

# Sample Paper

1

Time : 90 Minutes

Max Marks : 40

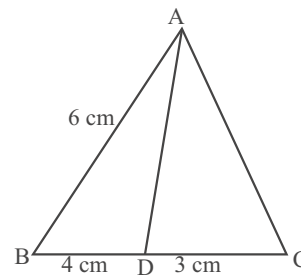
## General Instructions

1. The question paper contains three parts A, B and C.
2. Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
3. Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
4. Section C consists of 10 questions based two Case Studies. Attempt any 8 questions.
5. There is no negative marking.

## SECTION-A

Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.

1. Two isosceles triangles have their corresponding angles equal and their areas are in the ratio 25 : 36. The ratio of their corresponding height is  
(a) 25 : 35                      (b) 36 : 25                      (c) 5 : 6                      (d) 6 : 5
2. Two dice are thrown at a time, then find the probability that the difference of the numbers shown on the dice is 1.  
(a)  $\frac{3}{16}$                       (b)  $\frac{5}{18}$                       (c)  $\frac{7}{36}$                       (d)  $\frac{7}{18}$
3.  $(\cos^4 A - \sin^4 A)$  is equal to  
(a)  $1 - 2 \cos^2 A$                       (b)  $2 \sin^2 A - 1$                       (c)  $\sin^2 A - \cos^2 A$                       (d)  $2 \cos^2 A - 1$
4. The coordinates of the point which is reflection of point  $(-3, 5)$  in  $x$ -axis are  
(a)  $(3, 5)$                       (b)  $(3, -5)$                       (c)  $(-3, -5)$                       (d)  $(-3, 5)$
5. In the given figure, AD is the bisector of  $\angle A$ . If  $BD = 4$  cm,  $DC = 3$  cm and  $AB = 6$  cm, determine AC  
(a) 4.5 cm  
(b) 3.5 cm  
(c) 4.8 cm  
(d) 3.2 cm
6. If  $b \tan \theta = a$ , the value of  $\frac{a \sin \theta - b \cos \theta}{a \sin \theta + b \cos \theta}$  is  
(a)  $\frac{a-b}{a^2+b^2}$                       (b)  $\frac{a+b}{a^2+b^2}$                       (c)  $\frac{a^2+b^2}{a^2-b^2}$                       (d)  $\frac{a^2-b^2}{a^2+b^2}$
7. If the sum of the ages (in years) of a father and his son is 65 and twice the difference of their ages (in years) is 50, what is the age of the father?  
(a) 45 years                      (b) 40 years                      (c) 50 years                      (d) 55 years
8. If the point  $P(6, 2)$  divides the line segment joining  $A(6, 5)$  and  $B(4, y)$  in the ratio 3 : 1, then the value of  $y$  is  
(a) 4                      (b) 3                      (c) 2                      (d) 1
9.  $\triangle ABC$  is an isosceles triangle right angled at B. Similar triangles  $ACD$  and  $ABE$  are constructed on sides  $AC$  and  $AB$ . Ratio between the areas of  $\triangle ABE$  and  $\triangle ACD$  is  
(a) 1 : 4                      (b) 2 : 1                      (c) 1 : 2                      (d) 4 : 3



