5 cm, $<QPR = 45^o$ and *PS* = 3 cm.

14. Construct a cyclic quadrilateral *ABCD* with *AB* = 7 cm, $<A = 80^o$, *AD* = 4.5 cm and *BC* = 5 cm.

3. Triangle drawing with altitude

15. Construct a $\triangle ABC$ such that AB = 6 cm, $<C = 40^0$ and the altitude from C to AB is of length 4.2 cm.

16. Construct a $\triangle PQR$ in which the base PQ = 6 cm, $<R = 60^0$ and the altitude from R to PQ is 4 cm.

17. Construct a $\triangle PQR$ such that PQ = 4 cm, $<R = 25^0$ and the altitude from R to PQ is 4.5 cm.

4. Triangle drawing with Median

18. Construct a $\triangle ABC$ in which BC = 5.5 cm., $<A = 60^0$ and the median AM from the vertex A is 4.5 cm

19 . Construct a $\triangle ABC$, in which BC = 4.5 cm, $<A=40^0$ and the median AM from A to BC is 4.7 cm. Find the length of the altitude from A to BC.

20. Construct a $\triangle ABC$ such that BC = 5 cm. $<A = 45^0$ and the median from A to BC is 4 cm.

21. Construct a $\triangle ABC$ in which the base BC = 5 cm, $<BAC = 40^0$ and the median from A to BC is 6 cm. Also, measure the length of the altitude from $A.$

5.Graphs

1. With table

1. Draw a graph for the following table and identify the variation.
    Hence, find the value of y when $x = 4$.

x	2	3	5	8	10
y	8	12	20	32	40

2 A cyclist travels from a place A to a place B along the same route at a uniform speed on different days. The following table gives the speed of his travel and the corresponding time he took to cover the distance

Speed in km x	2	4	6	10	12
Time in hrs Y	60	30	20	12	10

 Draw the speed-time graph and use it to find
(i) the number of hours he will take if he travels at a speed of 5 km / hr
(ii) the speed with which he should travel if he has to cover the distance in 40 hrs.

3   The following table gives the cost and number of notebooks bought

No of Note books x	2	4	6	8	10	12
Cost y	30	60	90	120	150	180

Draw the graph and hence (i) Find the cost of seven note books.
                                      (ii) How many note books can be bought for Rs.165.

4.

x	1	3	5	7	8
y	2	6	10	14	16

Draw the graph for the above table and hence find
        (i) the value of y if $x = 4$
        (ii) the value of x if $y = 12$

5 .

No of Workers x	3	4	6	8	9	16
No of days y	96	72	48	36	32	18

Draw graph for the data given in the table. Hence find the number of days taken by 12 workers to complete the work.

II.To prepare the table

1.   A bank gives 10% S.I on deposits for senior citizens. Draw the graph for the relation between the sum deposited and the interest earned for one year. Hence find
        (i) the interest on the deposit of Rs. 650
        (ii)the amount to be deposited to earn an interest of Rs. 45.

2   A bus travels at a speed of 40 km / hr. Write the distance-time formula and draw the graph of it. Hence, find the distance travelled in 3 hours.

3. The cost of the milk per litre is Rs.15. Draw the graph for the relation between the quantity and cost . Hence find
            (i) the proportionality constant.
            (ii) the cost of 3 litres of milk

4. Draw the Graph of $xy = 20$, $x, y > 0$. Use the graph to find y when $x = 5$, and to find x when $y = 10$.

Lesson 1 - Sets and Functions

## 5 Marks questions

Use Venn diagrams to verify

1. Use Venn diagrams to verify (A ∩ B)' = A'UB'

2. Use Venn diagrams to verify (AUB)' = A'∩ B'

3. Use Venn diagrams to verify AU(B∩C) = (AUB)∩(AUC)

4. Use Venn diagrams to verify A∩ (BUC) = (A∩B) U (A∩C)

5. Use Venn diagrams to verify A \ (BUC) = (A \ B) ∩(A \ C)

6. Use Venn diagrams to verify A \ (B∩C) = (A \ B) U (A \ C)

7. Let A= { 0, 1, 2, 3 } and B = { 1, 3, 5, 7, 9 } be two sets. Let f : A → B be a function given by f (x) = 2x + 1. Represent this function as (i) a set of ordered pairs (ii) a table   (iii) an arrow diagram and (iv) a graph

8. Let f = { (2, 7), (3, 4), (7, 9), (–1, 6), (0, 2), (5, 3) } be a function from A = { –1, 0, 2, 3, 5, 7 } to B = { 2, 3, 4, 6, 7, 9 }. Is this (i) an one-one function (ii) an onto function (iii) both one-one and onto function?

