

M.M. - 60

**Instructions:**

Section A : Questions 1 to 4 carry 1 mark each.

Section B : Questions 5 to 8 carry 2 marks each.

Section C : Questions 9 to 16 carry 3 marks each.

Section D : Questions 17 to 22 carry 4 marks each.

Section A

1. Explain why  $3 \times 5 \times 8 + 8$  is a composite number?
2. Can  $(x-2)$  be the remainder on division of a polynomial  $p(x)$  by  $(3x-1)$ ? justify your answer.
3. Find the point of intersection of lines  $x=y$  and  $x=-y$ .
4. State converse of Thales theorem.

Section B

5. D, E are points on the sides AB and AC respectively of a  $\Delta ABC$  such that  $DE \parallel BC$ . Find the value of  $x$ , when  $AD = x-1$ ,  $DB = 5-x$ ,  $AE = 4-x$  and  $EC = x-2$ .
6. If one zero of polynomial  $2x^2-3x+q$  is 3, find other zero. Also find value of  $q$ .
7. For which value of  $k$  will the following equations have no solution?  $3x+y=1$ ,  $(2k-1)x+(k^2-1)y=2k+1$ .
8. Show that any positive odd integer is of the form  $4q+1$  or  $4q+3$ , where  $q$  is an integer.

Section C

9. Prove that  $1/(4-2\sqrt{2})$  is irrational.
10. A class of 20 boys and 15 girls is divided into  $n$  groups so that each group has  $x$  boys and  $y$  girls. Find  $x, y$  and  $n$ .
11. In a triangle ABC right angled at C, CD is perpendicular to AB. Prove that  $CD^2 = BD \cdot AD$ .
12. If  $\alpha, \beta$  are the zeroes of the polynomial  $f(x) = x^2+x-6$ , then form quadratic equation whose zeroes are  $2\alpha$  and  $2\beta$ .
13. Find quadratic polynomial one of whose zeros is  $3-\sqrt{5}$  and sum of zeroes is 6.
14. Solve for  $x$  and  $y$ :  $ax+by=a-b$  and  $bx-ay=a+b$ .

15. The ratio of incomes of two persons is 9:7 and the ratio of their expenditure is 4:3. If each saves Rs.200 per month, find their monthly incomes.

16. If the areas of 2 similar triangles are equal then prove that they are congruent.

#### Section D

17. If the polynomial  $6x^4 + 8x^3 - 5x^2 + ax + b$  is exactly divisible by the polynomial  $2x^2 - 5$ , find the values of a and b.

18. A boat covers 32 km upstream and 36 km downstream in 7 hours. Also it covers 40 km upstream and 48 km downstream in 9 hrs. Find the speed of the boat in still water and that of the stream.

19. State and prove converse of Pythagoras theorem.

20. Find x, y and p. If d is the HCF of 45 and 27, find x, y satisfying  $d = 27x + 45y$

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

22. Solve the equations graphically:  $3x + y - 12 = 0$  and  $x - 3y + 6 = 0$ . Also find the area of triangle formed by these lines and y-axis.