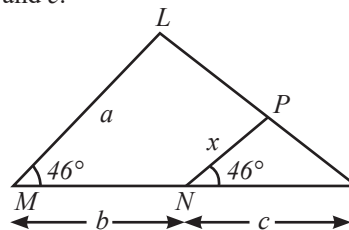
10. If  $x = p \sec \theta$  and  $y = q \tan \theta$ , then  
 (a)  $x^2 - y^2 = p^2 q^{2z}$  (b)  $x^2 q^2 - y^2 p^2 = pq$  (c)  $x^2 q^2 - y^2 p^2 = \frac{1}{p^2 q^2}$  (d)  $x^2 q^2 - y^2 p^2 = p^2 q^2$
11. If  $f(x) = 2x^3 - 6x + 4x - 5$  and  $g(x) = 3x^2 - 9$ , then the value of  $f(1) + g(-2)$  is  
 (a) -3 (b) -2 (c) 3 (d) 2
12. A book containing 100 pages is opened at random. Find the probability that a doublet page is found.  
 (a)  $\frac{8}{25}$  (b)  $\frac{9}{100}$  (c)  $\frac{7}{100}$  (d)  $\frac{11}{100}$
13.  $\sin^2 \theta + \operatorname{cosec}^2 \theta$  is always  
 (a) greater than 1 (b) less than 1 (c) greater than or equal to 2 (d) equal to 2
14. Find area of minor segment made by a chord which subtends right-angle at the centre of a circle of radius 10 cm.  
 (a)  $24.5 \text{ cm}^2$  (b)  $25.5 \text{ cm}^2$  (c)  $24.5 \text{ cm}^2$  (d)  $28.5 \text{ cm}^2$
15. Points  $A$  and  $B$  are 90 km. apart from each other on a highway. A car starts from  $A$  and another from  $B$  at the same time. If they go in the same direction, they meet in 9 hrs and if they go in opposite directions, they meet in  $9/7$  hrs. Find their speeds.  
 (a) 40 km/hr, 30 km/hr (b) 10 km/hr, 20 km/hr  
 (c) 20 km/hr, 30 km/hr (d) 50 km/hr, 40 km/hr
16. Identify polynomials from the following:  
 (a)  $\frac{2}{x^2} - 3x + 2$  (b)  $2x^2 + 3 - 4x$  (c)  $\frac{1}{3}x^{-2} - 3$  (d)  $\sqrt{x} - 6$
17. The two consecutive odd positive integers, the sum of whose squares is 290 are  
 (a) 9, 11 (b) 11, 13 (c) 13, 15 (d) 15, 17
18. If the sum of first  $n$  even natural numbers is equal to  $k$  times the sum of first  $n$  odd natural numbers, then  $k =$   
 (a)  $\frac{1}{n}$  (b)  $\frac{n-1}{n}$  (c)  $\frac{n+1}{2n}$  (d)  $\frac{n+1}{n}$
19. Determine the value of  $k$  for which the following system of equations becomes consistent :  
 $7x - y = 5, 21x - 3y = k.$   
 (a)  $k = 15$  (b)  $k = 11$  (c)  $k = 4$  (d)  $k = \frac{11}{2}$
20. The product of two numbers is 4107. If the H.C.F. of these numbers is 37, then find the greater number.  
 (a) 111 (b) 137 (c) 37 (d) 311

## SECTION-B

Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.

21. Which among the following is correct?  
 (a) The ratios of the areas of two similar triangles is equal to the ratio of their corresponding sides.  
 (b) The areas of two similar triangles are in the ratio of the corresponding altitudes.  
 (c) The ratio of area of two similar triangles are in the ratio of the corresponding medians.  
 (d) If the areas of two similar triangles are equal, then the triangles are congruent.
22. If the system of equations  $2x + 3y = 7$  and  $2ax + (a + b)y = 28$  represents coincident lines, which of the conditions holds true?  
 (a)  $b = 2a$  (b)  $a = 2b$  (c)  $2a + b = 0$  (d)  $a + 2b = 0$
23. Solve the following system of linear equations :  
 $2(ax - by) + (a + 4b) = 0$   
 $2(bx + ay) + (b - 4a) = 0$   
 (a)  $x = 0, y = 1$  (b)  $x = -1/2, y = 2$  (c)  $x = 1, y = 2$  (d)  $x = 1/2, y = -1/2$
24. Find  $\alpha$  and  $\beta$  if  $x + 1$  and  $x + 2$  are factors of  $p(x) = x^3 + 3x^2 - 2\alpha x + \beta$   
 (a) 3, -1 (b) -1, 0 (c) 0, -3 (d) 5, 6

