

## Section A

[24]

## Multiple Choice Questions:

[6]

- Out of the following, which is the solution of the equation  $2x + 3y = 7$ .....  
(A) (1,2) (B) (2,1) (C) (-1,-2) (D) (-2,-1)
- Equation of  $(x+1)^2 - x^2 = 0$  has number of real roots equal to:  
(A) 1 (B) 2 (C) 3 (D) 4
- For any Arithmetic Progression  $a_9 =$  .....  
(A)  $a + 6d$  (B)  $a + 6d$  (C)  $a + 7d$  (D)  $a + 8d$
- The points  $(-1, -2)$ ,  $(1, 0)$ ,  $(-1, 2)$ ,  $(-3, 0)$  form a quadrilateral of type:  
(A) Square (B) Rectangle (C) Parallelogram (D) Rhombus
- $\sin^2 45^\circ =$  .....  
(A) 0 (B) 1 (C)  $1/2$  (D)  $1/3$
- Mean = 25 and Mode = 25 then median = .....  
(A) 23 (B) 0 (C) 1 (D) 25

## Fill in the blanks:

[6]

- HCF (17,20) = .....(1,0,1 or 0)
- Numbers at maximum zeroes at quadratic equation are.....(0,1,2)
- The probability that sun rises in west direction is..... (0,1,-1)
- When value of  $\theta$  increases then value of  $\sin\theta$  ..... (Increase, Decrease, Constant)
- A circle has at most.....parallel tangents. (one, two, three)
- The mean of the data: 4,10,5,9,12 is.... (9,8,10)

## True or false:

[4]

- HCF (15,30) is 15.
- 2 is one zero of  $p(x) = x^2 - 6x + 8$  polynomials.
- The graph of equation  $3x = 7$  is parallel to  $x$  - axis.
- Probability of any event can't be zero.

## Answer in one word:

[4]

- Write the equation of  $n^{\text{th}}$  term of Arithmetic progression.
- How many tangents does circle have?
- What is probability that you will get 102 marks in math paper?
- Find the class marks of 85-95

Match the following :( 21 to 24 )

[4]

A	B
21. Surface area of sphere	$\frac{4}{3} \pi r^3$
22. Volume of 5 Rs. Coin	$4\pi r^2$
	$\pi r^2 h$

A	B
23. Area of minor sector	$(\theta/360^\circ) \times \pi r^2$
24. circumference of circle	$2\pi r$
	$\pi r$

### Section B

Answer any nine questions from question number 25 to 37. (2 Marks Each)

[18]

25. Find the zeroes of  $p(x) = x^2 - 7x + 10$
26. Form a quadratic equation, whose root's sum and product are -3 and 2 respectively.
27. Find the roots of the following quadratic equation by factorization:  $2x^2 + x - 6$
28. Find the 31<sup>th</sup> term of AP: 10, 7, 4, ...
29. Find the sum of the following AP: -37, -33, -29, ..... to 12 terms.
30. Find the distance between pairs of points: (2, 3), (4, 1)
31. Find the coordinates of midpoint of line joining of points A(-4, -2) and B(6, 8)
32.  $\sin \theta = 3/5$  then find  $\cos \theta$  and  $\tan \theta$ .
33. Find the value:  $2\tan^2 45^\circ + \sin^2 60^\circ - \cos^2 30^\circ$
34. From a point 375 meters away from the foot of a tower, the top of the tower is observed at an angle of elevation of  $45^\circ$ , then the height (in meters) of the tower is?
35. If the total surface area of a solid hemisphere is  $462 \text{ cm}^2$ , find its volume.
36. Two cubes each of volume  $64 \text{ cm}^3$  are joined end to end. Find the surface area of the resulting cuboid
37. Find the mode of given data where  $l = 40$ ,  $f_0 = 3$ ,  $f_1 = 7$ ,  $f_2 = 6$  and  $h = 15$ .

### Section C

Answer any six questions from question number 38 to 46. (3 Marks Each)

[18]

38. Solve the pair of linear equations:  $4x + 6y = 10$  and  $2x - 3y = 8$  using Substitution method.
39. Solve the pair of linear equation by elimination method  
 $6x - 3y + 10 = 0$  ;  $2x - y + 9 = 0$
40. Find the sum of AP: -5, -8, -11, ....., -230.
41. Find a relation between x and y such that the point (x, y) is equidistance from the point (3, 6) and (-3, 4)
42. Verify that (5, -2), (6, 4) and (7, -2) are vertices of a isosceles triangle.
43. Prove that "The lengths of tangents drawn from an external point to a circle are equal."

44. Two concentric circles of radii 26 and 24. Find the length of the chord of the larger circle which touches the smaller circle.

45. The following table shows the ages of the patients admitted in a hospital during year:

Age	5-15	15-25	25-35	35-45	45-55
No. of patients	6	11	21	23	14

Find the mode of the data given above.

46. A bag contains a red ball, a blue ball and a yellow ball, all the balls being of the same size. Kritika takes out a ball from the bag without looking into it. What is probability that she takes out the (a) yellow ball? (b) red ball? (c) blue ball?

### Section D

**Answer any five questions from question number 47 to 54. (4 Marks Each) [20]**

47. A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower
48. If the product of parth's age six years before and six year after is 288. Find Parth's present age.
49. If the sum of 51 terms of an AP is 49 and that of 17 terms is 289. Find the sums of n terms.
50. Find the mean.

