

## General Instructions:

**Read the following instructions very carefully and strictly follow them.**

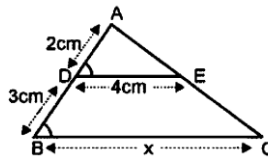
1. This question paper contains 38 questions. All questions are compulsory.
2. This question paper is divided into five Sections – A, B, C, D and E.
3. In Section A, Questions no. 1 to 18 are multiple choice questions (MCQs) and questions number 19 and 20 are Assertion – Reason based questions of 1 mark each.
4. In Section B, Questions no. 21 to 25 are very short answer (VSA) type questions carrying 2 marks each.
5. In Section C, Questions no. 26 to 31 are short answer type (SA) type questions, carrying 3 marks each.
6. In Section D, Questions no. 32 to 35 are long answer (LA) type question carrying 5 marks each.
7. In Section E, Questions no. 36 to 38 are case study-based questions carrying 4 marks each with sub – parts of values 1, 1 and 2 marks each respectively.
8. There is no overall choice.
9. Draw neat figures wherever required. Take  $\pi = \frac{22}{7}$  wherever required if not stated.
10. Use of calculators is not allowed.

## Section-A

**This section comprises multiple choice questions (MCQs) of 1 mark each.**

1. The L.C.M. & H.C.F. of  $x$  and 18 is 36 and 2 respectively. Then  $x$  is equal to  
(a) 1 (b) 2 (c) 3 (d) 4
2. If the HCF of two prime numbers is 1, then the two numbers are called  
(a) Composite (b) Co-prime (c) Irrational numbers (d) Perfect numbers
3. The sum of zeroes of polynomial  $2x^2 + 4x + \frac{3}{2}$  is  
(a) 4 (b) 2 (c) -4 (d) -2

4. Which of the following is not the root of  $\sqrt{7}y^2 - 6y - 13\sqrt{7} = 0$  ?  
 (a)  $\frac{13}{\sqrt{7}}$  (b)  $\sqrt{7}$  (c)  $-\sqrt{7}$  (d) None of these.
5. The pair of linear equation  $4x + 6y - 10 = 0$  and  $px - 12y - 16 = 0$  have a unique solution for all the value of  $p$  except  
 (a) 0 (b)  $-4$  (c)  $-12$  (d)  $-8$
6. If  $2x + 3y + 7 = 0$  and  $(a - 1)x + (a + 1)y + 3a - 1 = 0$  has infinitely many solutions then, value of variable  $a$  is  
 (a) 3 (b) 5 (c)  $-3$  (d)  $-5$
7. Which of the following is not a quadratic equation?  
 (a)  $(\sqrt{2}x + \sqrt{3})^2 + x^2 = 3x^2 - 5x$   
 (b)  $2(x - 1)^2 = 4x^2 - 2x + 1$   
 (c)  $2x - x^2 = x^2 + 5$   
 (d)  $x = x^2 + 3 + 4x^2$
8. If the equation  $x^2 - kx + 1 = 0$  has real and distinct roots, then  
 (a)  $k > 2$  (b)  $k < 2$  (c)  $k \leq 4$  (d) None of these
9. 9<sup>th</sup> term of an A.P. is 499 and 499<sup>th</sup> term is 9. The term which is equal to zero is:  
 (a) 507<sup>th</sup> (b) 508<sup>th</sup> (c) 509<sup>th</sup> (d) 510<sup>th</sup>
10. In a certain A.P., 5 times the 5<sup>th</sup> term is equal to 8 times the 8<sup>th</sup> term, then its 13<sup>th</sup> term is equal to  
 (a) 5 (b) 0 (c) 1 (d) 13
11. The 4<sup>th</sup> term from the end of an AP :  $-11, -8, -5, \dots \dots 49$  is  
 (a) 40 (b) 37 (c) 43 (d) 58
12. If in triangles  $ABC$  and  $DEF$ ,  $\frac{AB}{DE} = \frac{BC}{FD}$ , then they will be similar, if  
 (a)  $\angle B = \angle E$  (b)  $\angle A = \angle D$  (c)  $\angle B = \angle D$  (d)  $\angle A = \angle F$
13. In the given figure, if  $DE \parallel BC$ , then  $x =$



- (a) 6 cm (b) 10 cm (c) 8 cm (d) 12.5 cm
14. The distance of the point  $(-6, 4)$  from the  $x$  - axis is  
 (a) 6 units (b) 4 units (c)  $\sqrt{52}$  units (d) None of these
15. If  $P(-1, 1)$  is the mid - point of the line segment joining  $A(-3, b)$  and  $B(1, b + 4)$ , then the value of  $b$  is  
 (a) 1 (b)  $-1$  (c) 2 (d) 0
16. If the distance between the points  $(8, p)$  and  $(4, 3)$  is 5, then the value of  $p$  is

- (a) 10 (b) 6 (d) 20 (d) 12
17. The perimeter of a semi-circular protractor is 108 cm. Find its diameter.  
 (a) 21 cm (b) 40 cm (c) 22 cm (d) 42 cm
18. If the circumference of circle is 22 cm. What is the area of its one quadrant?  
 (a)  $77 \text{ cm}^2$  (b)  $\frac{77}{8} \text{ cm}^2$  (c)  $100 \text{ cm}^2$  (d)  $\frac{55}{7} \text{ cm}^2$
19. Directions: In the following question, A statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as.

