

Time : $2\frac{1}{2}$ Hrs.
Total Score : 80

Class: X

Instructions :

- Use the first 15 minutes to read the questions and think about the answers.
- There are 26 questions, split into 4 parts A, B, C and D.
- Answer all questions; but in questions of the type A or B, you need answer only one of those.
- You can answer the questions in any order, writing the correct question number.
- No need to simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π etc. using approximations unless you are asked to do so.
- Answers must be explained, whenever necessary.

Section A

This section has 8 questions of score 1 each. Select the correct answer.

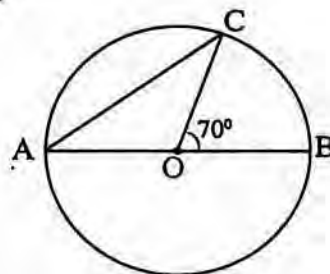
1. The 5
- th
- term of the arithmetic sequence 1, 11, 21, ... is

A. 41 B. 51
C. 61 D. 71

2. In the picture O is the centre of the circle.
- $\angle COB = 70^\circ$

Find $\angle CAB$.

A. 35° B. 90°
C. 110° D. 140°



3. The algebraic form of an arithmetic sequence is
- $4n - 3$
- . To get its 21
- st
- term from the 20
- th
- term what we must do is

A. add 3 B. subtract 3
C. add 4 D. subtract 4

4. When each side of a square was increased by 3 centimetres to make a larger square its area became 64 square centimetres. What was the length of a side of the original square ?

A. 10 B. 8
C. 7 D. 5

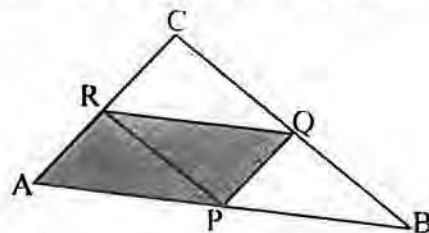
5. In the picture P, Q, R are the mid points of the sides of triangle ABC. If a dot is put in the picture without looking, what is the probability that it falls inside the parallelogram APQR?

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. $\frac{2}{3}$



6. Each letter of the word MATHEMATICS is written on separate pieces of paper and put in a box. If one piece of paper is taken out of the box without looking, then

(i) The probability of getting the letter M is $\frac{2}{11}$.

(ii) The probability of getting the letter E is $\frac{2}{11}$.

(iii) The probability of not getting the letter A is $\frac{9}{11}$.

(iv) The probability of not getting the letter C is $\frac{9}{11}$.

Choose the correct answer from those given below.

(A) (i) and (ii) are true.

(B) (iii) and (iv) are true.

(C) (ii) and (iii) are true.

(D) (i) and (iii) are true.

7. Read the following statements.

Statement I : In the picture, O is the centre of the circle,
A, B, C are the points on the circle.

If $\angle AOB = 40^\circ$, then $\angle ACB = 20^\circ$.

Statement II : If all vertices of a quadrilateral are on a circle,
then the sum of the opposite angles is 180° .

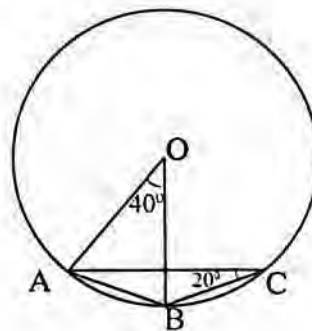
Choose the correct answer from those given below.

A. Statement I is true, Statement II is false.

B. Statement I is false, Statement II is true.

C. Both statements are true. Statement II is the reason of Statement I.

D. Both statements are true. Statement II is not the reason of Statement I.



8. Read the following statements.

Statement I : Sum of the 5th term and the 7th term of an arithmetic sequence is 90. The 6th term of the arithmetic sequence is 45.

Statement II : In an arithmetic sequence, the sum of two terms at the same distance behind and ahead of a term is twice this term.

Choose the correct answer from those given below.

- A. **Statement I** is true, **Statement II** is false.
- B. **Statement I** is false, **Statement II** is true.
- C. Both statements are true. **Statement II** is the reason of **Statement I**.
- D. Both statements are true. **Statement II** is not the reason of **Statement I**.

Section- B

9. A. The 5th term of an arithmetic sequence is 40 and the 9th term is 22.

- (i) What is the first term of this sequence ? (2)
- (ii) What is the 7th term of this sequence ? (1)

OR

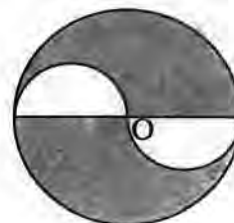
B. The First term of an arithmetic sequence is 15 and sum of first 5 terms of this sequence is 135.