Class mark	0-2	2-4	4-6	6-8	8-10	10-12	12-14
Frequency	1	2	1	5	6	2	3

51. If the median of the distribution given below is 38. Find the value of x and y.

Class interval	Frequency
10-20	42
20-30	38
30-40	X
40-50	54
50-60	Y
60-70	36
70-80	32

52. A die is thrown once. Find the probability of getting
- A prime number
  - A perfect square number
  - A number divisible by 5
53. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting
- a king of red colour
  - not a spade
  - the queen of hearts
54. State and Prove Basic Proportionality theorem

## Section A

Answer the following : ( 1 Mark Each )

[24]

1. If  $3|x| + 5|y| = 8$  and  $7|x| + 3|y| = 48$ , then the value of  $x + y$  is  
 (A) 5 (B) -4 (C) 4 (D) The value does not exist
2. The linear factors of the quadratic equation  $x^2 + kx + 1 = 0$  are  
 (A)  $k > 2$  (B)  $k < 2$  (C)  $k > -2$  (D)  $2 \leq k \leq -2$
3. An AP starts with a positive fraction and every alternate term is an integer. If the sum of the first 11 terms is 33, then the fourth term is  
 (A) 2 (B) 3 (C) 5 (D) 6
4. Find the sum of the series  $1 + 2 + 3 + \dots + 20$   
 (A) 210 (B) 310 (C) 450 (D) not given
5.  $\sin^2 45^\circ = \dots\dots\dots$   
 (A)  $1/2$  (B)  $1/4$  (C)  $3/4$  (D) not given
6. If the vertices of a triangle have integral coordinates, the triangle cannot be  
 (A) right angled triangle (B) isosceles triangle (C) equilateral triangle (D) none of these
7. If  $X = 15$  and  $Z = 15$  find  $M = \dots\dots\dots$   
 (A) 30 (B) 45 (C) 15 (D) 20
8.  $\sqrt{3} + \sqrt{5}$  is an \_\_\_\_\_ number. (irrational, rational, natural)
9. one zero of  $2x^2 - 3x + k$  is reciprocal to the other, then the value of  $k$  is \_\_\_\_\_ (2, -2, 0 )
10. Tangent touches circle in \_\_\_\_\_ points. ( 1 , 2 , 0 )
11. Value of  $\theta$  increases with  $\sin \theta$  \_\_\_\_\_. ( increases, decreases, zero )
12. If  $u_i = \frac{x_i - 20}{10}$ ,  $\sum f_i u_i = 30$  and  $\sum f_i = 40$ , then the value of  $\bar{x} = \dots\dots\dots$  (27.5, 30.5, 42.5)
13. Cos is abbreviation of cosine. T/F
14. In cyclic quadrilateral sum of opposite side is 180. T/F
15. Circle is two dimensional figure. T/F
16. All circles are congruent T/F
17. Find the 25<sup>th</sup> term of the AP:  $-5, -\frac{5}{2}, 0, \frac{5}{2}$
19. A letter is chosen at random from the English alphabet. What is the probability that it is a letter of the word 'RAMANUJAN'?
20. Write the empirical relationship between the three measures of central tendency.
21. Volumes of two spheres are in the ratio 64 : 27, find the ratio of their surface areas.
22. Find the number of cubes of side 2 cm which can be cut from a cube of side 4 cm.

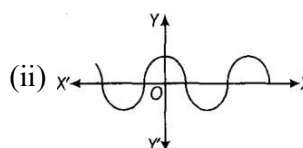
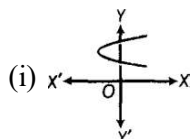
23. The area of a circle is  $2464 \text{ cm}^2$ . Find the diameter of circle.
24. Find the area of a quadrant of a circle, whose circumference is 22 cm.

### Section B

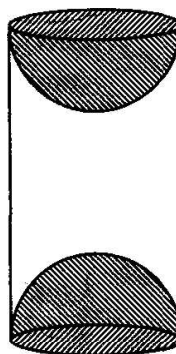
Answer the following : ( 2 Marks Each )

[18]

25. Find the zeroes of the quadratic polynomials and verify the relationship between the zeroes and its coefficients.  $x^2 - 5x - 6$
26. If 2 is a zero of polynomial  $p(x) = 4x^2 + 2x - 5a$ , then value of  $a$ .
27. The graph of  $y = p(x)$  is given, for some polynomials  $p(x)$ . Find the number of zeroes of  $p(x)$  in each case



28. Examine that the sequence 13, 10, 7, 4, ... is an AP.
29. Write the first term and common difference of an AP: 5, 8, 11, 14, ...
30. Find the distance between the points P(-6, 7) and Q(-1, -5).
31. Find the value of  $y$ , if the distance between the points (2,  $y$ ) and (-4, 3) is 10.
32. Evaluate the following:  
 $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$
33. If  $\tan A = \frac{4}{3}$ , find the other trigonometric ratios of  $\angle A$ .
34. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are  $45^\circ$  and  $60^\circ$ , respectively. Find the height of the tower.
35. Three cubes each of side 5 cm are joined end to end. Find the surface area of the resulting solid.
36. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in adjacent figure. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm, then find the total surface area of the article.



37. The mean of the following data is 14. Find the value of  $k$ .

$x$	5	10	15	20	25
$f$	7	$k$	8	4	5

### Section C

**Answer any six questions from question number 38 to 46. (3 Marks Each)**

**[18]**

38. Solve the pair of linear equations by cross-multiplication method,

$$4x + 6y = 5, 2x + 9y = 3$$

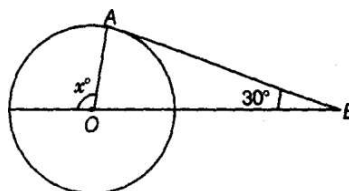
39. Five years ago, Jacob's age was seven times that of his son. After five years, the age of Jacob will be three times that of his son. Represent this situation algebraically and graphically.

40. Find the sum of the first 15 multiples of 8.

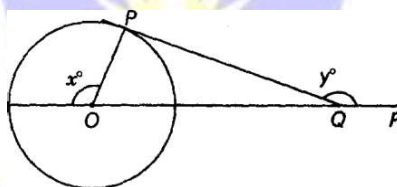
41. If the centre of a circle is  $\left(\frac{4}{3}, -2\right)$  and one end of the diameter is (3, 2), then find the coordinates of the other end.

42. Find the coordinates of the point which divides the line segment joining of  $(-1, 7)$  and  $(4, -3)$  in the ratio 2 : 3.

43. (i) In the given figure, find the value of  $x^\circ$ .



- (ii) From the given figure, find the value of  $x^\circ + y^\circ$ .



44. PQ is a tangent drawn from a point P to a circle with centre O and QOR is a diameter of the circle such that  $\angle POR = 135^\circ$ , then find  $\angle OPQ$ .