25. If one zero of the quadratic polynomial  $2x^2 - 8x - m$  is  $\frac{5}{2}$ , then the other zero is  
 (a)  $\frac{2}{3}$  (b)  $-\frac{2}{3}$  (c)  $\frac{3}{2}$  (d)  $-\frac{15}{2}$
26. If  $x = 2$  and  $x = 0$  are roots of the polynomials  $f(x) = 2x^3 - 5x^2 + ax + b$ . Then values of  $a$  and  $b$  respectively are  
 (a) 2, 0 (b) 1, 2 (c) -1, 1 (d) 0, 3
27. If  $\cos A = \frac{3}{5}$ , find the value of  $9 \cot^2 A - 1$ .  
 (a) 1 (b)  $\frac{16}{65}$  (c)  $\frac{65}{16}$  (d) 0
28. Which of the following statement is false?  
 (a) All isosceles triangles are similar. (b) All equilateral triangles are similar.  
 (c) All circles are similar. (d) None of the above
29. If one root of the equation  $px^2 - 14x + 8 = 0$  is six times the other, then  $p$  is equal to  
 (a) 2 (b) 3 (c) 1 (d) none of these
30. Determine the values of  $a$  and  $b$  for which the following system of linear equations has infinitely many solutions:  
 $3x - (a + 1)y = 2b - 1$ ,  $5x + (1 - 2a)y = 3b$   
 (a)  $a = 8, b = 5$  (b)  $a = 4, b = 6$  (c)  $a = 7, b = 1$  (d)  $a = 5, b = 3$
31. If  $\sin \theta = \frac{a^2 - b^2}{a^2 + b^2}$ , then find  $\operatorname{cosec} \theta + \cot \theta$ .  
 (a)  $\frac{a}{a+b}$  (b)  $\frac{b+a}{b-a}$  (c)  $\frac{a^2}{a+b}$  (d)  $\frac{a+b}{a-b}$
32. Degree of polynomial  $y^3 - 2y^2 - \sqrt{3}y + \frac{1}{2}$  is  
 (a)  $\frac{1}{2}$  (b) 2 (c) 3 (d)  $\frac{3}{2}$
33. If  $\alpha, \beta$  are the roots of the equation  $x^2 + x\sqrt{\alpha} + \beta = 0$ , then value of  $\alpha$  and  $\beta$  are  
 (a)  $\alpha = 1, \beta = -1$  (b)  $\alpha = 1, \beta = -2$  (c)  $\alpha = 2, \beta = 1$  (d)  $\alpha = 2, \beta = -2$
34. Solve the following system of equations  
 $ax + by = c$ ;  $bx - ay = c$   
 (a)  $x = \frac{a}{a^2 + b^2}, y = \frac{b}{a^2 + b^2}$  (b)  $x = \frac{1}{a}, y = \frac{1}{b}$   
 (c)  $x = \frac{2ab}{(a+b)^2}, y = \frac{2ab}{(a-b)^2}$  (d)  $x = \frac{c(a+b)}{a^2 + b^2}, y = -\frac{c(a-b)}{a^2 + b^2}$
35. In the given figure, express  $x$  in terms of  $a, b$  and  $c$ .



- (a)  $x = \frac{ab}{a+b}$  (b)  $x = \frac{ac}{b+c}$  (c)  $x = \frac{bc}{b+c}$  (d)  $x = \frac{ac}{a+c}$
36. Evaluate :  $\frac{\sec \theta \operatorname{cosec} \theta (90^\circ - \theta) - \tan \theta \cot (90^\circ - \theta) + \sin^2 55^\circ + \sin^2 35^\circ}{\tan 10^\circ \tan 20^\circ \tan 60^\circ \tan 70^\circ \tan 80^\circ}$   
 (a)  $\frac{2}{\sqrt{3}}$  (b)  $\frac{\sqrt{3}}{2}$  (c) 0 (d) None of these

37. If  $x = \frac{4}{3}$  is a root of the polynomial  $f(x) = 6x^3 - 11x^2 + kx - 20$ , then find the value of  $k$ .
- (a) 10 (b) 19 (c) -5 (d) 3
38. The decimal expansion of  $\frac{21}{45}$  is :
- (a) terminating (b) non-terminating and repeating  
(c) non-terminating and non-repeating (d) none of these
39. A boat goes 12 km. upstream and 40 km downstream in 8 hours. It can go 16 km upstream and 32 km downstream in the same time. Find the speed of the boat in still water and the speed of the stream.
- (a) 4 km/hr, 5 km/hr (b) 3 km/hr, 1 km/hr (c) 6 km/hr, 2 km/hr (d) 7 km/hr, 2 km/hr
40. Find the value of  $a$  if  $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = a + \tan^2 A + \cot^2 A$
- (a) 5 (b) 4 (c) 0 (d) 7

## SECTION-C

## Case Study Based Questions:

Section C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted.

## Q 41. - Q 45 are based on case study-I

## Case Study-I

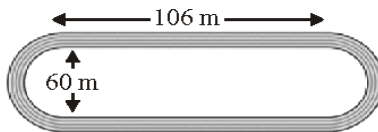
HCF of natural numbers is the largest factor which is common to all the number and LCM of natural numbers is the smallest natural number which is multiple of all the numbers.