9. Let A= { 5, 6, 7, 8 }; B = { –11, 4, 7, –10,–7, –9,–13 } and
f = {(x,y) : y = 3 - 2x, x ε A, y ε B }
(i) Write down the elements of f . (ii) What is the co-domain?
(iii) What is the range ? (iv) Identify the type of function

10. Let A = { 6, 9, 15, 18, 21 }; B = { 1, 2, 4, 5, 6 } and f : A → B be defined by
F(x) = x-3/3 Represent f by
(i) an arrow diagram (ii) a set of ordered pairs
(iii) a table (iv) a graph .

11. Let A = {4, 6, 8, 10 } and B = { 3, 4, 5, 6, 7 }. If f : A → B is defined by f(x)=1/2x+1 then represent f by (i) an arrow diagram (ii) a set of ordered pairs and (iii) a table.

2 Marks questions

1. Which of the following relations are functions from A = { 1, 4, 9, 16 } to B = { –1, 2, –3, –4, 5, 6 }? In case of a function, write down its range.
(i) f1 = { (1, –1), (4, 2), (9, –3), (16, –4) }
(ii) f2 = { (1, –4), (1, –1), (9, –3), (16, 2) }
(iii) f3 = { (4, 2), (1, 2), (9, 2), (16, 2) }
(iv) f4 = { (1, 2), (4, 5), (9, –4), (16, 5) }

2.   A = { 1, 2, 3, 4, 5 }, B = N and f : A → B be defined by f (x) = x²
      Find the range of *f* . Identify the type of function.

3.. State whether each of the following arrow diagrams define a function or not. Justify
     your answer. (i)
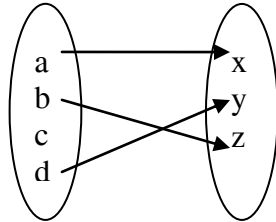
     (ii)
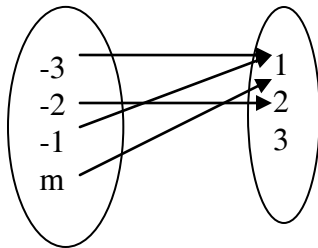
4.   For the given function F= { (1, 3), (2, 5), (4, 7), (5, 9), (3, 1) } write the domain and
range.

5.   A = { 10, 11, 12, 13, 14 }; B = { 0, 1, 2, 3, 5 } and fi : A→ B , i = 1,2,3.
       State the type of function for the following (give reason):.
       (i) f1 = { (10, 1), (11, 2), (12, 3), (13, 5), (14, 3) }
       (ii) f2 = { (10, 1), (11, 1), (12, 1), (13, 1), (14, 1) }
       (iii) f3 = { (10, 0), (11, 1), (12, 2), (13, 3), (14, 5) }

6.   If   X = { 1, 2, 3, 4, 5 }, Y = { 1, 3, 5, 7, 9 } determine which of the following
relations from *X* to *Y* are functions? Give reason for your answer. If it is a function, state
its type.
       (i) R1 = {(x, y)/ y = x + 2, x ε X , y ε Y }
       (ii) R2 = { (1, 1), (2, 1), (3, 3), (4, 3), (5, 5) }
       (iii) R3 = { (1, 1), (1, 3), (3, 5), (3, 7), (5, 7) }
       (iv) R4 = { (1, 3), (2, 5), (4, 7), (5, 9), (3, 1) }

7. If R= {(a,- 2), (- 5, b), (8, c), (d,- 1)} represents the identity function, find the
    values of *a*, *b*, *c* and *d* .