45. Calculate the mean of the following data.

Class	4 – 7	8 – 11	12 – 15	16 – 19
Frequency	5	4	9	10

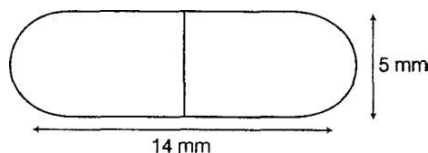
46. Two players Neha and Shivani play a tennis match. It is known that the probability of Neha winning the match is 0.62. What is the probability of Shivani winning the match?

## Section D

**Answer any five questions from question number 47 to 54. (4 Marks Each)**

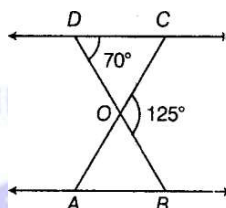
**[20]**

47. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends (see below figure). The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm.

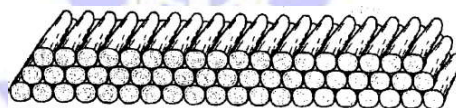


Find its surface area.

48. Stat BPT. And prove it.
49. In the given figure,  $\triangle ODC \sim \triangle OBA$   $\angle BOC = 125^\circ$  and  $\angle CDO = 70^\circ$ . Find  $\angle DOC$ ,  $\angle DCO$  and  $\angle OAB$ .



50. 200 logs are stacked in the following manner 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on (see below figure).
- In how many rows, are the 200 logs placed and how many logs are in the top row?
  - Which value is depicted in the pattern of log?



51. Find the roots of the following quadratic equations by factorization:

(i)  $x^2 - 3x - 10 = 0$

(ii)  $2x^2 + x - 6 = 0$

52. A child has a die whose six faces show the letters as given below

**A B C D E A**

The die is thrown once. What is the probability of getting (i) A (ii) D

53. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be –

(i) red? (ii) white (iii) not green?

54. Which of the following cannot be the probability of an event?

(i)  $\frac{2}{3}$

(ii)  $-1.5$

(iii) 15 %

(iv) 0.7



## Section A

[24]

## Fill in the Blanks From (Question 1 to 13)

- The pair of linear equations  $3x + 5y = 3$ ,  $6x + ky = 8$  does not have a solution if  
a.  $k = 5$                       b.  $k = 10$                       c.  $k \neq 10$                       d.  $k \neq 5$
- The discriminant of  $x^2 + 5x + 5 = 0$  is:  
a. 5                      b. -5                      c.  $5/2$                       d.  $-5/2$
- If  $a = 3$ ,  $n = 8$ ,  $S = 192$ , then  $d$  is  
a. 3                      b. 4                      c. 5                      d. 4
- The distance between the points  $(\sin\theta, \sin\theta)$  and  $(\cos\theta, -\cos\theta)$  is  
a.  $\sqrt{2}$                       b. 2                      c. 3                      d. 1
- For  $0 < \theta < 90^\circ$ , when  $\theta$  increases from  $\theta^\circ$  to  $90^\circ$  the value of \_\_\_\_\_ increase.  
a.  $\cos \theta$                       b.  $\cot \theta$                       c.  $\operatorname{cosec} \theta$                       d.  $\sin \theta$
- The class with maximum frequency is called  
a. median class                      b. modal class                      c. mean class                      d. average class.

## Fill in the blanks: ( 7 to 12 )

- HCF (17, 20) = \_\_\_\_\_ ( 1, 0, 1 and 0)
- The degree of a non-zero constant polynomial is \_\_\_\_\_ (0, 1, 2)
- If  $\bar{x} = 6.45$ ,  $\Sigma fi = 100$ ,  $\Sigma fix_i =$  \_\_\_\_\_. (645, 6.45, 64.5)
- From the top of the tower 30 m height, the angle of depression of a ship is  $60^\circ$ .  
The distance of the ship from the tower is \_\_\_\_\_ m. ( $5\sqrt{2}$ ,  $5\sqrt{3}$ ,  $10\sqrt{3}$ )
- A line which intersects the circle in two points is called \_\_\_\_\_ (tangent, radius, secant)
- If the mode of observation 6 of 64, 40, 48,  $x$ , 43, 48, 43 and 34 is 43 then  $x + 3 =$  \_\_\_\_\_ (51, 45, 46)

## State whether the following statements are true or false : (Question 14 to 16)

- By dividing the integer  $a$  by 3, we get the remainder 0 and 1 only.
- Numbers at zeroes at polynomial  $p(x) = x^2 - 10x + 16$  are three.
- The equations  $4x + 3y + 1 = 5$  and  $12x + 9y = 15$  represent coincide lines.
- Probability of any event can't be zero.

## Answer the following : (Question 17 to 24)

- Find  $n^{\text{th}}$  term of an AP: 3, 8, 13, 18, .....
- Find the area of a sector of a circle with radius 21 cm if an angle of the sector is  $120^\circ$ .



19. Find the mean of all factors of 12.
20. Find the probability that there is at least one boy in the families having two children.

**Match the following: ( 21 to 24 )**

A	B
21. The volume of a cone is ____	a. $\pi r^2 h$
22. The volume of a sphere is ____	b. $\frac{1}{3} \pi r^2 h$
	c. $2\pi r h$
	d. $\frac{4}{3} \pi r^3$

A	B
23. A circle has _____ tangents.	a. $l = \frac{\pi r \theta}{180}$
24. Length of an arc of a sector of an angle $\theta$ is ____	b. $\frac{\pi r}{180}$
	c. one
	d. infinite

