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REVISED**

Question Paper Serial No. **21**

ಇಲ್ಲಿಂದ ಕತ್ತರಿಸಿ

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಇಂಗ್ಲಿಷ್ ಭಾಷಾಂತರ / English Version)

(ಹೊಸ ಪಠ್ಯಕ್ರಮ / New Syllabus)

(ಶಾಲಾ ಅಭ್ಯರ್ಥಿ & ಪುನರಾವರ್ತಿತ ಶಾಲಾ ಅಭ್ಯರ್ಥಿ / Regular Fresh & Regular Repeater)

ದಿನಾಂಕ : 07. 04. 2020]

[Date : 07. 04. 2020

ಸಮಯ : ಬೆಳಿಗ್ಗೆ 9-30 ರಿಂದ ಮಧ್ಯಾಹ್ನ-12-45 ರವರೆಗೆ] [Time : 9-30 A.M. to 12-45 P.M.

ಗರಿಷ್ಠ ಅಂಕಗಳು : 80]

[Max. Marks : 80

General Instructions to the Candidate :

1. This Question Paper consists of 38 objective and subjective types of questions.
2. This question paper has been sealed by reverse jacket. You have to cut on the right side to open the paper at the time of commencement of the examination. Check whether all the pages of the question paper are intact.
3. Follow the instructions given against both the objective and subjective types of questions.
4. Figures in the right hand margin indicate maximum marks for the questions.
5. The maximum time to answer the paper is given at the top of the question paper. It includes 15 minutes for reading the question paper.

TEAR HERE TO OPEN THE QUESTION PAPER

ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ತೆರೆಯಲು ಇಲ್ಲಿ ಕತ್ತರಿಸಿ

Tear here



I. Four alternatives are given for each of the following questions / incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet. 8 × 1 = 8



1. In the pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ then the 

(A) equations have no solution

(B) equations have unique solution 

(C) equations have three solutions

(D) equations have infinitely many solutions.

2. In an arithmetic progression, if $a_n = 2n + 1$, then the common difference of the given progression is 

(A) 0  (B) 1

(C) 2 (D) 3.

3. The degree of a linear polynomial is

(A) 0  (B) 1 

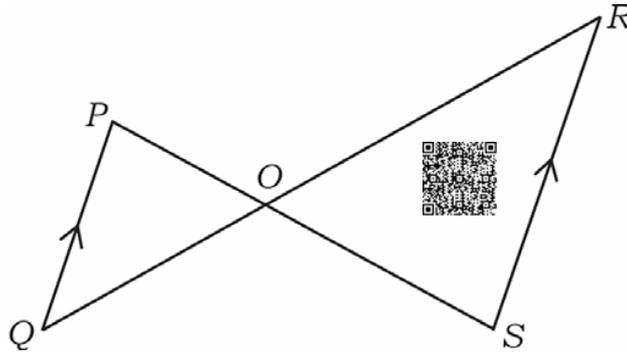
(C) 2 (D) 3.

4. If $13 \sin \theta = 12$, then the value of $\operatorname{cosec} \theta$ is

(A) $\frac{12}{5}$  (B) $\frac{13}{5}$ 

(C) $\frac{12}{13}$ (D) $\frac{13}{12}$.

5. In the figure, if $\Delta POQ \sim \Delta SOR$ and $PQ : RS = 1 : 2$, then $OP : OS$ is



- (A) 1 : 2  (B) 2 : 1
 (C) 3 : 1 (D) 1 : 3.

6. A straight line passing through a point on a circle is

- (A) a tangent  (B) a secant
 (C) a radius (D) a transversal.

7. Length of an arc of a sector of a circle of radius r and angle θ is

- (A) $\frac{\theta}{360^\circ} \times \pi r^2$  (B) $\frac{\theta}{360^\circ} \times 2\pi r^2$ 
 (C) $\frac{\theta}{180^\circ} \times 2\pi r$ (D) $\frac{\theta}{360^\circ} \times 2\pi r$.

8. If the area of the circular base of a cylinder is 22 cm^2 and its height is 10 cm, then the volume of the cylinder is 

- (A) 2200 cm^2  (B) 2200 cm^3
 (C) 220 cm^3 (D) 220 cm^2 .