8.   A = { –2, –1, 1, 2 } and   f ={(x, 1/x):x ε A} Write down the range of f . Is f a function from   A to A ?

9.   Write the pre-images of 2 and 3 in the function f = { (12, 2), (13, 3), (15, 3), (14, 2), (17, 17) }

10.   The following table represents a function from, A= { 5, 6, 8, 10 }from
     B = { 19, 15, 9, 11 } to f(x) = 2x - 1 Find the values of a and b.

x	5	6	8	10
f(x)	a	11	b	19

11.   Represent the function f = { (–1, 2), (– 3, 1), (–5, 6), (– 4, 3) }
      (i) a table (ii) an arrow diagram

Lesson-3 . ALGEBRA

Factorization using synthetic division

1. $2x^3 - 3x^2 - 3x + 2$

2. $x^3 - 3x^2 - 10x + 24$.

3. $x^3 - 2x^2 - 5x + 6$

4. $4x^3 - 7x + 3$

5,. $x^3 - 23x^2 + 142x - 120$

6. $4x^3 - 5x^2 + 7x - 6$

7. $x^3 - 7x + 6$

8. $x^3 - 5x + 4$

9. $x^3 - 10x^2 - x + 10$

10. $2x^3 + 11x^2 - 7x - 6$

11. $x^3 + 13x^2 + 32x + 20$

12. $x^3 + x^2 + x - 14$

13. $x^3 - 5x^2 - 2x + 24$

14. $2x^3 - 9x^2 + 7x + 6$

Finding the square root of a polynomial by division method

1. $x^4 - 10x^3 + 37x^2 - 60x + 36$

2. $x^4 - 6x^3 + 19x^2 - 30x + 25$

3. $x^4 - 4x^3 + 10x^2 - 12x + 9$

4. $4x^4 + 8x^3 + 8x^2 + 4x + 1$

5. $9x^4 - 6x^3 + 7x^2 - 2x + 1$

6. $4 + 25x^2 - 12x - 24x^3 + 16x^4$

7. $4x^4 - 12x^3 + 37x^2 + ax + b$

8. $x^4 - 4x^3 + 10x^2 - ax + b$

9. $ax^4 + bx^3 + 109x^2 - 60x + 36$

10. $ax^4 - bx^3 + 40x^2 + 24x + 36$

11. $m - nx + 28x^2 + 12x^3 + 9x^4$

2 Marks questions

1. Find the quotient and remainder when $x^3 + x^2 - 7x - 3$ is divided by $x - 3$

2. Find the quotient and remainder when $x^3 + x^2 - 3x + 5$ is divided by $x - 1$

3. Find the quotient and remainder when $3x^3 - 2x^2 + 7x - 5$ is divided by $x + 3$

4. Prove that $x - 1$ is a factor of $x^3 - 6x^2 + 11x - 6$

5. Prove that Prove that $x + 1$ is a factor of $x^3 + 6x^2 + 11x + 6$

6. Simplify

$$\frac{5x + 20}{7x + 28}$$

7. Determine the nature of roots $x^2 - 8x + 12 = 0$

8, Determine the nature of roots $2x^2 - 3x + 4 = 0$

9. Determine the nature of roots $9x^2 + 12x + 4 = 0$

10. Find the values of *k* for which the roots are real and equal in each of the following $2x^2 - 10x + K = 0$

11. Find the values of *k* for which the roots are real and equal in each of the following $12x^2 + 4Kx + 3 = 0$

12. Form the quadratic equation whose roots are $7 + \sqrt{3}$ and $7 - \sqrt{3}$

13. Form the quadratic equation whose roots are 3 and 4

14. Form the quadratic equation whose roots are $3 + \sqrt{7}$ and $3 - \sqrt{7}$

15. Find the sum and the product of the roots of the following equations $x^2 - 6x + 5 = 0$

16. Find the sum and the product of the roots of the following equations $3x^2 - 5x = 0$

17. Find the sum and the product of the roots of the following equations $8x^2 - 25 = 0$

Lesson - 12. **Probability**

5 Marks questions

1. A fair die is rolled. Find the probability of getting
   (i) the number 4 (ii) an even number
   (iii) a prime factor of 6 (iv) a number greater than 4.

