

## SECTION A

1) Find the values of  $k$  for the given quadratic equation so that it has two equal roots.  
 $k(x-2)+6=0$ .

2)  $D$  is a point on the side  $BC$  of a triangle  $ABC$  such that  $\angle ADC = \angle BAC$ . Show that  $CA = CB \cdot CD$ .

3) How many two digit numbers are divisible by 3?

4) Consider the following frequency distribution of heights of 60 students of a class.

Height (cm)	150-155	155-160	165-170	170-175	175-180
No. of students	15	13	10	8	5

The upper limit of the median class in the given data is \_\_\_\_\_.

5) For which values of  $p$ , will the lines represented by the foll. pair of linear equations be parallel.  $3x - y - 5 = 0$  (11)  
 $6x - 2y - p = 0$

- (a) all real values except 10  
(b) 10  
(c)  $5/2$   
(d)  $1/2$

6) The total surface area of the given solid figure is \_\_\_\_\_



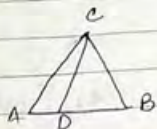
7) If one root of the equation  $(k-1)x^2 - 10x + 3 = 0$  is the reciprocal of the other, then the value of  $k$  is \_\_\_\_\_.

8) The perimeters of two similar triangles  $\triangle ABC$  &  $\triangle PQR$  are 35 cm & 45 cm respectively, then the ratio of the areas of the two triangles is —

9) Fill up the AP. 2, —, 26, —.

10) A number is chosen at random from the numbers  $-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5$ . Then the probability that the square of this number is less than or equal to 1 is —.

11) In the figure, if  $\angle ACB = \angle CDA$ ,  $AC = 6\text{ cm}$  and  $AD = 3\text{ cm}$ , then find the length of  $AB$ .



12) If the first three terms of an AP are  $b, c$  &  $db$ , then find the ratio of  $b$  &  $c$ .

13) Find the value(s) of  $k$  for which the quadratic equation  $x^2 + 2\sqrt{2}kx + 18 = 0$  has equal roots.

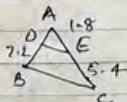
14) Find the nature of roots of the quadratic equation  $2x^2 - 4x + 3 = 0$ .

15) Find the common difference of the AP.  
 $\frac{1}{a}, \frac{3-a}{3a}, \frac{3-2a}{3a}$  ... where  $a \neq 0$ .

16) In figure,  $ABC$  is an isosceles triangle right angled at  $C$  with  $AC = 4\text{ cm}$ . Find the length of  $AB$ .



17) In fig,  $DE \parallel BC$ . Find the length of side  $AD$ , given that  $AE = 1.8\text{ cm}$ ,  $BD = 7.2\text{ cm}$  and  $CE = 5.4\text{ cm}$ .



## SECTION B

18) The probability of selecting a blue marble at random from a jar that contains only blue, black & green marbles is  $\frac{1}{5}$ . The probability of selecting a black marble at random from the same jar is  $\frac{1}{4}$ . If the jar contains 11 green marbles, find the total number of marbles in the jar.

19) Find the values of  $k$  so that the pair of equations  $x + 2y = 5$  and  $3x + by + 15 = 0$  has a unique solution.

20) The larger of two supplementary angles exceeds the smaller by  $18^\circ$ . Find the angles.

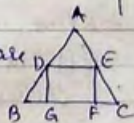
21) Sumit is 3 times as old as his son. Five years later, he shall be two and a half times as old as his son. How old is Sumit at present?

22) Find the mode of the following frequency distribution.

Class	25-30	30-35	35-40	40-45	45-50	50-55
Freq.	25	34	50	42	38	14

23) Find the number of natural numbers between 100 & 998 which are divisible by both 2 & 5.

24) In the given fig. DEFG is a square and  $\angle BAC = 90^\circ$ . Show that  $FG^2 = BG \times FC$ .



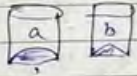
25) In an equilateral triangle, prove that three times the square of one side is equal to four times the square of one of its altitudes.

26) Jayanti throws a pair of dice and records the

product of the numbers appearing on the dice. Pihu throws 1 dice and records the squares of the numbers that appears on it. Who has the better chances of getting the number 36. Justify.

