

Maximum Marks: 90

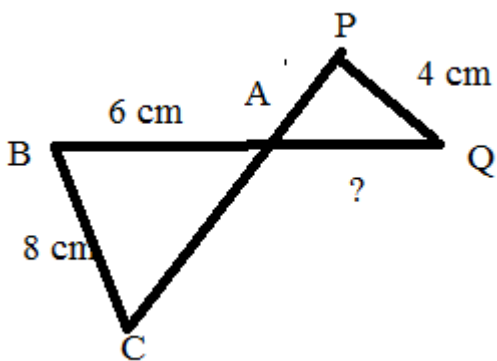
Time: 3 hours

General Instructions:

- The question paper consists of 31 questions divided into 4 sections A, B, C, & D.
- Section A consists of 4 questions of 1 mark each.
- Section B consists of 6 questions of 2 mark each.
- Section C consists of 10 questions of 3 mark each.
- Section D consists of 11 questions of 4 mark each.
- There is no overall choice in this question paper.

SECTION A

1. In the figure, $\triangle ACB \sim \triangle APQ$. IF $BA= 6\text{cm}$, $BC=8\text{cm}$ and $PQ= 4\text{cm}$, then find AQ .



2. For the following distribution find the modal class :

| Marks | Below 10 | Below 20 | Below 30 | Below 40 | Below 50 |
|--------------------|----------|----------|----------|----------|----------|
| Number of students | 2 | 13 | 33 | 48 | 54 |

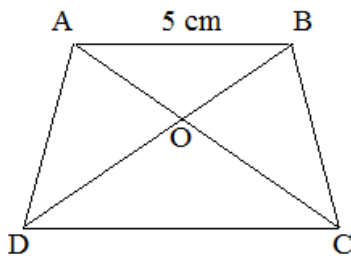
3. Find the value of p for which the polynomial $x^3 + 4x^2 - px + 8$ is exactly divisible by $(x - 2)$.
4. Find the value of k for which the system of equations $3x - 4y = 7$; $kx + 3y - 5 = 0$ has no solution

SECTION B

5. If $\tan A = \cot B$, prove that, $A + B = 90^\circ$.
6. If the mean of the following data is 15, find 'p':

| X | FREQUENCY |
|----|-----------|
| 5 | 6 |
| 10 | p |
| 15 | 6 |
| 20 | 10 |
| 25 | 5 |

7. Explain why $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$ is a composite number.
8. In the figure, $\frac{AO}{OC} = \frac{OB}{OD} = \frac{1}{2}$ and $AB = 5\text{cm}$. Find the value of DC .



9. Prove that : $\frac{1-\sin \theta}{1+\sin \theta} = \left(\frac{1-\sin \theta}{\cos \theta}\right)^2$

10. Find the mode of the following data:

| Class | Frequency |
|---------|-----------|
| 100-120 | 12 |
| 120-140 | 14 |
| 140-160 | 8 |
| 160-180 | 6 |
| 180-200 | 10 |

SECTION C

11. Prove that $3+2\sqrt{5}$ is irrational.

12. Obtain all the zeroes of $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$.

13. Solve for x and y:

$$99x + 101y = 1499$$

$$101x + 99y = 1501$$

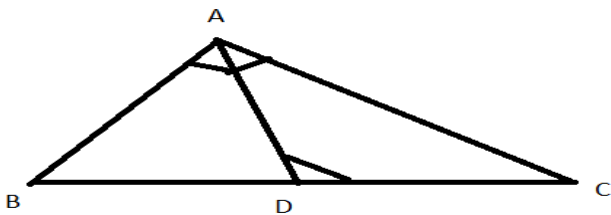
14. Find the value of 'k' for which the following system of equations represents a pair of coincident lines :

$$x + 2y = 3$$

$$(k - 1)x + (k + 1)y = k + 3$$

15. Prove that the area of the equilateral triangle described on the side of a square is half the area of the equilateral described on its diagonal.

16. In the given figure , $\angle ADC = \angle BAC$. prove that $BC \times CD = AC^2$



17. Evaluate:

$$\cos^2 30^\circ \cos^2 45^\circ + 4 \sec^2 60^\circ + \frac{1}{2} \cos^2 90^\circ$$

18. Prove:

$$(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$$

19. Show that any positive odd integer is of the form $4q+1$ or $4q +3$, where q is a positive integer.

20. 50 people work in a cooperative society. They all use their own conveyance. 20 people use their scooters, 12 go by their cars, 1 go by public transport and 2 use bicycles.

a) Find H.C.F OF 20, 12, 16, and 2.

b) One day they all decided to go by public transport, which value is shown by them?

SECTION D

21. Divide $2x^4 - 9x^3 + 5x^2 + 3x - 8$ by $x^2 - 4x + 1$ and verify the division algorithm.
22. Places A and B are 200km apart on a high way. One car starts from A and another from B at the same time. If the cars travel in the same directions at different speeds, they meet in 10 hours. Find the speeds of the two cars.
23. In a trapezium, show that any line drawn parallel to the parallel sides of the trapezium divides the non parallel sides proportionally.
24. Prove that in a right angle triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides
25. Evaluate the following:

$$\frac{\operatorname{cosec}^2 65^\circ - \tan^2 25^\circ}{\sin^2 17^\circ + \sin^2 73^\circ} + \frac{1}{\sqrt{3}} (\tan 10^\circ \tan 30^\circ \tan 80^\circ)$$

26. $\sqrt{\frac{\sec A - 1}{\sec A + 1}} + \sqrt{\frac{\sec A + 1}{\sec A - 1}} = 2 \operatorname{cosec} A.$

27. Find $\sin 75^\circ$ using the formula, $\sin(A+B) = \sin A \cos B + \cos A \sin B$

28. Draw a less than type ogive for the following distribution. Hence find out the median from the curve :

| | | | | | | | | |
|---------------------------|-----|------|-------|-------|-------|-------|-------|-------|
| Pocket expenses (in Rs) | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 |
| Number of students | 10 | 16 | 30 | 42 | 50 | 30 | 16 | 12 |

29. If the median of the distribution is 28.5, find the values 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 |

30. The weights of tea in 70 packets are shown in the following table: Find the mean weight of packets.

| | | | | | | |
|----------------|----------|----------|----------|----------|----------|----------|
| Weight(in gms) | 200 -201 | 201 -202 | 202 -203 | 203 -204 | 204 -206 | 206 -207 |
| No. of packets | 13 | 27 | 18 | 10 | 1 | 1 |

31. Show graphically that the system of equations $x + 2y = 4$ and $7x + 4y = 18$ is consistent with a unique solution (2, 1)