Assertion (A): If we join two hemispheres of same radius along their bases, then we get a sphere.

Reason (R): A tank is made of the shape of a cylinder with a hemispherical depression at one end. The height of the cylinder is 1.45 m and radius is 30 cm. The total surface area of the tank is 3.3 m.

- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation for assertion (A).  
 (b) Both assertion (A) and reason (R) are true but reason (R) is not correct explanation for assertion (A).  
 (c) Assertion (A) is true but reason (R) is false.  
 (d) Assertion (A) is false and reason (R) is true.
20. Directions: In the following question, A statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as

Assertion: The volume of two spheres are in the ratio 27 : 8 then their surface area are in the ratio 3 : 2

Reason: Volume of sphere =  $\frac{4}{3}\pi r^3$  and its surface area  $4\pi r^2$

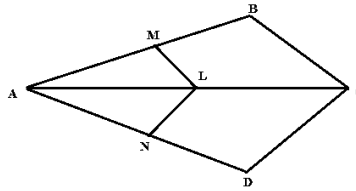
- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation for assertion (A).  
 (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation for assertion (A).  
 (c) Assertion (A) is true but reason (R) is false.  
 (d) Assertion (A) is false and reason (R) is true.

### Section-B

**This section comprises of very short answer (VSA) type questions of 2 marks each.**

21. Find the value of  $k$  for which the given equation has real and equal roots:  
 $x^2 - 2x(1 + 3k) + 7(3 + 2k) = 0$

22. Find the middle term of the AP:  $-11, -7, -3, \dots, 45$ .
23. In the figure given, if  $LM \parallel CB$  and  $LN \parallel CD$ , prove that  $\frac{AM}{AN} = \frac{AB}{AD}$

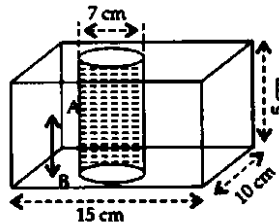


24. If the mid-point of the segment joining  $A(x, y, +1)$  and  $B(x + 1, y + 2)$  is  $C\left(\frac{3}{2}, \frac{5}{2}\right)$ . Find the value of  $x$  and  $y$ .
25. 150 spherical marbles, each of diameter 1.4cm are dropped in a cylindrical vessel of diameter 7cm containing some water and are completely immersed in water. Find the rise in level of water in the cylindrical vessel.

### Section-C

**This section comprises of short answer type questions (SA) of 3 marks each.**

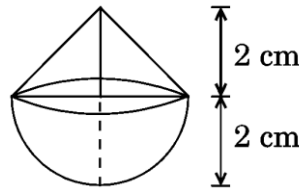
26. Prove that  $\sqrt{5}$  is an irrational number.
27. I am three times as old as my son. Five years later, I shall be two and a half times as old as my son. How old am I and how old is my son?
28. In an AP, if  $S_5 + S_7 = 167$  and  $S_{10} = 235$ , then find the first four terms of that A.P.
29. Find the ratio in which the line  $x - y - 2 = 0$  divides the line segment joining the points  $A(3, -1)$  and  $B(8, 9)$ .
30. A chord of a circle of radius 10cm subtends a right angle at the center. Find the length and the area of minor arc.
31. In the given figure, from a cuboidal solid metallic block, of dimensions  $15 \text{ cm} \times 10 \text{ cm} \times 5 \text{ cm}$ , a cylindrical hole of diameter 7 cm is drilled out. Find the surface area of the remaining block.



### Section-D

**This section comprises of long answer type questions (LA) of 5 marks each**

32. By graphical method, find whether the following pair of equation is consistent or not.  $3x + y + 4 = 0$  ;  $6x - 2y + 4 = 0$
33. At 't' minutes past 2 p.m., the time needed by the minute hand of a clock to show 3 p.m. was found to be 3 minutes less than  $\frac{t^2}{4}$  minutes. Find the value of 't'.
34. Prove that if a line is parallel to a side of a triangle which intersects the other sides into two distinct points, then the line divides those sides in proportion.
35. In the following figure, a solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the diameter of the base is 4 cm. Determine the volume of the toy.