- 27) An integer is chosen between 70 & 100. Find the probability that it is (a) a prime number.  
(b) divisible by 9.

28) The heights of both glasses in the fig. are 10 cm. They have an inner radius of 3 cm. Glass a has a hemispherical raised bottom. Glass b has a conical raised bottom of height 1.5 cm. Which glass could contain more liquid and by how much?



- 29) Find the 11<sup>th</sup> term from the last term of the AP: 10, 9, 4, ..., -62.

30) Two APs. have the same common difference. The difference between their 100<sup>th</sup> terms is 100, what is the difference between their 1000<sup>th</sup> terms?

31) One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting neither a red card nor a queen.

32) A die is thrown twice. What is the probability that 5 will come at least once?

33) For which value of a and b does the following pair of linear eqns. have an infinite no. of solutions?  
 $2x + 3y = 7$   
 $(a-b)x + (a+b)y = 3a + b - 2$ .

## SECTION C

34) Find the roots of the quadratic eqn.

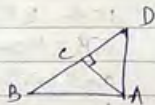
$$3x^2 - 2\sqrt{6}x + 2 = 0$$

35) A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hrs more to cover the same distance. Find the speed of the train.

36) In fig. ABD is a triangle right angled at A and  $AC \perp BD$ . Show that

$$AB^2 = BC \cdot BD$$

$$AC^2 = BC \cdot DC$$



37) In an equilateral triangle ABC, D is a point on side BC such that  $BD \perp AC$ . Prove that  $9AD^2 = 7AB^2$ .

38) How many silver coins, 1.75 cm in diameter and thickness 2 mm, must be melted to form a cuboid of dimensions 5.5 cm x 10 cm x 3.5 cm?

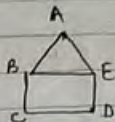
39) A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the no. of such cones which can be filled with ice cream.

40) A student noted the no. of cars passing through a spot on the road for 100 periods each of 3 minutes and summarised it in the 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

41) If the sum of the first  $m$  terms of an AP is the same as the sum of its first  $n$  terms, show that the sum of its first  $(m+n)$  terms is 0.

42) In the fig, ABCDE is a pentagon with  $BE \parallel CD$  and  $BC \parallel DE$ .  $BC \perp CD$ .  $AB = 5\text{cm}$ ,  $AE = 5\text{cm}$ ,  $BE = 7\text{cm}$ ,  $BC = x - y$  and  $CD = x + y$ . If the perimeter of ABCDE =  $27\text{cm}$ , find the value of  $x$  and  $y$ , given  $x, y \neq 0$ .



43) Solve.  $\frac{21}{x} + \frac{47}{y} = 110$        $\frac{47}{x} + \frac{21}{y} = 162$        $x, y \neq 0$ .

44) Two right triangles ABC and DAC are drawn on the same hypotenuse AC and on the same side of AC. If AB and DC intersect at P, prove that  $AP \times PC = BP \times DP$ .

45) Diagonals of a trapezium PQRS intersect each other at point O.  $PQ \parallel RS$  and  $PQ = 3RS$ . Find the ratio of the areas of  $\Delta POQ$  and  $\Delta ROS$ .

46) A solid is in the form of a cylinder with hemispherical ends. The total height of the solid is 20 cm and the diameter of the cylinder is 7 cm. Find the total volume of the solid.

47) Find the mean of the marks obtained by 100 student from the given table.

Marks	30-35	35-40	40-45	45-50	50-55	55-60	60-65
No of students	14	16	28	23	18	8	3

- 48) Write all the values of  $p$  for which the quadratic equation  $x^2 + px + 16 = 0$  has equal roots. Find the roots of the equation so obtained.