- (i) What is the 3rd term of this sequence ? (1)
- (ii) Write the first five terms of this sequence. (2)

10. In the picture, there is a large circle and two semicircles of equal size inside it. O is the centre of the large circle.

If a dot is put in the picture, without looking,

what is the probability that the dot is in the shaded region ?



(3)

11. Consider the arithmetic sequence 3, 7, 11, ...

- (i) Check whether 2026 is a term of this sequence. Why? (2)
- (ii) What is the position of 211 in this sequence ? (2)

12. A bag contains 12 black beads and some white beads. If one bead is taken from the bag

without looking, the probability of getting a white bead is $\frac{3}{5}$.

- (i) What is the probability of getting a black bead ? (1)
- (ii) How many beads are there in the bag ? (2)
- (iii) How many more black beads to be added to the bag so that the probability of getting a

white bead becomes $\frac{1}{2}$? (1)

13. A. The sum of first 5 terms of an arithmetic sequence is 110 and sum of first 9 terms is 270.

- (i) What is the 3rd term of this sequence ? (1)
- (ii) What is the 5th term of this sequence ? (1)
- (iii) Calculate the sum of first 13 terms of this sequence ? (2)

OR

- B. In an arithmetic sequence, the sum of the terms from 4th to the 6th is 75 and the sum of the terms from 14th to the 18th of this sequence is 350.
- (i) What is the 5th term of this sequence ? (1)
 - (ii) What is the 16th term of this sequence ? (1)
 - (iii) Calculate the sum of first 20 terms of this sequence ? (2)
14. A. A box contains five slips numbered 1, 2, 3, 4, 5 and another box contains three slips numbered 2, 3, 5. One slip is drawn from each box.
- (i) In how many different ways can we take the slips ? (1)
 - (ii) What is the probability of the sum of the numbers being prime ? (2)
 - (iii) What is the probability of the product of the numbers being a multiple of 5 ? (2)

OR

- B. There are 25 boys and 20 girls in class 10 A and 30 boys and 20 girls in class 10 B. One student is to be chosen from each class.
- (i) How many different possible pairs are there ? (1)
 - (ii) What is the probability of both being girls ? (1)
 - (iii) What is the probability of one being a boy and one being a girl ? (2)
 - (iv) What is the probability of at least one being a boy ? (1)
15. Sum of the first and 21st terms of an arithmetic sequence is 180.
- (i) What is the 11th term of this sequence ? (1)
 - (ii) The 4th term of the sequence is 34. what is its 18th term ? (2)
 - (iii) Calculate the sum of first 28 terms of this sequence. (2)

Section- C

16. The algebraic form of an arithmetic sequence is $3n + 2$.
- (i) Write the sequence. (1)
 - (ii) Prove that this sequence does not contain any perfect square. (2)
17. One added to the product of two consecutive odd numbers gave 196.
- (i) Write the above information as a second degree equation. (1)
 - (ii) What are the numbers ? (2)
18. (i) Write the algebraic form of the arithmetic sequence 5, 9, 13, ... (1)
- (ii) Write the 25th term of this sequence. (1)
 - (iii) Calculate the sum of first 25 terms of this sequence. (2)
19. A. (i) What is $1 + 2 + 3 + \dots + 20$? (1)
- (ii) What is $3 + 6 + 9 + \dots + 60$? (1)
 - (iii) The algebraic form of an arithmetic sequence is $3n + 1$. Find the sum of first 20 terms of this arithmetic sequence. (2)

OR

- B. (i) How much more is the sum of the first 15 terms of the arithmetic sequence 11, 17, 23, ... than the sum of first 15 terms of the arithmetic sequence 4, 10, 16, ... ? (2)

- (ii) The algebraic form of an arithmetic sequence is $5n + 3$. Calculate the difference between sum of the first 10 terms of this sequence and the sum of the next 10 terms. (2)

20. Consider the sequence of multiples of 6 between 100 and 400.

- (i) What is the first term and last term of this sequence ? (2)
 (ii) How many terms are there in this sequence ? (1)
 (iii) Calculate the sum of all terms of this sequence. (2)

21. A. The algebraic form of an arithmetic sequence is $6n + 2$.

- (i) What is the remainder obtained when each terms of this sequence is divided by 6 ? (1)
 (ii) Can the difference between any two terms of this sequence be 192? Why? (2)
 (iii) Calculate the sum of first n terms of this sequence. (2)

OR

B. The sum of first n terms of an arithmetic sequence is $5n^2 - 2n$.

- (i) Calculate the sum of the first 10 terms of this sequence. (1)
 (ii) Write the first three terms of this sequence. (2)
 (iii) Write the algebraic form of this sequence. (2)

