

MATHS SAMPLE PAPER BY ANURAG TYAGI CLASSES

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Code.No. 041/1

- Please check that this question paper contains **5** printed pages
- Code number given on the right hand side of the question paper should be written on the title page of the answer book by the candidates.
- Please check that this question paper contains **25** questions.
- Please write down the serial number of the question before attempting it.

MATHEMATICS

*Time allowed: 3 hours]**[Maximum Marks: 80***General Instructions:**

1. All questions are compulsory.
2. The question paper consists of 25 questions divided into three sections A, B and C. Section A contains 7 questions of 2 marks each, Section B is of 12 questions of 3 marks each and Section C is of 6 questions of 5 marks each.
3. There is no overall choice. However, internal choice has been provided in two questions of two marks each, two questions of three marks each and one question of five marks each.
4. In question on construction, the drawing should be neat and exactly as per the given measurements.
5. Use of calculators is not permitted. However, you may ask for Mathematical tables.

SECTION A

1. What is the minimum number of factors :
 - (i) A prime number can have? 1
 - (ii) A composite number can have? 1

2. Verify whether $x=3$ is a zero of the polynomial $p(x) = 4x^2 + 7x + 1$. Also find the value of $p(-2)$ 2

3. Form a quadratic equation one of whose roots is $2 + \sqrt{5}$ and the sum of the roots is 4. 2

4. Evaluate : $\frac{5\sin^2 30^\circ + \cos^2 45^\circ + 4\tan^2 60^\circ}{2\sin 30^\circ \cos 60^\circ + \tan 45^\circ}$ 2

Or

If $\sin \theta = \frac{8}{17}, (\theta < 90^\circ)$, then find $\tan \theta$ 2

5. Find the value of p for which the equation $4x^2 - 5x + p$ gives two equal roots. 2

6. Given below are three equations. Two of them have infinite solutions and two have unique solutions. State the two pairs. 2

$$3x - 2y = 4$$

$$6x + 2y = 4$$

$$9x - 6y = 12$$

7. Solve the following equation $x^4 - 25x^2 + 144 = 0$ 2

Or

Find the sum and product of the roots of the following equation without actually solving it : $\sqrt{3} ax^2 = -10ax - 7\sqrt{3}$ 2

SECTION B

8. Using Euclid's Division Lemma, find the HCF of 867 and 255 3

9. A fraction becomes $\frac{1}{3}$ if 1 is subtracted from both its numerator and denominator. If 1 is added to both numerator and denominator, the fraction becomes $\frac{1}{2}$. Find the original fraction. 3

Or

The sum of the digits of a two digit number is 8. If the difference between this number and the number formed by reversing the digits is 18, find the original number. 3

10. In right triangle ΔPMO , right angled at M, $PM = 8\text{cm}$ and $OP = \frac{16\sqrt{3}}{3}\text{cm}$, find the values of $\angle OPM$, $\angle POM$ and OM ? 3

11. Solve for x : $\sqrt{2x+9} + x = 13$ 3

12. Find a quadratic polynomial with sum of the roots as 0 and product of the roots as $\sqrt{5}$ 3

13. Solve for x : $4^x - 3 \cdot 2^{x+2} + 32 = 0$ 3

14. Solve the following system of equations using elimination method : 3

$$\frac{x}{2} + \frac{y}{4} = 3 \quad 2x - y = 4$$

Or

Solve the following system of equations using substitution method : 3

$$\frac{11}{x+y} = 2 \quad x - y = 0.9$$

15. If α and β are the roots of the quadratic equation $x^2 + x - 2$, find the value of $\alpha^{-1} + \beta^{-1}$ without solving for α and β . **3**
16. For what value of λ will the following pair of equations have no solution?
 $8x + 5y = 9$ $\lambda x + 10y = 8$ **3**
17. Solve for x and y :
 $\frac{2}{x} + \frac{2}{3y} = \frac{1}{6}$ $\frac{3}{x} + \frac{2}{y} = 0$
 Hence find a where $y = ax - 4$. **3**
18. Prove that : $\frac{1 + \sin A}{1 - \sin A} = (\sec A + \tan A)^2$ **3**
19. Show that any positive odd integer is of the form $4m+1$ or $4m+3$ where m is any integer. **3**

SECTION C

20. Solve the following system of equations graphically and find the coordinates of the points where the lines meet the axis of y.
 $2(x - 1) = y$; $x + 3y = 15$ **5**
21. A 1.6m tall girl stands at a distance of 3.2 m from a lamp-post and casts a shadow of 4.8m on the ground. Find the height of the lamp-post. **5**

22. Solve for x: $\sqrt{x^2 - 16} - \sqrt{x^2 - 8x + 16} = \sqrt{x^2 - 5x + 4}$ 5
23. Find the quotient and remainder when $-10y^4 + 21y^3 - 21y^2 + 18$ is divided by $2y^2 - 3y + 4$. Hence verify the division algorithm 5
24. A party of tourists booked a room in a hotel for Rs.1200. Three of the members failed to pay as they had no cash with them. As a result, each of the remaining people had to pay Rs.20 more. How many tourists were there in all? 5
- Or*
- In a flight of 600km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200km/hr and so the time for the journey increased by half an hour. Find the original duration of the flight. 5
25. Points A and B are 90km 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 hours. If they go in opposite directions, they meet in 9/7 hours. Find their speeds. 5