### Section B

**Answer any nine questions from question number 25 to 37. (2 Marks Each)**

**[18]**

25. Find the zeroes of  $x^3 - 3$  and verify the relationship between the zeroes and its coefficient
26. If  $\alpha$  and  $\beta$  are zeroes of the polynomial  $p(x) = 3x^2 - 10x + 7$ , find the value of  $\alpha^2 + \beta^2$ .
27. Find the quadratic polynomial whose zeroes are  $7 + 2\sqrt{2}$  and  $7 - 2\sqrt{2}$ .
28. How many multiples of 4 lie between 10 and 260?
29. The 17th term of AP exceeds its 10<sup>th</sup> term by 7. Find the common difference.
30. Find the point on the x – axis, which is equidistant from the points (6, 3) and (3, 0).
31. If the point P (2, 2) is equidistant from the points A (-2, k) and B (-2k, -3), find k. Also, find the length of AP
32. Evaluate:  $2 \cos^2 60^\circ + 3 \sin^2 45^\circ - \sin^2 60^\circ + 2 \cos 90^\circ$
33. If  $\sin A = \frac{3}{5}$ , calculate  $\cos A$  and  $\tan A$ .
34. A tower stands vertically on the ground. From a point on the ground which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be  $60^\circ$ . Find the height of the tower.
35. Three cubes each of volume  $216 \text{ cm}^3$  are joined end to end. Find the surface area of the resulting cuboid.
36. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. find the total surface area of the toy.
37. For  $l = 35$ ,  $\Sigma fi = 45$ ,  $f = 10$ ,  $h = 5$ ,  $cf = 15$  then find the median.

### Section C

Answer any six questions from question number 38 to 46. (3 Marks Each)

[18]

38. The larger of two supplementary angles exceeds the smaller by 18 degrees. Find them.
39. Two years ago, Dipika was eight times as old as Divya. One year later, Dipika will be five times as old as Divya. How old are Dipika and Divya?
40. How many terms of the AP: 9, 17, 25, ..... Must be taken to give a sum of 636?
41. If the distance between the points  $p(3,2)$  and  $Q(7, y)$  is 5 units then find the value of  $y$ .
42. Find the ratio in which the line segment joining the points  $A(3, -3)$  and  $B(-2, 7)$  is divided by X-axis. Also find the coordinates of the point of division.
43. A right of height 90 cm is walking away from the base of a lamp- post at a speed of 1.3 m/s. if the lamp is 2.7 m above the ground, find the length of her shadow after 4 seconds.
44. Prove that the parallelogram circumscribing a circle is a rhombus.
45. The lengths of 40 leaves of a plants are measured correct to the nearest mm, and the data obtained is represented in the following table:

Length (in mm)	118-126	127-135	136-144	145-153	154-162	163-171	172-180
No. of leaves	3	5	9	12	5	4	2

Find the median length of the leaves.

46. One card is drawn at random from a pack of 52 cards. Find the probability that a card drawn is,
  - (i) face card
  - (ii) A diamond card
  - (iii) Not an ace

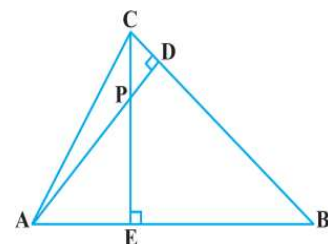
### Section D

Answer any five questions from question number 47 to 54. (4 Marks Each)

[20]

47. State and prove that Basic Proportionality Theorem.
48. In the figure, altitudes AD and CE of  $\triangle ABC$  intersect each other at the point P. Show that

- (i)  $\triangle AEP \sim \triangle CDP$
- (ii)  $\triangle ABD \sim \triangle CBE$
- (iii)  $\triangle AEP \sim \triangle ADB$
- (iv)  $\triangle PDC \sim \triangle BEC$



49. A cottage industry produces a certain number of toys in a day. The cost of production of each toy (in rupees) was found to be 55 minus the number of toys produced in a day. On a particular day, the total cost of production was Rs.750. We would like to find out the number of toys produced on that day.
50. If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first  $n$  terms.

51. If the median of the following frequency distribution is 32.5. Find the values of  $f_1$  and  $f_2$ .

Classes	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
Frequency	$f_1$	5	9	12	$f_2$	3	2	40

52. Find the mean of the following frequency distribution by step-deviation method:

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	4	7	20	12	8	5

53. Three different coins are tossed together. Find the probability of getting (i) exactly two heads (ii) at least two heads (iii) at least two tails.
54. A box contains 20 balls bearing numbers 1, 2, 3, 4, 5, ....., 18, 19, 20. A ball is drawn at random from the box. What is the probability that the number on the ball is:
- (i) An odd number?
  - (ii) Divisible by 2 or 3?
  - (iii) Prime number?
  - (iv) Not divisible by 10?



## Section A

Answer the following : ( 1 Mark Each )

[24]

- State the condition for the solution of  $a_1x + b_1y + c_1 = 0$  and  $a_2x + b_2y + c_2 = 0$  being infinite.  
 (A)  $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$  (B)  $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$  (C)  $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$  (D)  $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$
- If \_\_\_\_\_ then the two roots of quadratic equation are distinct real roots.  
 (A)  $b^2 - 4ac < 0$  (B)  $b^2 - 4ac = 0$  (C)  $b^2 - 4ac > 0$  (D)  $b^2 - 4ac \neq 0$
- The 8<sup>th</sup> term of an A.P. is 17 and its 14<sup>th</sup> term is 29. The common difference of the A.P. is  
 (A) 3 (B) 2 (C) 5 (D) 4
- Find the distance between the points (0,5) and (-5,0) is  
 (A) 5 units (B)  $5\sqrt{2}$  units (C)  $2\sqrt{5}$  units (D) 10 units
- If  $\cot 3\theta = \frac{1}{\sqrt{3}}$ ,  $0^\circ < \theta \leq 20^\circ$ , then the value of  $\theta$  is  
 (A)  $0^\circ$  (B)  $20^\circ$  (C)  $40^\circ$  (D)  $60^\circ$
- The mean of 1, 2, 3, 4, ..., n is given by  
 (A)  $\frac{n(n+1)}{2}$  (B)  $\frac{(n+1)}{4}$  (C)  $\frac{n}{2}$  (D)  $\frac{(n+1)}{2}$

Fill in the blanks:

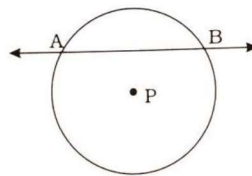
- If  $HCF(10,15) = 2a + 1$ , then  $a =$  \_\_\_\_\_. (2, 3, 5)
- If the product of the zeroes of the polynomial  $p(x) = 6x^2 - x + k$  is  $-\frac{1}{3}$ , then  $k =$  \_\_\_\_\_. (-2, 2, -3)
- The probability of a certain event is \_\_\_\_\_. (0, 1, 2)
- If  $\sin \alpha = \frac{1}{\sqrt{2}}$  and  $\cot \beta = 1$ , then  $\alpha + \beta =$  \_\_\_\_\_. ( $45^\circ, 60^\circ, 90^\circ$ )
- A circle can have \_\_\_\_\_ parallel tangents at the most. ( one, two, three )
- The mean of first n natural number is \_\_\_\_\_. ( $\frac{n}{2}, \frac{n(n+1)}{2}, \frac{n+1}{2}$ )

True or False:

- $(\sqrt{2} - \sqrt{3})(\sqrt{3} + \sqrt{2})$  is an irrational number.
- The quadratic polynomial  $p(x) = x^2 + x$  has two real zeroes.
- If a pair of linear equations has no solution, it is called an inconsistent pair of equations.
- $P(E) + P(\bar{E}) = -1$ .

Answer By A number or A word or A Sentence:

- Find the common difference of the AP: -5, -1, 3, 7, ...
- Line AB as shown in the figure below is known as what?



19. If  $P(A) = \frac{x}{3}$  and  $P(\bar{A}) = \frac{2x}{7}$ , find the value of  $x$ .
20. In the formula  $l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$ , What does  $f_1$  represent ?

Match the following : ( 21 to 24 )

[04]

21. CSA of Hemisphere	(a) $3\pi r^2$
22. CSA of cone	(b) $\pi r l$
	(c) $2\pi r^2$

23. Length of arc	(a) $\frac{\pi r^2 \theta}{360}$
24. Area of Sector	(b) $\frac{\pi r^2 \theta}{180}$
	(c) $\frac{\pi r \theta}{180}$

### Section B

Answer any nine questions from question number 25 to 37. (2 Marks Each)

[18]

25. Find the zeroes of the quadratic polynomial  $x^2 + 7x + 10$ .
26. Find a quadratic polynomial for which the sum and the product of zeroes are  $\sqrt{5}$  and  $\frac{3}{4}$  respectively.
27. Find the roots of the following quadratic equation by factorization :  $2x^2 - 7x + 3 = 0$ .
28. Find the 15<sup>th</sup> term of the AP: 2, 7, 12, ...
29. Find the sum of the first 22 terms of the AP 8, 3, -2, ...
30. Find the distance between the points A(2, 3) and B(4, 1).
31. Find the midpoint of the line segment AB joining the points A(5, 1) and B(1, 3).
32. If  $\sin A = \frac{3}{4}$ , calculate  $\cos A$  and  $\tan A$ .
33. Evaluate:  $2\cot^2 45^\circ + \sin^2 30^\circ - \cos^2 60^\circ$ .
34. The angle of elevation of the top of a tower from a point on the ground, which is 30m away from the foot of the tower, is  $30^\circ$ . Find the height of the tower.
35. 2 cubes each of volume  $1000\text{cm}^3$  are joined face to face. Find the surface area of the resulting cuboid.
36. The radius and height of a cylinder are equal. If the radius of the cylinder is 14cm, find its volume.
37. The following data gives the information on the observed lifetime (in hours) of 225 electrical components. Find the Mean.

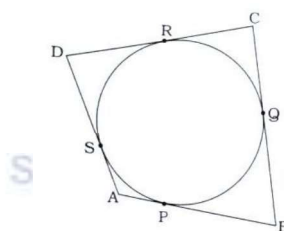
Lifetime In hours	0-20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120
Frequency	10	35	52	61	38	29

### Section C

Answer any six questions from question number 38 to 46. (3 Marks Each)

[18]

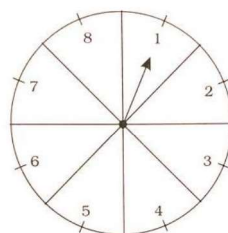
38. Solve the following pair of linear equations by the substitution method:  
 $3x - 5y - 4 = 0$  and  $9x = 2y + 7$ .
39. Solve the following pair of linear equation by the elimination method:  
 $2x + y = 23$  and  $4x - y = 13$ .
40. Find the 31<sup>st</sup> term of an AP whose 11<sup>th</sup> term is 88 and the 16<sup>th</sup> term is 73.
41. Find the coordinate of the points of trisection of the line segment joining (4, -1) and (-2, -3).
42. Show that the points (1, 7), (4, 2), (-1, -1) and (-4, 4) are the vertices of a square.
43. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that  $AB + CD = AD + BC$ .



44. The center of two concentric circles  $C_1$  and  $C_2$  is P and their radii are 73cm and 55cm respectively. A chord AB of circle  $C_1$  touches the circle  $C_2$  at M. Find the length of chord AB.
45. Students noted the number of cars passing through a spot on a road for 100 periods each of 3 minutes and summarized it in the table given below. Find the mean and Mode.

Number of cars	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	7	14	13	12	20	11	15	8

46. A game of chance consist of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 and these are equally likely outcomes. What is the probability that it will point at (i) 8 ? (ii) an odd number ? (iii) a number greater than 2 ?

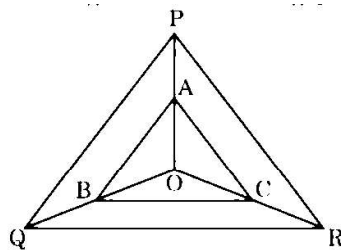


### Section D

Answer any five questions from question number 47 to 54.(4 Marks Each)

[20]

47. State and Prove Basic Proportionality theorem.
48. In figure A, B and C are points on OP, OQ and OR respectively such that  $AB \parallel PQ$  and  $AC \parallel PR$ . Show that  $BC \parallel QR$ .