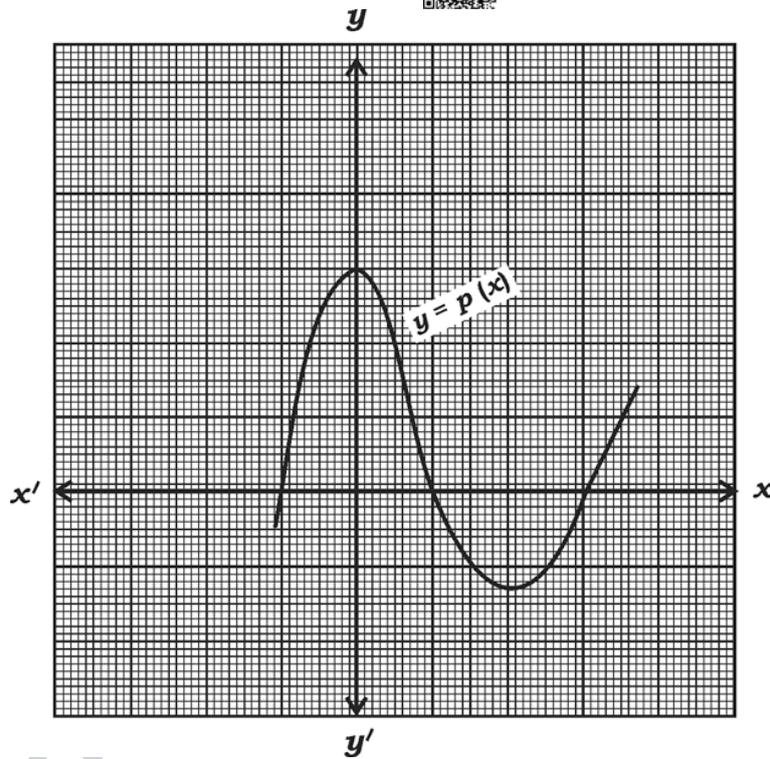


II. Answer the following questions :

8 × 1 = 8

9. Express the denominator of $\frac{23}{20}$ in the form of $2^n \times 5^m$ and state whether the given fraction is terminating or non-terminating repeating decimal.

10. The following graph represents the polynomial $y = p(x)$. Write the number of zeroes that $p(x)$ has.

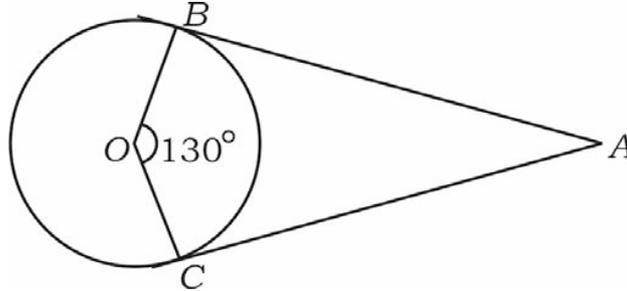


11. Find the value of $\tan 45^\circ + \cot 45^\circ$.

12. Find the coordinates of the mid-point of the line joining the points (x_1, y_1) and (x_2, y_2) .

13. State “Basic proportionality theorem”.

14. In the figure AB and AC are the two tangents drawn from the point A to the circle with centre O . If $\angle BOC = 130^\circ$ then find $\angle BAC$.



15. Write, $\frac{x+1}{2} = \frac{1}{x}$ in the standard form of a quadratic equation.

16. Write the formula to find the total surface area of the cone whose radius is ' r ' units and slant height is ' l ' units.

III. Answer the following questions :

$8 \times 2 = 16$

17. Solve : $2x + y = 11$

$x + y = 8$

18. Find the sum of $5 + 8 + 11 + \dots$ to 10 terms using the formula.

19. Find the value of k , if the pair of linear equations $2x - 3y = 8$ and

$2(k - 4)x - ky = k + 3$ are inconsistent.

20. Find the discriminant of the equation $2x^2 - 5x + 3 = 0$ and hence write the nature of the roots.



21. If one zero of the polynomial $p(x) = x^2 - 6x + k$ is twice the other then find the value of k . 

OR

Find the polynomial of least degree that should be subtracted from $p(x) = x^3 - 2x^2 + 3x + 4$ so that it is exactly divisible by 

$$g(x) = x^2 - 3x + 1.$$



22. Find the distance between the points $(-5, 7)$ and $(-1, 3)$.

OR

Find the coordinates of the point which divides the line joining the points $(1, 6)$ and $(4, 3)$ in the ratio $1 : 2$. 

23. The points $A(1, 1)$, $B(3, 2)$ and $C(5, 3)$ cannot be the vertices of the triangle ABC . Justify. 

24. Draw a pair of tangents to a circle of radius 3 cm which are inclined to each other at an angle of 60° . 

IV. Answer the following questions :

$9 \times 3 = 27$

25. Prove that $\sqrt{5}$ is an irrational number.

OR



Find the HCF of 24 and 40 by using Euclid's division algorithm. Hence find the LCM of HCF (24, 40) and 20. 

26. To save fuel, to avoid air pollution and for good health two persons A and B ride bicycle for a distance of 12 km to reach their office. As the cycling speed of B is 2 km/h more than that of A , B takes 30 minutes less than that of A to reach the office. Find the time taken by A and B to reach the office.

27. If $x = p \tan \theta + q \sec \theta$ and $y = p \sec \theta + q \tan \theta$ then prove that

$$x^2 - y^2 = q^2 - p^2.$$

OR

Prove that
$$\frac{\cot^2 (90^\circ - \theta)}{\tan^2 \theta - 1} + \frac{\operatorname{cosec}^2 \theta}{\sec^2 \theta - \operatorname{cosec}^2 \theta} = \frac{1}{\sin^2 \theta - \cos^2 \theta}.$$

28. Find the median of the following data :

<i>Class-interval</i>	<i>Frequency</i>
20 — 40	7
40 — 60	15
60 — 80	20
80 — 100	8

OR

Find the mode of the following data :



<i>Class-interval</i>	<i>Frequency</i>
1 — 3	6
3 — 5	9
5 — 7	15
7 — 9	9
9 — 11	1



29. The following table gives the information of daily income of 50 workers of a factory. Draw a 'less than type ogive' for the given data.



