O. P. JINDAL SCHOOL, SAVITRI NAGAR

Half Yearly Examination - (2025 – 2026)

Class: X **MM: 80**

Subject: Mathematics **Time: 3 Hrs**

(Fifteen Minutes Extra will be given for reading the Question Paper.)

General Instructions:

i. This question paper has 5 sections A-E.

ii. Section A has 20 MCQs carrying 1 mark each.

iii.Section B has 5 questions carrying 2 mark each.

iv.Section C has 6 questions carrying 3 mark each.

v. Section D has 4 questions carrying 5 mark each.

vi.Section E has 3 case based questions of 04 (1 + 1 + 2) marks each .

vii. All the questions are compulsory.

viii. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

Section A

1. The n^{th} term of an AP is $7 - 4n$. Its common difference is

a) -3 b) 3 c) -4 d) 4

2. In an AP if $a = 1$, $a_n = 20$ and $S_n = 399$, then n is,

a) 19 b) 21 c) 38 d) 4

3. $\frac{2\tan 30^0}{1-\tan^2 30^0}$ is equal to

a) $\cos 60^0$ b) $\sin 60^0$ c) $\tan 60^0$ d) $\sin 30^0$

4. The roots of the equation $3x^2 - 2\sqrt{6}\,x + 2 = 0$ are

a) rational b) real and distinct c) not real d) real and equal

5. In Δ ABC and DEF, $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar, when

a) $\angle B = \angle E$ b) $\angle A = \angle D$ c) $\angle B = \angle D$ d) $\angle A = \angle F$

6. If the equation $x^2 + 4x + k = 0$ has real and distinct roots then

a) $k < 4$ b) $k > 4$ c) $k \leq 4$ d) $k \geq 4$

7. A quadratic polynomial having sum and product of its zeroes are 5 and 0 respectively is

a) $x^2 + 5x$ b) $5x^2 - 1$ c) $x^2 - 5x + 5$ d) $x(x - 5)$

8. If α and β are the zeroes of the polynomial $x^2 - 9$ then value of $\alpha + \beta$ is

a) 3 b) -3 c) 0 d) 6

9. If one zero of the quadratic polynomial $3x^2 + 8x + k$ is the reciprocal of other, then the value of k is

a) 3 b) -3 c) $-\frac{1}{3}$ d) $\frac{1}{3}$

10. The coordinate of centroid of the triangle with vertices (3, -5), (4, 6) and (5, -7) is

a) (0, 0) b) (6, -3) c) (4, 2) d) (4, -2)

12. . In Δ ABC, DE is parallel to BC. AE = 0.8cm, BD = 7.8 cm and CE = 4.8cm then length of side AD is

a) 2.4cm b) 1.6cm c) 2.8cm d) 1.3cm

12. The origin divides the line segment joining the points A(1, -3) and B(-3, 9) in the ratio

a) 3 : 1 b) 1 : 3 c) 2 : 3 d) 1 : 1

13. HCF of two numbers is 27 and their LCM is 162. If one of the number is 54, then the other number is

a) 36 b) 35 c) 9 d) 81 .

14. If one root of the equation $2x^2 + kx + 4 = 0$ is 2 then other root is

a) 6 b) -6 c) -1 d) 1

15. HCF of $\left(3^4 \times 2^2 \times 7^3\right)$ and $\left(3^2 \times 5 \times 7\right)$ is

a) 630 b) 63 c) 729 d) 567

16. The pair of linear equation is consistent then the lines will be

a) parallel b) always coincident c) intersecting or coincident d) no solution

17. Two lines given by 3x + 2ky = 2 and 2x + 5y + 1 = 0 are parallel, then the value of k is

a) $-\frac{5}{4}$ b) $\frac{2}{5}$ c) $\frac{15}{4}$ d) $\frac{3}{2}$

18. (secA + tanA)(1 - sinA) is equal to

a) secA b) sinA c) cosecA d) cosA

DIRECTIONS: In the question number 19 and 20, a statement of **Assertion(A)** is followed by a statement of **Reason(R).** Choose the correct option

(A) Both assertion and reason are true and reason is the correct explanation of assertion

(B) Both assertion and reason are true and reason is not the correct explanation of assertion

(C) Assertion is true but reason is false

(D) Assertion is false but reason is true.

19. Assertion(A):- If the points A(4, 3) and B(x, 5) lie on a circle with centre O(2, 3), then the value of x is 2.

Reason(R) :- Centre of a circle is the mid point of the longest chord.

20. Assertion(A) :- For $0 < \theta \leq 90^0$, $\operatorname{cosec}\theta - \cot\theta$ and $\operatorname{cosec}\theta + \cot\theta$ are reciprocal of each other.

Reason(R) :- $\cos ec^2\theta - \cot^2\theta = 1$.

Section B

21. Find the coordinates of the point which divides the join of (-1, 7) and (4, -3) in the ratio 2 : 3.

OR

Find the value of a , if the distance between the points A(-3, -14) and B(a, -5) is 9 units ?

22. If $15\tan A = 8$, find $\dfrac{15\sin A + 6\cos A}{30\sin A - 7\cos A}$.

OR

Evaluate:- $4\cot^2 45^0 - \sec^2 60^0 + \sin^2 60^0 + \cos^2 90^0$.