2. In tossing a fair coin twice, find the probability of getting
   (i) two heads (ii) atleast one head (iii) exactly one tail

3. Two unbiased dice are rolled once. Find the probability of getting
   (i) a sum 8 (ii) a doublet (iii) a sum greater than 8.

4. From a well shuffled pack of 52 playing cards, one card is drawn at random. Find the probability of getting
   (i) a king (ii) a black king
   (iii) a spade card (iv) a diamond 10.

5. Three coins are tossed simultaneously. Find the probability of getting
   (i)at least one head (ii) exactly two tails (iii) at least two heads

6. Three coins are tossed simultaneously. Using addition theorem on probability, find the probability that either exactly two tails or at least one head turn up.

7. A card is drawn from a deck of 52 cards. Find the probability of getting a King or a Heart or a Red card.

8. A bag contains 10 white, 5 black, 3 green and 2 red balls. One ball is drawn at random.Find the probability that the ball drawn is white or black or green..

9. If a die is rolled twice, find the probability of getting an even number in the first time or a total of 8 .

10. One number is chosen randomly from the integers 1 to 50. Find the probability that it is divisible by 4 or 6.

11. A bag contains 50 bolts and 150 nuts. Half of the bolts and half of the nuts are rusted. If an item is chosen at random, find the probability that it is rusted or that it is a bolt.

12. Two dice are rolled simultaneously. Find the probability that the sum of the numbers on the faces is neither divisible by 3 nor by 4.

13. A basket contains 20 apples and 10 oranges out of which 5 apples and 3 oranges are rotten. If a person takes out one fruit at random, find the probability that the fruit is either an apple or a good fruit.

14. A card is drawn at random from a well-shuffled deck of 52 cards. Find the probability that it will be a spade or a king

15. The probability that a new car will get an award for its design is 0.25, the probability that it will get an award for efficient use of fuel is 0.35 and the probability that it will get both the awards is 0.15. Find the probability that
    (i) it will get atleast one of the two awards
    (ii) it will get only one of the awards

16. The probability that *A*, *B* and *C* can solve a problem are 4/5, 2/3 , 3/7 respectively The probability of the problem being solved by *A* and *B* is 8/15 *B* and *C* is 2/7 *A* and *C* is 2/35 The probability of the problem being solved by all the three is 8/35 Find the probability that the problem can be solved by atleast one of them.

2 Marks questions

1. An integer is chosen from the first twenty natural numbers. What is the probability that it is a prime number?

2. The probability that it will rain on a particular day is 0.76. What is the probability that it will not rain on that day?

3. If *A* is an event of a random experiment such that
$P(A) : P(A) = 7 : 12$, then find $P(A)$

4. A die is thrown twice. Find the probability of getting a total of 9.

5. Three rotten eggs are mixed with 12 good ones. One egg is chosen at random What is the probability of choosing a rotten egg??

6. Two coins are tossed together. What is the probability of getting at most one head.

7. One card is drawn randomly from a well shuffled deck of 52 playing cards. Find the probability that the drawn card is
(i) a Diamond (ii) not a Diamond (iii) not an Ace.

8. . A box contains 4 Green, 5 Blue and 3 Red balls. A ball is drawn at random. Find the probability that the selected ball is (i) Red in colour (ii) not Green in colour.

9. Three dice are thrown simultaneously. Find the probability of getting the same number on all the three dice.

10 If *A* and *B* are mutually exclusive events such that P(A) = 3/5 and P(B)= 1/5-then find P(A U B)

11. If *A* and *B* are mutually exclusive events such that P(A) = 1/4 , P(B)= 2/5 and P(A U B) = 1/2 then find, P(A ∩B)

12. A box contains 10 white, 6 red and 10 black balls. A ball is drawn at random. Find the probability that the ball drawn is white or red.

13 A two digit number is formed with the digits 2, 5, 9 (repetition is allowed). Find the probability that the number is divisible by 2 or 5.