<i>Daily Income</i>	<i>Number of workers</i>
Less than 100	0
Less than 120	8
Less than 140	20
Less than 160	34
Less than 180	44
Less than 200	50



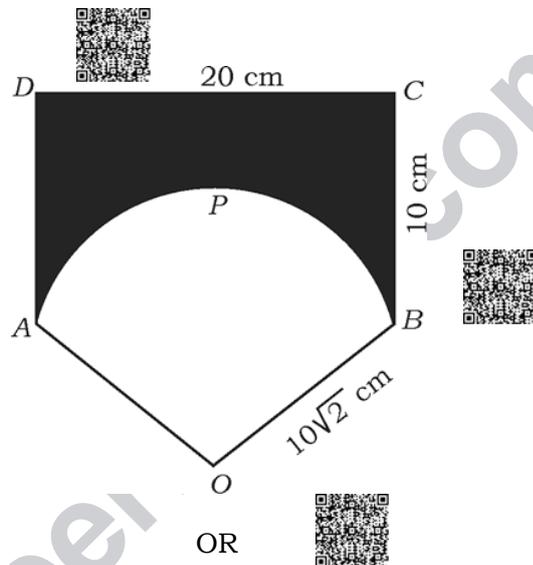
30. A bag contains 3 red balls, 5 white balls and 8 blue balls. One ball is taken out of the bag at random. Find the probability that the ball taken out is (a) a red ball, (b) not a white ball.



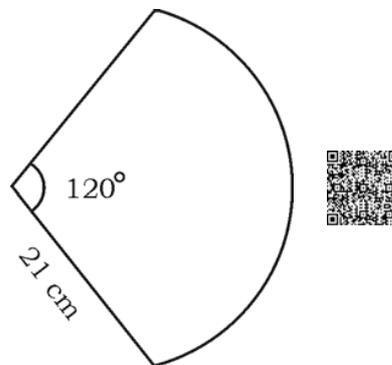
31. Prove that the “lengths of tangents drawn from an external point to a circle are equal”.

32. Construct a triangle ABC with sides $BC = 3$ cm, $AB = 6$ cm and $AC = 4.5$ cm. Then construct a triangle whose sides are $\frac{4}{3}$ of the corresponding sides of the triangle ABC .

33. $ABCD$ is a rectangle of length 20 cm and breadth 10 cm. $OAPB$ is a sector of a circle of radius $10\sqrt{2}$ cm. Calculate the area of the shaded region. [Take $\pi = 3.14$]



A hand fan is made up of cloth fixed in between the metallic wires. It is in the shape of a sector of a circle of radius 21 cm and of angle 120° as shown in the figure. Calculate the area of the cloth used and also find the total length of the metallic wire required to make such a fan.



V. Answer the following questions :



$4 \times 4 = 16$

34. Find the solution of the pair of linear equations by graphical method.

$$x + y = 7$$



$$3x - y = 1$$

35. There are five terms in an Arithmetic Progression. The sum of these terms is 55, and the fourth term is five more than the sum of the first two terms.

Find the terms of the Arithmetic progression.



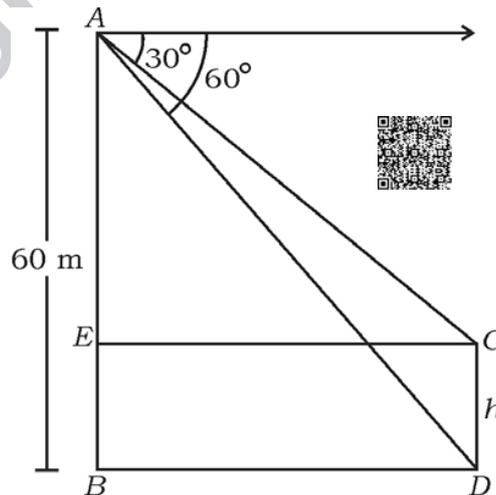
OR

In an Arithmetic Progression sixth term is one more than twice the third term. The sum of the fourth and fifth terms is five times the second term.

Find the tenth term of the Arithmetic Progression.



36. A tower and a pole stand vertically on the same level ground. It is observed that the angles of depression of top and foot of the pole from the top of the tower of height 60 m is 30° and 60° respectively. Find the height of the pole.



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37. A container opened from the top is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends are 8 cm and 20 cm respectively. Find the cost of the milk which can completely fill the container at the rate of Rs. 20 per litre. [Take $\pi = 3.14$] 

VI. Answer the following question :



1 × 5 = 5

38. State and prove Pythagoras theorem. 

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