49. Ajay's mother is 26 years older than him. The product of their ages 3 years from now will be 360. We would like to find Ajay's present age.
50. If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find the 20<sup>th</sup> term.
51. The distribution below gives the weights of 30 students of a class. Find the median weight of the students.

Weight (in kg)	40 – 45	45 – 50	50 – 55	55 – 60	60 – 65	65 – 70	70 – 75
No. of students	2	3	8	6	6	3	2

52. Find the mean of the following data:

Class	50 – 70	70 – 90	90 – 110	110 – 130	130 – 150	150 – 170
Frequency	10	18	7	6	5	4

53. One card is drawn from a well – shuffled deck of 52 cards. Find the probability of getting (i) a king of red color (ii) a face card (iii) a red face card (iv) the jack of hearts.
54. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a one – digit number (ii) a two – digit number (iii) a perfect square no. (iv) a no. divisible by 5.



## Section A

Do as directed : ( 1 Mark Each )

[24]

Choose the correct answer from the following:-

- The sum of two numbers is 10 and their difference is 2 then the bigger number is \_\_\_\_\_.  
(A) 2 (B) 4 (C) 6 (D) 8
- If the equation  $2x^2 - kx + k = 0$  has equal roots, then  $k =$  \_\_\_\_\_.  
(A) 0 (B) 4 (C) 8 (D) 0 or 8
- For an A.P. If  $a_{18} - a_{14} = 32$  then  $d =$  \_\_\_\_\_.  
(A) 8 (B) -8 (C) -4 (D) 4
- A (0, 0), B (3, 0), C (3, 4) are the vertices of the \_\_\_\_\_ triangle.  
(A) Isosceles (B) Equilateral (C) Right angled (D) Acute angled
- $\sec^4 A - \sec^2 A =$  \_\_\_\_\_.  
(A)  $\tan^2 A - \tan^4 A$  (B)  $\tan^4 A - \tan^2 A$  (C)  $\tan^4 A + \tan^2 A$  (D)  $\cos^2 A - \cos^4 A$
- \_\_\_\_\_ is not measure of central tendency.  
(A) Mean (B) Median (C) Mode (D) Range

Fill in the blanks :

- $\sqrt{5^2 + 1^2}$  is \_\_\_\_\_ number.
- If 5 is one of the zeroes of polynomial  $P(X) = X^3 - 6x^2 + ax + 10$ , then  $a =$  \_\_\_\_\_.
- Probability of getting 53 Sundays come in a leap year is \_\_\_\_\_.
- For an acute angle  $\theta$ , if  $\sin \theta = \cos \theta$ , then  $\theta =$  \_\_\_\_\_.
- There is \_\_\_\_\_ tangent at a point of the circle.
- If the mode of the observations 64, 40, 48,  $x$ , 43, 48, 43, 34 is 43 then  $X + 3 =$  \_\_\_\_\_.

State whether the following sentences are true or false:-

- The LCM of the smallest prime number and the smallest composite number is 4.
- Degree of polynomial  $p(x) = (x - 5)^2$  is 2.
- An event having only one outcome of the experiment is called an elementary event.
- A pair of linear equations is said to be consistent pair, if it has no solution.

Answer in one sentence, word or number :

- What is the sum of the probability of all the elementary events of an experiment?
- Find out the class mark of 10 – 25 and 35 – 55 class.
- In cyclic quadrilateral ABCD,  $\angle A = \angle C - 40^\circ$ . Find  $\angle A$ .
- If  $k - 1$ ,  $k + 3$  and  $3k - 1$  are three consecutive terms of an AP, find the value of  $k$ .

A	B
21. Area of quadrant	a) $\frac{\sqrt{3}}{4} \times (\text{side})^2$
22. Area of equilateral triangle	b) $\frac{\sqrt{3}}{4} \pi r^2$
	c) $\frac{1}{4} \pi r^2$

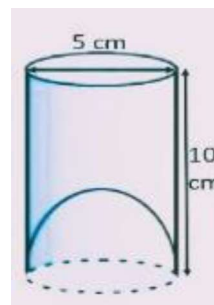
A	B
23. Volume of cone	a) $\frac{1}{3} \pi r^3 h$
24. Volume of cylinder	b) $\frac{1}{3} \pi r^2 h$
	c) $\pi r^2 h$

## Section B

Answer any nine questions from question number 25 to 37. (2 Marks Each)

[18]

25. Without finding the zeroes  $\alpha$  and  $\beta$  of polynomial  $p(x) = x^2 - 5x + 6$ ; Find values of  $\frac{1}{\alpha} + \frac{1}{\beta}$ .
26. Find the zeros of the quadratic polynomial  $t^2 - 15$  and verify the relationship between the zeroes and coefficients.
27. Find two parts of 20 such that the square of the greater part exceeds the square of the smaller part by 16.
28. Find the 31<sup>st</sup> term of an AP whose 11<sup>th</sup> term is 38 and the 16<sup>th</sup> term is 73.
29. Find the sum of the odd numbers between 0 and 50.
30. Find the value of  $y$  for which the distance between the points  $P(2, -3)$  and  $Q(10, y)$  is 10 units.
31. Find the ratio in which the line segment joining the points  $(-3, 10)$  and  $(6, 8)$  is divided by  $(1, 6)$ .
32. In  $\Delta PQR$ ,  $\angle Q = 90^\circ$ ,  $PR + QR = 25$  and  $PQ = 5$ . Then find  $\sin P$ ,  $\cos P$  and  $\tan P$ .
33. Find the value of  $\frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$ .
34. An observer 1.5 m tall is 28.5 m away from a chimney the angle of elevation of the top of the chimney from her eyes is  $45^\circ$ . what is the height of the chimney?
35. A Juice seller was serving his customers using glasses as shown in figure. The inner diameter of the cylindrical glass was 5cm but the bottom of the glass had a hemispherical raised portion which reduce the capacity of the glass if the height of a glass was 10cm, find the apparent capacity of the glass and its actual capacity. ( $\pi = 3.14$ )



36. A toy is in the form of a cone of a radius 3.5cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.
37. A student noted number of car passing through a spot on a road for 100 periods each of 3 minutes and summarized it enter table given below find the mode of the data.