13. "Each individual letter of the word "ACCOMMODATION" is written in a piece of paper, and all 13 pieces of papers are placed in a jar. If one piece of paper is selected at random from the jar, find the probability that
(i) the letter '*A*' or '*O*' is selected.
(ii) the letter '*M*' or '*C*' is selected

Lesson 4 - **Matrices**

5 Mark questions

1. $A = \begin{bmatrix} 4 & 1 & 2 \\ 1 & -2 & 3 \\ 0 & 3 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 2 & 0 & 4 \\ 6 & 2 & 8 \\ 2 & 4 & 6 \end{bmatrix}$ $C = \begin{bmatrix} 1 & 2 & -3 \\ 5 & 0 & 2 \\ 1 & -1 & 1 \end{bmatrix}$

   verify that $A + (B + C) = (A + B) + C$.

2. $A = \begin{bmatrix} -2 \\ 4 \\ 5 \end{bmatrix}$ $B = (1 \quad 3 \quad -6)$

   (then verify that $(AB)^T = B^T A^T$

3. . $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ then verify that $A^2 - 4A + 5I_2 = 0$

4. $A = \begin{bmatrix} 5 & 2 \\ 7 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 2 & -1 \\ -1 & 1 \end{bmatrix}$

   then verify that $(AB)^T = B^T A^T$

2 Mark questions

1. $A = \begin{bmatrix} 8 & 5 & 2 \\ 1 & -3 & 4 \end{bmatrix}$

   Then find, A^T and $(A^T)^T$

2. There are 6 Higher Secondary Schools, 8 High Schools and 13 Primary Schools in a town. Represent these data in the form of 3 x1 and 1 x3 matrices

3. A matrix has 8 elements. What are the possible orders it can have?

4. A matrix consists of 30 elements. What are the possible orders it can have?.

5. $A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \\ 5 & 0 \end{bmatrix}$

then find the transpose of A.

6. $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & -5 \\ 3 & -5 & 6 \end{bmatrix}$

then verify that $(A^T)^T = A$

7. $\begin{bmatrix} x & 5 & 4 \\ 5 & 9 & 1 \end{bmatrix} = \begin{bmatrix} 3 & 5 & z \\ 5 & Y & 1 \end{bmatrix}$

Find the values of x, y and z

8. $A = \begin{bmatrix} 5 & 6 & -2 & 3 \\ 1 & 0 & 4 & 2 \end{bmatrix} \quad B = \begin{bmatrix} 3 & -1 & 4 & 7 \\ 2 & 8 & 2 & 3 \end{bmatrix}$

To find $A + B$

9. $A = \begin{bmatrix} 2 & 3 \\ -9 & 5 \end{bmatrix} - \begin{bmatrix} 1 & 5 \\ 7 & -1 \end{bmatrix}$

then find the additive inverse of A.

10. $A = \begin{bmatrix} 3 & 2 \\ 5 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 8 & -1 \\ 4 & 3 \end{bmatrix}$

Find the matrix C if $C = 2A + B$.

11. $A = \begin{bmatrix} 4 & -2 \\ 5 & -9 \end{bmatrix}$ and $B = \begin{bmatrix} 8 & 2 \\ -1 & -3 \end{bmatrix}$

find $6A - 3B$.

12. $A = \begin{bmatrix} 1 & 3 \\ 9 & -6 \end{bmatrix}$

then verify $AI = IA = A$, where I is the unit matrix of order 2.

13. $\begin{bmatrix} 3 & 5 \\ 1 & 2 \end{bmatrix}$ and $\begin{bmatrix} 2 & -5 \\ -1 & 3 \end{bmatrix}$

prove that the above matrices are multiplicative inverses to each other

Lesson 5 - **Coordinate geometry**

5 Marks questions

1. Find the area of the quadrilateral formed by the points
   (-4, -2), (-3, -5), (3, -2) and (2 , 3).

2. Find the area of the quadrilateral whose vertices area
   (i) (6, 9), (7, 4), (4, 2) and (3, 7)
   (ii) (-3, 4), (-5, -6), (4, -1) and (1, 2)
   (iii) (-4, 5), (0, 7), (5, -5) and (-4, -2)

3. Using the section formula, show that the points A(1,0), B(5,3), C(2,7) and D(-2, 4) are the vertices of a parallelogram taken in order.