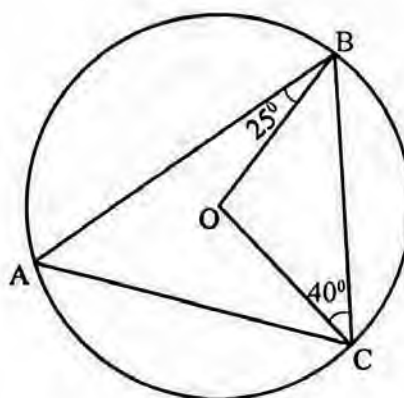
Section- D

22. In the picture O is the centre of the circle.

A, B, C are points on the circle.

$$\angle ABO = 25^\circ, \angle BCO = 40^\circ$$

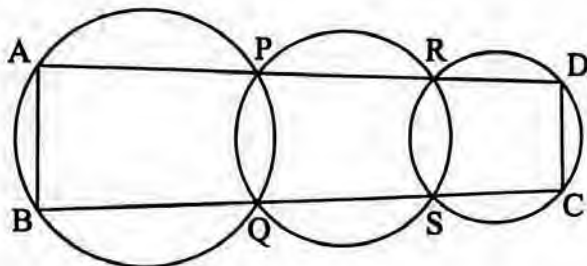
- (i) $\angle CBO =$ _____ (1)
 (ii) $\angle CAB =$ _____ (1)
 (iii) $\angle ACB =$ _____ (1)



23. A. Prove that in a cyclic quadrilateral, the outer angle at any vertex is equal to the inner angle at the opposite vertex. (3)

OR

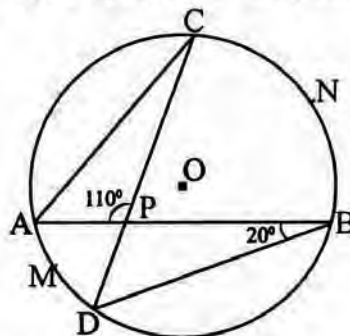
- B. In the picture, the circles on the left and right intersect the middle circle at P, Q, R, S. Lines joining these meet the left and right circles at A, B, C, D. Prove that ABCD is a cyclic quadrilateral.



(3)

24. A. In the picture, O is the centre of the circle. A, B, C, D, M, N are the points on the circle. Chords AB and CD intersect at P.

$$\angle ABD = 20^\circ, \angle APC = 110^\circ.$$

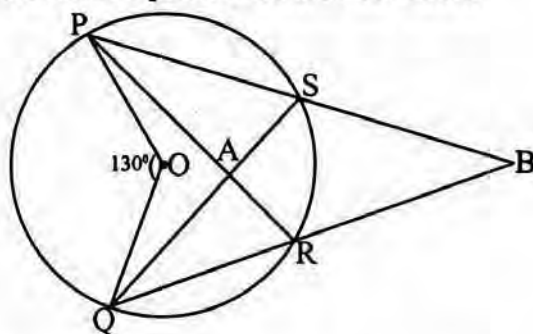


- (i) $\angle ACD =$ _____ (1)
(ii) $\angle CDB =$ _____ (1)
(iii) Calculate the sum of central angles of arc AMD and arc BNC ? (2)

OR

- B. In the picture, O is the centre of the circle. P, Q, R, S are points on this circle. The chords PS and QR are extended to meet at a point B outside the circle.

$$\angle POQ = 130^\circ.$$

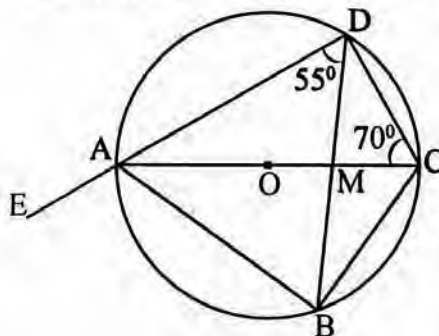


- (i) $\angle PSQ =$ _____ (1)
(ii) $\angle PRB =$ _____ (1)
(iii) $\angle RAS + \angle SBR =$ _____ (2)

25. In the picture, O is the centre of the circle. A, B, C, D are the points on the circle.

$$\angle ACD = 70^\circ, \angle ADB = 55^\circ.$$

- (i) $\angle ADC =$ _____ (1)
(ii) $\angle CAD =$ _____ (1)
(iii) $\angle CBD =$ _____ (1)
(iv) $\angle BAE =$ _____ (2)



26. Draw a triangle with circumradius 3.5 centimetres and two of the angles $52\frac{1}{2}^\circ$ and 65° . (5)