No. of cars	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	7	14	13	12	20	11	15	8

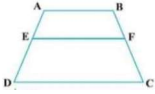
### Section C

**Answer any six questions from question number 38 to 46. (3 Marks Each) [18]**

38. There are some coins of Rs. 5 and Rs. 2 in a box. If total coins are 40 and total amount is Rs. 125. Find each coins.
39. The larger of two supplementary angles exceeds the smaller by  $18^\circ$ . Find them by elimination method.
40. How many terms to the AP: 9, 17, 25.....must be taken to give a sum of 636.
41. Find the coordinates of the points which divide the line segment joining A (-2, 2) and B (2, 8) into four equal parts.
42. If the point A(6, 1), B(8, 2), C(9, 4) and D(p, 3) are the vertices of a parallelogram, taken in order find the value of p.
43. Two tangents TP and TQ are drawn to a circle with center O from an external point T. Prove that  $\angle PTQ = 2 \angle OPQ$ .
44. Prove that, The lengths of tangents drawn from an external point to a circle are equal.
45. Two dice one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of two number appearing on the top of the dice is (i) 8? (ii) 13? (iii) Less than or equal to 12?
46. If  $M + \bar{x} = 15$  and  $M - \bar{x} = 5$  then find Z.

### Section D

**Answer any five questions from question number 47 to 54. (4 Marks Each) [20]**

47. Write basic proportionality theorem and prove that.
48. ABCD is a trapezium with  $AB \parallel DC$ . E and F are points on non-sides AD and BC respectively such that EF is parallel to AB. Show that  $\frac{AE}{ED} = \frac{BF}{FC}$
- 
49. The numerator of a fraction is 3 less than its denominator. The sum of the original fraction and the new fraction obtained by adding 2 to both the numerator as well as denominator of the original fraction is  $\frac{29}{20}$ . Find the original fraction.
50. In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees that each section of each class will plant will be the same as the class, in which they are studying, e.g. a section of class I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. How

many trees will be planted by the students?

51. The median of the following frequency distribution is 46 and the total frequency is 230. Find the missing frequencies  $x$  and  $y$ .

Class	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	12	30	$x$	65	$y$	25	18

52. During a middle check up to 35 students, their weights were recorded as follows:

Weight (in kg)	No. of students
Below 38	0
Below 40	3
Below 42	5
Below 44	9
Below 46	14
Below 48	28
Below 50	31
Below 52	35

Compute the modal weight.

53. There are boards numbered 1 to 50 in a box. One board is selected at random. Find the probability that the number on the board is (1) a multiple of 11 (2) a prime number (3) a multiple of 10 (4) an even number.
54. A card is drawn at random from a well shuffled deck of 52 cards. Find the probability that the card drawn is (1) not a face card (2) either a black card or a king (3) neither a heart nor a king, (4) a spade or an ace.

## Section A

Do as directed (Que. 1 to 24) (each carries 1 mark)

[24]

Choose the correct alternative and write the answer :

1. Which of the following is an amphoteric oxide?  
A.  $\text{Al}_2\text{O}_3$                       B.  $\text{ZnO}$                       C. Both A and B                      D. None of these
2. The general formula of aldehyde is  $\text{C}_n\text{H}_{2n+1}\text{CHO}$ . The value of n for its 1<sup>st</sup> member is \_\_\_\_  
A. 1                      B. 0                      C. 2                      D. 3
3. During which process is energy released from absorbed food?  
A. Digestion                      B. Respiration                      C. Excretion                      D. Reptiles
4. Select false statement from the following.  
A. Magnetic field lines form closed loops.  
B. Magnetic field is stronger at the region in magnetic field where field lines are crowded.  
C. Magnetic field lines can cross each other after intersecting.  
D. Outside bar magnet, magnetic field is from N to S.
5. Which one of the following materials cannot be used to make a lens?  
A. clay                      B. water                      C. Glass                      D. Plastic
6. Refractive index of glass is maximum for \_\_\_\_ coloured  
A. violet                      B. green                      C. blue                      D. red

• Fill in the blanks by choosing the correct option from the bracket.

7. \_\_\_\_\_ is an unsaturated compound. ( $\text{CH}_4$ ,  $\text{C}_2\text{H}_4$ ,  $\text{C}_3\text{H}_8$ )
8. While preparing electromagnet, conducting wire is wound over \_\_\_\_\_ metal.  
(aluminium, Copper, Iron)
9. In \_\_\_\_\_ form is cellular energy stored in autotrophic organisms.  
(Glycogen, Protein, Starch)
10. \_\_\_\_\_ is the probability for a boy to be born in human beings. (1, 0.56, 0.5)
11. Image obtained by plane mirror is always \_\_\_\_\_.  
(virtual and erect, virtual and inverted, real and erect)
12. \_\_\_\_\_ non-metals is a liquid. (mercury, barium, bromine)

State whether the following statements are True or False :

13. Ionic compounds are insoluble in water and soluble in petrol.
14. Tubectomy is a contraceptive method for male.
15. The near point of human eye can be 50 cm in hypermetropic eye.
16. Stomach produces sulphuric acid

• **Answer in short :**

17. What is synapse?
18. What is Mendel's contribution to genetics?
19. Write function of iris.
20. On what factors is resistivity dependent?

• **Match the following :**

	<b>'A'</b>		<b>'B'</b>
21.	Auxin	(a)	Cell division test in plant
22.	Gibberellin	(b)	Increase cell division in plants
		(c)	Induces stem growth

	<b>'A'</b>		<b>'B'</b>
23.	Biotic components	(a)	temperature
24.	Abiotic Component	(b)	Bacteria
		(c)	Paper

**Section B**

**Answer any 9 questions from Que. No. 25 to 37 . ( each carries 2 Marks )**

**[18]**

25. Explain electrolytic decomposition of water.
26. State two ways to prevent the rusting of iron.
27. How do guard cells regulate the opening and closing of stomatal pore?
28. Write the difference between sexual and asexual mode of reproduction.
29. Explain reproduction by budding in yeast with diagram.
30. What is called scattering of light? Define tyndall effect.
31. What is electric current? Write its SI unit and explain.
32. Derive equivalent resistance in series connection.
33. Write properties of magnetic field lines around a bar magnet.
34. What is biological magnification? Will the levels of this magnification be different at different levels of the ecosystem?
35. Distinguish between : Biodegradable waste and-Non Biodegradable waste
36. During any awkward situation, we perspire more. Give scientific reason.
37. Show a schematic diagram of an electric circuit comprising of cell, electric bulb, ammeter and plug key. Also mention about direction of electric current.