2 Marks questions

1. Find the centroid of the triangle whose vertices are
   (i) (1,3), (2, 7) and (12 , -16) (ii) (3, -5), (-7, 4) and (10, -2)

2. Find the centroid of the triangle whose vertices are A(4, -6), B(3, -2) and C(5, 2)

3. The centre of a circle is at (-6, 4). If one end of a diameter of the circle is at the origin, then find the other end.

4. Find the area of the triangle whose vertices are
   (1, 2), (-3 , 4), and (-5 , -6).

5. If the area of the $\triangle ABC$ is 68 sq.units and the vertices are A(6, 7), B(-4 , 1) and C(a , -9) taken in order, then find the value of a.

6. Show that the points A(2 , 3), B(4 , 0) and C(6, -3) are collinear

7. Show that the straight lines $3x + 2y - 12 = 0$ and $6x + 4y + 8 = 0$ are parallel

8. Prove that the straight lines $x + 2y + 1 = 0$ and $2x - y + 5 = 0$ are perpendicular to each other.

9.   Show that the straight lines $x + 2y + 1 = 0$ and $3x + 6y + 2 = 0$ are parallel.

10.   Show that the straight lines $3x - 5y + 7 = 0$ and $15x + 9y + 4 = 0$ are perpendicular

Lesson 6 - **Geometry**

5 Marks questions

1. Basic proportionality theorem or Thales Theorem

2. Angle Bisector Theorem

3. Pythagoras theorem (Baudhayan theorem)

2 Marks questions

1. In $\triangle$ABC DE II BC and AD / DB $= 2/3$. AE = 3.7 cm Find EC

2 *AB* and *CD* are two chords of a circle which intersect each other
    internally at *P*. (i) If *CP* = 4 cm, *AP* = 8 cm, *PB* = 2 cm, then find *PD*.
                  (ii) If *AP* = 12 cm, *AB* = 15 cm, *CP* = *PD,* then find *CD*

3. *AB* and *CD* are two chords of a circle which intersect each other externally at *P*
     (i) If *AB* = 4 cm *BP* = 5 cm and *PD* = 3 cm, then find *CD*.
    (ii) If *BP* = 3 cm, *CP* = 6 cm and *CD* = 2 cm, then find *AB*

Lesson 7 - Trigonometry

5.Marks questions

1.   A vertical tree is broken by the wind. The top of the tree touches the ground and makes   an angle 30^0 with it. If the top of the tree touches the ground 30 m away from its foot, then find the actual height of the tree

2 A person in an helicopter flying at a height of 700 m, observes two objects lying
  opposite to each other on either bank of a river. The angles of depression of the objects are 30^0 and 45^0. Find the width of the river.

3.   From the top of a lighthouse of height 200 feet, the lighthouse keeper observes a Yacht and a Barge along the same line of sight . The angles of depression for the Yacht and the Barge are 45^0 and 30^0 respectively. For safety purposes the two sea vessels should be atleast 300 feet apart. If they are less than 300 feet , the keeper has to sound thealarm. Does the keeper have to sound the alarm ?

4. From the top of a tower of height 60 m, the angles of depression of the top and the bottom of a building are observed to be 30^0 and 60^0 respectively. Find the height of the building.

5. From the top and foot of a 40 m high tower, the angles of elevation of the top of a lighthouse are found to be 30^0 and 60^0 respectively. Find the height of the lighthouse. Also find the distance of the top of the lighthouse from the foot of the tower.

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2 Marks questions

1. A kite is flying with a string of length 200 m. If the thread makes an angle 30^0 with the ground, find the distance of the kite from the ground level. (Here, assume that the string is along a straight line)

2. A ladder leaning against a vertical wall, makes an angle of 60^0 with the ground. The foot of the ladder is 3.5 m away from the wall. Find the length of the ladder.