23. Find the 20^{th} term from the end of an AP : 3, 8, 13, . . . 253

24. For what value of k, the following systems of equations have infinitely many solutions?

$3x - 4y = 5$

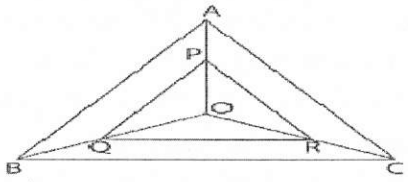
$6x + (2k + 1)y = 10$.

25. Find the roots of the quadratic equation $4\sqrt{3}\,x^2 + 5x - 2\sqrt{3} = 0$ by using quadratic formula.

Section C

26. Prove that: $\dfrac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$.

27. In figure P, Q,R are the points on OA,O B and OC respectively such that QP || AB, QR || BC. Show that AC || PR .



28. Prove that $5 + 3\sqrt{2}$ is irrational, assuming that $\sqrt{2}$ is irrational.

29. If α and β are the zeroes of the quadratic polynomial $5x^2 - 3x + 2$, find the value of $\dfrac{\alpha}{\beta} + \dfrac{\beta}{\alpha}$.

OR

If one zero of the quadratic polynomial $x^2 - 8x + k$ exceeds the other by 2, then find the zeroes and the value of k .

30. Find the values of k for which the equation $9x^2 + 3kx + 4 = 0$ has real and equal roots.

OR

The altitude of a right angled triangle is 7 cm less than its base. If its hypotenuse is 17 cm long, then find the Length of the sides of the triangle.

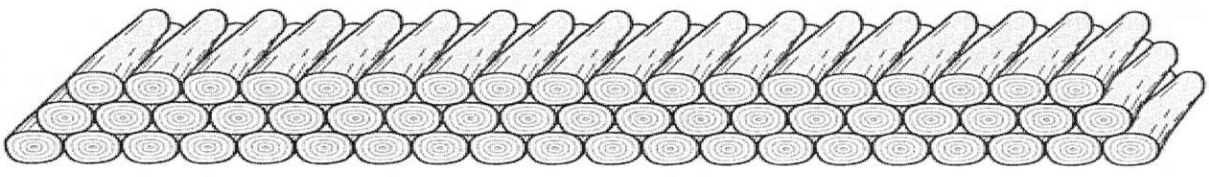
31. Show that the points (-3, -4), (2, 6) and (-6, 10) are the vertices of a right angled triangle.

Section D

32. If the sum of first seven terms of an AP is 49 and that of 17 terms is 289, then find the sum of first n terms.

OR

200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on. In how may rows are the 200 logs placed and how many logs are in the top row?



33. Solve graphically :- $x - y = -1$ and $3x + 2y = 12$, and Calculate the area bounded by these lines and the x- axis .

34. Prove that:

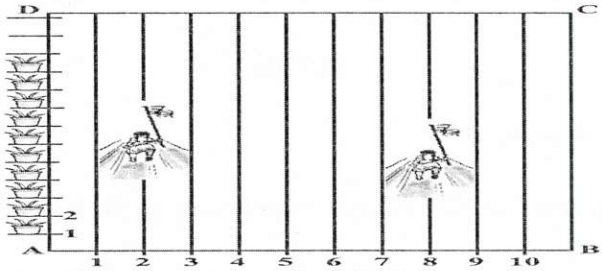
a) $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$.

b) $\sec A(1 - \sin A)(\sec A + \tan A) = 1$.

35. State and prove Basic proportionality theorem.

Section E

36. To conduct Sports Day activities, in your rectangular shaped school ground ABCD, lines have been



drawn with chalk powder at a distance of 1m each. 100 flower pots have been placed at a distance of 1m from each other along AD, as shown in below figure. Niharika runs 1/4 th the distance AD on the 2nd line and posts a green flag. Preet runs 1/5 th the distance AD on the eighth line and posts a red flag. Considering AB as x- axis and AD as y – axis. Answer the following questions.

(i) What is the coordinates of the point where Niharika and preet posts their flags? **(1)**

(ii) What is the distance between both the flag? **(1)**

(iii) What is the coordinate of mid point of both the flags? **(2)**

OR

If an another blue flag posts at a point with coordinate (6, 45). Then what is the coordinate of the centroid of the triangle formed by these three flags?

37. Yash scored 40 marks in a test, getting 3 marks for each right answers and losing 1 mark for each wrong answer. Had 4 marks awarded for each correct answer and 2 marks deducted for each incorrect answer, then Yash would have scored 50 marks.

i) Frame an equations representing above situation. **(1)**

ii) Find the number of questions in the test. **(2)**

OR

Find the number of right answers in the test if Yash scored 60% of the total marks.

iii) Find whether the equations formed in this case is consistent or not by comparing the coefficient. **(1)**

38. The sum of first n terms of an AP is $4n - n^2$, then

i) what is the first term? **(1)**

ii) what is the sum of first two terms? **(1)**

iii) what is the common difference? **(2)**

OR

what is the n^{th} term of this AP.

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