**Section C**

**Answer any 6 questions from Que. No. 38 to 4 ( each carries 3 Marks )**

**[18]**

38. Explain oxidation and reduction reaction with examples.
39. Give reasons

- (a) platinum,, gold and silver are used to make jewellery.
- (b) Sodium, potassium and lithium are stored under oil.
- (c) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.
40. You must have seen tarnished copper vessels being cleaned with lemon or tamarind juice. Explain why these sour substances are effective in cleaning the vessels.
41. Draw the structure of a neuron and explain its function.
42. Explain asexual mode of reproduction in Rhizopus with the help of spore formation. Also state its importance
43. Explain the reproductive organs of Flowering plants with a neat diagram.
44. A convex mirror used for rear-view on an automobile has a radius of curvature of 5 m. If a bus is located at 15 m from this mirror, find the position, nature and size of the image.
45. State the laws of reflection.
46. Explain Joules law of heating and define electric power.

**Section D**

**Answer any 5 questions from Que. No. 47 to 54. ( each carries 4 Marks ) [20]**

47. Explain reaction of zinc granules with dilute sulphuric acid and show how test of hydrogen gas by burning can be done? Discuss this experiment.
48. From the name of salt, their chemical formulae, how are the acid and base identified? Explain with example.
49. Write a detailed note on allotropes of carbon.
50. Explain : human digestive system.
51. Explain the process of nutrition in a unicellular organism.
52. Explain about atmospheric refraction on a large scale by the example of twinkling of stars.
53. What is solenoid and electromagnet? Explain with an activity.
54. Discuss the formation of Ozone layer.



## Section A

Answer the following : ( 1 Mark Each )

[24]

1. Which acid is present in nettle leaves?  
(A)  $\text{CH}_3\text{COOH}$  (B)  $\text{HCOOH}$  (C)  $\text{H}_2\text{CO}_3$  (D) Lactic acid
2. Which of the following is a pair of isomers?  
(A) Propane and Butane (B) Pentane and 2-methyl propane  
(C) Pentane and 2, 2-dimethyl propane (D) Hexane and 2-methyl butane
3. Protein is digested by .....  
(A) Lipase (B) Trypsin (C) Amylase (D) All of these
4. What is the unit of Electric power?  
(A) Watt (B)  $\text{A}^2\text{ohm}$  (C) Volt-ampere (D) All of these
5. What is the power of a plane mirror?  
(A) Infinite (B) zero (C) +1 (D) -1
6. Why does the sea water appear blue?  
(A) Reflection of sky colour (B) Due to the presence of water in sea  
(C) Scattering of light rays (D) Absorption of light rays

## Fill in the blanks

7. Hexane has ..... isomers.
8. The magnetic field line produced by current carrying conductor is ..... To perpendicular distance.
9. Lipase digests fats into .....
10. The flowers are unisexual in .....
11. .... is the chemical formula of teeth.
12. Stomata closes when ..... shrinks.

## True or False

13. Copper-T is useful to prevent implantation of embryo.
14. The heart is the main coordination center of the body.
15. While flying at high altitudes, we find the sky black.
16.  $\frac{3}{4}$  plants are seen tall in F1 generation in experiment done by Mendel.
17. Magnesium hydroxide and hydrogen gas are formed when magnesium reacts with cold water.
18. Primary consumers are considered as the first trophic level.

## Answer in one word or one sentence

19. Katrina is gazing the stunning view of rainbow at 7 pm. Find the direction of her back.

20. Write the full form of UNEP.
21. Define tropism.
22. What is the SI unit of electrical resistivity.
23. What are amphoteric oxides?
24. Where should the object be placed to use convex lens as a microscope?

### Section B

**Answer the following : ( 2 Marks Each – Any 9 )**

**[18]**

25.  $A + BCl_2 \rightarrow ACl_2 + B$ ;  $C + BO \rightarrow CO + B$ ;  $D + BCl_2 \rightarrow$  No reaction  
Write the reactivity series of A, B, C and D in ascending order.
26. Explain the conductivity property of an ionic compound by an experiment.
27. Draw diagram of stomata and explain them.
28. Explain the methods of contraception.
29. What is vegetative propagation and write its advantages.
30. What is tyndall effect? Give multiple examples.
31. Just draw the chart of inheritance of two traits – shape and color of the seed.
32. Write Fleming's left hand rule and also state the direction of force acting on a current carrying conductor placed on this sheet of paper if current is flowing in north-west direction and magnetic field is present in north-east direction on the paper.
33. Give difference between AC and DC current.
34. Explain breakdown of glucose molecule.
35. What is biological magnification?
36. Explain the formation and depletion of ozone layer.
37. A piece of resistance R is cut into 12 parts, and then each part is connected in parallel connection. If the equivalent resistance is R' then find the ratio of R'/R.

### Section C

**Answer the following : ( 3 Marks Each – Any 6 )**

**[18]**

38. Complete and balance the following chemical equations:
  - (i) Barium chloride reacts with aluminium sulphate
  - (ii) Ammonium phosphate reacts with potassium sulphate
  - (iii) Calcium phosphate + Silicon dioxide  $\rightarrow$   $CaSiO_3 + P_4O_{10}$
39. How are metals extracted lying at the top of activity series?
40. Write chemical reactions of different metals with water.
41. Explain the different parts of human brain and its functions with a neat diagram.
42. Mention various methods of contraception.
43. What is vegetative propagation? Explain with advantages.
44. An inverted image of 6 cm of a pencil of 9 cm is formed at 12 cm in front of a spherical mirror. Find the focal length and the type of that mirror.