3. Find the angular elevation (angle of elevation from the ground level) of the Sun when the length of the shadow of a 30 m long pole is $10\sqrt{3}$ m.

4. A ramp for unloading a moving truck, has an angle of elevation of 30°. If the top of the ramp is 0.9 m above the ground level, then find the length of the ramp.

5. A girl of height 150 cm stands in front of a lamp-post and casts a shadow of length $150\sqrt{3}$ cm on the ground. Find the angle of elevation of the top of the lamp-post .

6. Prove the identity   sin ɵ /cosec ɵ + cos ɵ / sec ɵ = 1

Lesson 8 - Mensuration

5 Marks questions

1 Spherical shaped marbles of diameter 1.4 cm each, are dropped into a cylindrical beaker of diameter 7 cm containing some water. Find the number of marbles that should bedropped into the beaker so that the water level rises by 5.6 cm.

2. An iron right circular cone of diameter 8 cm and height 12 cm is melted and recast into spherical lead shots each of radius 4 mm. How many lead shots can be made?.

3. A right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 12 cm and diameter 6 cm, having a hemispherical shape on top. Find the number of such cones which can be filled with the ice cream available

4. Using clay, a student made a right circular cone of height 48 cm and base radius 12 cm. Another student reshapes it in the form of a sphere. Find the radius of the sphere.

5. A spherical solid material of radius 18 cm is melted and recast into three small solid spherical spheres of different sizes. If the radii of two spheres are 2cm and 12 cm, find the radius of the third sphere

6. A cylindrical bucket of height 32 cm and radius 18 cm is filled with sand. The bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap..

7. A cylindrical shaped well of depth 20 m and diameter 14 m is dug. The dug out soil is evenly spread to form a cuboid-platform with base dimension 20 m X 14 m. Find the height of the platform

8. A play-top is in the form of a hemisphere surmounted on a cone. The diameter of the hemisphere is 3.6 cm. The total height of the play-top is 4.2 cm. Find its total surface area.

9. A solid is in the shape of a cylinder surmounted on a hemisphere. If the diameter and the total height of the solid are 21 cm, 25.5 cm respectively, then find its volume

10. The diameter of a road roller of length 120 cm is 84 cm. If it takes 500 complete revolutions to level a playground, then find the cost of levelling it at the cost of 75 paise per square metre.

2 Marks questions

1. The radii of two circular ends of a frustum shaped bucket are 15 cm and 8 cm. If its depth is 63 cm, find the capacity of the bucket in litres

2. A solid right circular cylinder has radius of 14 cm and height of 8 cm. Find its curved surface area and total surface area.

3. The total surface area of a solid right circular cylinder is 660 sq.cm. If its diameter of the base is 14 cm, find the height and curved surface area of the cylinder.

4. Curved surface area and circumference at the base of a solid right circular cylinder are 4400 sq.cm and 110 cm respectively. Find its height and diameter.

5. Radii of two solid hemispheres are in the ratio 3 : 5. Find the ratio of their curved surface areas and the ratio of their total surface areas.

6. Find the volume of a solid cylinder whose radius is 14 cm and height 30 cm.

7 A patient in a hospital is given soup daily in a cylindrical bowl of diameter 7 cm. If the bowl is filled with soup to a height of 4 cm, then find the quantity of soup to be prepared daily in the hospital to serve 250 patients?

8. The radii of two right circular cylinders are in the ratio 2 : 3. Find the ratio of their volumes if their heights are in the ratio 5 : 3.

9. The circumference of the base of a 12 m high wooden solid cone is 44 m. Find the volume.

10. Find the volume of the largest right circular cone that can be cut out of a cube whose edge is 14 cm.

11. Find the volume of a sphere-shaped metallic shot-put having diameter of 8.4 cm.

Lesson 11 - Statistics

5 Marks questions

1 The number of books read by 8 students during a month are
   2, 5, 8, 11, 14, 6, 12, 10. Calculate the standard deviation of the data

2. A test in General Knowledge was conducted for a class. The marks out of 40, obtained by 6 students were 20, 14, 16, 30, 21 and 25. Find the standard deviation of the data.