41. If  $p$  and  $q$  are two co-prime natural numbers, then their HCF is equal to
- (a)  $p$  (b)  $q$  (c) 1 (d)  $pq$
42. The LCM and HCF of two rational numbers are equal, then the numbers must be
- (a) prime (b) co-prime (c) composite (d) equal
43. If two positive integers  $a$  and  $b$  are expressible in the form  $a = pq^2$  and  $b = p^3q$ ;  $p, q$  being prime number, then LCM ( $a, b$ ) is
- (a)  $pq$  (b)  $p^3q^3$  (c)  $p^3q^2$  (d)  $p^2q^2$
44. The largest number which divides 285 and 1249 leaving remainders 9 and 7 respectively, is
- (a) 46 (b) 6 (c) 12 (d) 138
45. The largest number which exactly divides 2011 and 2623 leaving remainders 9 and 5 respectively is
- (a) 11 (b) 22 (c) 154 (d) 13

## Q 46 - Q 50 are based on case study-II

## Case Study-II

On school sport day, a sport teacher make a racing track whose left and right ends are semicircular shown in figure.



The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide then answer the following questions.

46. Find the radius of inner semicircular end.
- (a) 30 m (b) 60 m (c) 10 m (d) 40 m
47. Find the radius of outer semicircular end
- (a) 30 m (b) 50 m (c) 40 m (d) 70 m
48. The distance around the track along its inner edge is:
- (a) 423.57 m (b) 400.57 m (c) 400.32 m (d) 400 m
49. The distance around the track along its outer edge is:
- (a) 462.43 m (b) 461.43 m (c) 463 m (d) 463.43 m
50. Find the area of the track.
- (a)  $4320 \text{ m}^2$  (b)  $4230 \text{ m}^2$  (c)  $2340 \text{ m}^2$  (d)  $4120 \text{ m}^2$

# OMR ANSWER SHEET

Sample Paper No –

- ★ Use Blue / Black Ball pen only.
- ★ Please do not make any stray marks on the answer sheet.
- ★ Rough work must not be done on the answer sheet.
- ★ Darken one circle deeply for each question in the OMR Answer sheet, as faintly darkend / half darkened circle might be rejected.

Start time : _____	End time _____	Time taken _____
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1. Name (in Block Letters)

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2. Date of Exam

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3. Candidate's Signature

## SECTION-A

1.	(a)	(b)	(c)	(d)	9.	(a)	(b)	(c)	(d)	17.	(a)	(b)	(c)	(d)
2.	(a)	(b)	(c)	(d)	10.	(a)	(b)	(c)	(d)	18.	(a)	(b)	(c)	(d)
3.	(a)	(b)	(c)	(d)	11.	(a)	(b)	(c)	(d)	19.	(a)	(b)	(c)	(d)
4.	(a)	(b)	(c)	(d)	12.	(a)	(b)	(c)	(d)	20.	(a)	(b)	(c)	(d)
5.	(a)	(b)	(c)	(d)	13.	(a)	(b)	(c)	(d)					
6.	(a)	(b)	(c)	(d)	14.	(a)	(b)	(c)	(d)					
7.	(a)	(b)	(c)	(d)	15.	(a)	(b)	(c)	(d)					
8.	(a)	(b)	(c)	(d)	16.	(a)	(b)	(c)	(d)					

## SECTION-B

21.	(a)	(b)	(c)	(d)	29.	(a)	(b)	(c)	(d)	37.	(a)	(b)	(c)	(d)
22.	(a)	(b)	(c)	(d)	30.	(a)	(b)	(c)	(d)	38.	(a)	(b)	(c)	(d)
23.	(a)	(b)	(c)	(d)	31.	(a)	(b)	(c)	(d)	39.	(a)	(b)	(c)	(d)
24.	(a)	(b)	(c)	(d)	32.	(a)	(b)	(c)	(d)	40.	(a)	(b)	(c)	(d)
25.	(a)	(b)	(c)	(d)	33.	(a)	(b)	(c)	(d)					
26.	(a)	(b)	(c)	(d)	34.	(a)	(b)	(c)	(d)					
27.	(a)	(b)	(c)	(d)	35.	(a)	(b)	(c)	(d)					
28.	(a)	(b)	(c)	(d)	36.	(a)	(b)	(c)	(d)					

## SECTION-C

41.	(a)	(b)	(c)	(d)	45.	(a)	(b)	(c)	(d)	49.	(a)	(b)	(c)	(d)
42.	(a)	(b)	(c)	(d)	46.	(a)	(b)	(c)	(d)	50.	(a)	(b)	(c)	(d)
43.	(a)	(b)	(c)	(d)	47.	(a)	(b)	(c)	(d)					
44.	(a)	(b)	(c)	(d)	48.	(a)	(b)	(c)	(d)					

No. of Qns. Attempted		Correct		Incorrect		Marks	
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