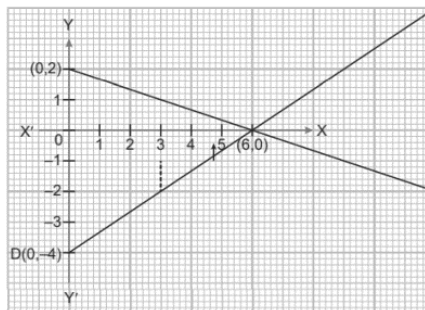
### Section-E

**This section comprises of 3 case study-based questions of 4 marks each.**

36. Junk food is unhealthy food that is high in calories from sugar or fat, with little dietary fiber, protein, vitamins, minerals, or other important forms of nutritional value. A sample of few students have taken. If  $\alpha$  be the number of students who take junk food,  $\beta$  be the number of students who take healthy food such that  $\alpha > \beta$  and  $\alpha$  and  $\beta$  are the zeroes of the quadratic polynomial  $f(x) = x^2 - 7x + 10$ , then answer the following questions:

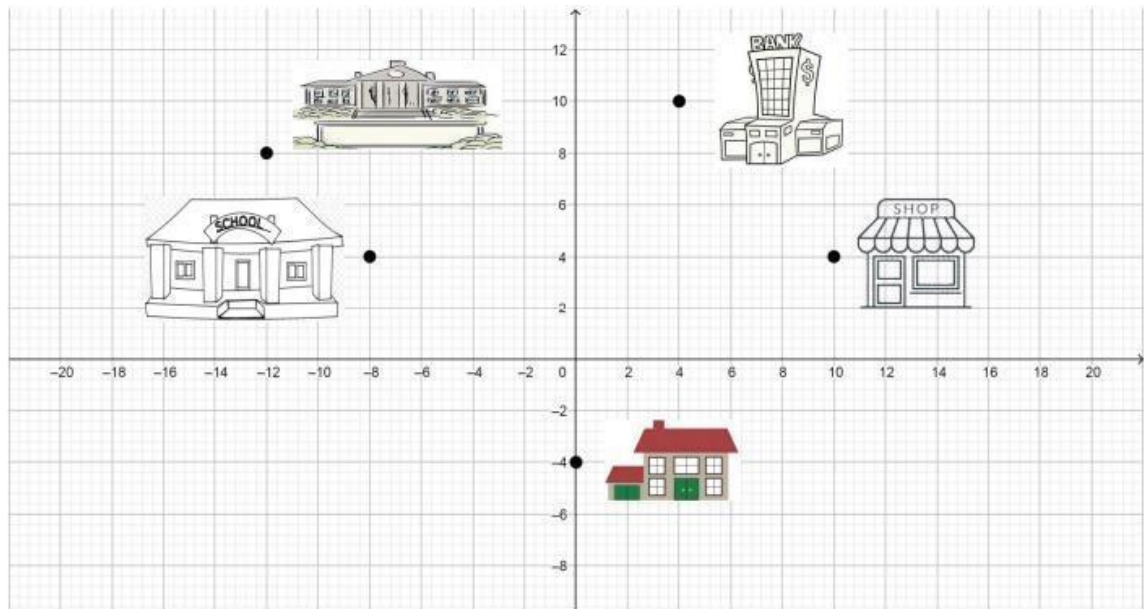


- (i) Name the type of expression of the polynomial in the above statement.
  - (ii) If one zero of the polynomial  $x^2 - 5x + 6$  is 2 then find the other zero.
  - (iii) Find the number of students who take healthy food.
37. The scissors which are so common in our daily life use, its blades represent the graph of linear equations.



Let the blades of a scissor be represented by the system of linear equations:  
 $x + 3y = 6$  and  $2x - 3y = 12$ .

- (i) Find points at which linear equations  $x + 3y = 6$  and  $2x - 3y = 12$  intersect y – axis respectively.
  - (ii) Find the number of solutions of the system of linear equations  $x + 2y - 8 = 0$  and  $2x + 4y = 16$  have.
  - (iii) If (1, 2) is the solution of linear equations  $ax + y = 3$  and  $2x + by = 12$ , then values of  $a$  and  $b$  are respectively.
38. One day, while going to her office, Suchitra has to go to her son's school to attend PTM. Then she worked in the office and left early as some guests are arriving at her house in the evening. She went to the bank after the office and then to the shop to purchase some groceries to welcome the guests. The route of Suchitra has been shown in the Cartesian plane in the figure below. The location of Suchitra's house in Cartesian plane is (0,-4).



- (i) Name the place that is farthest from Suchitra's house. Find its distance also.
- (ii) If there is a temple in the middle of bank and house, find its coordinates.
- (iii) Find the ratio at which the school divides the path of Suchitra from her house to office.