3. Calculate the standard deviation 62, 58, 53, 50, 63, 52, 55

4. The marks obtained by 10 students in a test in Mathematics are :
   80, 70, 40, 50, 90, 60, 100, 60, 30, 80. Find the standard deviation.

5. Calculate the standard deviation of the data
   (i) 10, 20, 15, 8, 3, 4. (ii) 38, 40, 34 ,31, 28, 26, 34.

6 Find the coefficient of variation of the following data. 18, 20, 15, 12, 25.

2 Marks questions

1. Find the range and coefficient of range of the following data.
       (i) 59, 46, 30, 23, 27, 40, 52,35, 29
       (ii) 41.2, 33.7, 29.1, 34.5, 25.7, 24.8, 56.5, 12.5

2 The smallest value of a collection of data is 12 and the range is 59. Find the largest value of the collection of data.

3. The largest of 50 measurements is 3.84 kg. If the range is 0.46 kg, find the smallest measurement.

4. Find the range and the coefficient of range of 43, 24, 38, 56, 22, 39, 45.

5. The weight (in kg) of 13 students in a class are 42.5, 47.5, 48.6, 50.5, 49, 46.2, 49.8, 45.8 , 43.2, 48, 44.7, 46.9, 42.4. Find the range and coefficient of range.

6. The largest value in a collection of data is 7.44. If the range is 2.26, then find the smallest value in the collection

7. The standard deviation of 20 observations is 5 . If each observation is multiplied by 2, find the standard deviation and variance of the resulting observations.

8. Calculate the standard deviation of the first 13 natural numbers

9. Calculate the standard deviation of the first 10 natural numbers

10. If the coefficient of variation of a collection of data is 57 and its S.D is 6.84, then find the mean.

11. A group of 100 candidates have their average height 163.8 cm with coefficient of variation 3.2. What is the standard deviation of their heights?

Lesson 2 - Sequences & Series

5 Marks questions

1. Find the sum of all 3 digit natural numbers, which are divisible by 9.

2. Find the sum of all natural numbers between 300 and 500 which are divisible by 11.

3. Find the sum of all numbers between 100 and 200 which are not divisible by 5.

4. Find the sum to n terms of the series 6 + 66 + 666 +………

5. Find the sum of first n terms of the series
    (i)   7 + 77 + 777 + ... (ii) 0.4 + 0.94 + 0.994 + ...

6. Find the sum of the following series

    (i) $12^2 + 13^2 + 14^2 + ... + 35^2$

(ii) $16^2 + 17^2 + 18^2 + \ldots + 25^2$

(iii) $11^3 + 12^3 + 13^3 + \ldots + 28^3$

(iv) $16^3 + 17^3 + 18^3 + \ldots + 35^3$

7. Find the total area of 14 squares whose sides are 11 cm, 12 cm, ……24 cm, respectively.

8. Find the total area of 12 squares whose sides are 12 cm, 13cm,… 23cm. respectively.

9. Find the total volume of 15 cubes whose edges are 16cm, 17cm, 18cm,…… 30cm respectively

10. If $1^3 + 2^3 + 3^3 + \ldots + K^3 = 4356$ then Find the value of k

11. If $1^3 + 2^3 + 3^3 + \ldots + K^3 = 8281$ then Find $1+2+3 + \ldots + k$

2 Marks questions

1. . Find the sum of the following series

(i) $26 + 27 + 28 + \ldots + 60$

(ii) $31 + 33 + \ldots + 53.$

2. . Find the sum of the following series

(i) $1^2 + 2^2 + 3^2 + \ldots + 25^2$

(ii) $1^3 + 2^3 + 3^3 + \ldots + 20^3$

3. The first term of an A.P. is 6 and the common difference is 5. Find the A.P. and its general term..

4..Find the common difference and 15th term of the A.P. 125, 120, 115, 110,…..

5.Find the 17th term of the A.P. 4, 9, 14, ………….

6 Find the sum of the first (i) 75 positive integers (ii) 125 natural numbers.