### SECTION D

- 49) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio.
- 50) A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm<sup>3</sup> of iron has approximately 8 gm mass.
- 51) Construct an equilateral  $\triangle ABC$  with each side 5 cm. Then construct another triangle whose sides are  $\frac{2}{3}$  times the corresponding sides of  $\triangle ABC$ .
- 52) Draw two concentric circles of radii 4 cm and 5 cm. Take a point  $P$  on the outer circle and construct a pair of tangents  $PA$  and  $PB$  to the smaller circle. Measure  $PA$ .
- 53) Change the foll. data into less than type distribution and draw its ogive.
- | Class Interval | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 |
|----------------|-------|-------|-------|-------|-------|-------|--------|
| Frequency      | 7     | 5     | 8     | 10    | 6     | 6     | 8      |
- 54) Which term of the AP  $-7, -12, -17, -22, \dots$  will be  $-82$ ? Is  $-100$  any term of the AP? Give reason.

55) How many terms of the AP  $45, 39, 33, \dots$  must be taken so that their sum is 180? Explain the double answer.

56) In a class test, the sum of Arun's marks in Hindi and English is 30. Had he got 2 marks more in Hindi and 3 marks less in English, the product of the marks would have been 210. Find his marks in the two subjects.

57) Draw  $\triangle ABC$  with side  $BC = 6.5 \text{ cm}$ ,  $\angle B = 30^\circ$ ,  $\angle A = 105^\circ$ . Then construct another triangle whose sides are  $\frac{3}{4}$  times the corresponding sides of the  $\triangle ABC$ .

58) Construct a pair of tangents to a circle of radius  $3 \text{ cm}$  which are inclined to each other at an angle of  $60^\circ$ .

59) A train covers a distance of  $360 \text{ km}$  at a uniform speed. Had the speed been  $5 \text{ km/h}$  more, it would have taken  $48 \text{ minutes}$  less for the journey. Find the original speed of the train.

60) Solve:  $\frac{1}{x} - \frac{1}{x-2} = 3$   $x \neq 0, 2$ .

61) A petrol tank is in the form of a frustum of a cone of height  $20 \text{ cm}$  with diameters of its lower and upper ends as  $20 \text{ cm}$  &  $50 \text{ cm}$  respectively. Find the cost of petrol which can fill the tank completely at the rate of  $270/\text{litre}$ . Also find the surface area of the tank.

62) Water is flowing at the rate of  $15 \text{ km/h}$  through a pipe of diameter  $14 \text{ cm}$  into a cuboidal pond which is  $50 \text{ m}$  long and  $44 \text{ m}$  wide. In what



time will the level of water in the pond rise by 1cm?

- 63) Daily wages of 110 workers, obtained in a survey, are tabulated below.

Daily wages	100-120	120-140	140-160	160-180	180-200	200-220	220-240
No. of workers	10	15	20	22	18	12	13

Compute the mean daily wages and modal daily wages of these workers.

- 64) Two water taps together can fill a tank in  $9\frac{3}{8}$  hrs. The tap of larger diameter takes 10 hrs less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

- 65) A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

- 66) 200 logs are stacked in such a way that 20 logs are in the bottom row, 19 in the next row, 18 in the next row and so on. In how many rows are 200 logs placed and how many logs are in the top row?

- 67) Construct a triangle similar to a given triangle ABC with its sides equal to  $\frac{3}{4}$  of the corresponding sides of the triangle ABC.

- 68) Prove that in a triangle if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle.

- 69) During a medical checkup of 35 students in a class, their weights were recorded as follows.
- | weight (in kg) | No. of students. |
|----------------|------------------|
| less than 38   | 0                |
| " " 40         | 3                |
| " " 42         | 5                |
| " " 44         | 9                |
| " " 46         | 14               |
| " " 48         | 28               |
| " " 50         | 32               |
| " " 52         | 35               |

Draw the less than type ogive for the given data. Hence obtain the median weight from the graph & verify the result by using the formula.

- 70) If the median of the distribution given below is 28.5, find the value of  $x$  and  $y$ .

Class Interval	Frequency
0-10	5
10-20	$x$
20-30	20
30-40	15
40-50	$y$
50-60	5
Total	60

- 71) A wooden Toy rocket is in the shape of cone mounted on a cylinder, as shown. The height of the entire rocket is 26cm. The base of the conical portion has a diameter of 5cm, while the base diameter of the cylindrical portion is 3cm. If the conical portion is to be painted orange and the cylindrical portion yellow, find the area of the rocket painted with each of these colours.

