

**Udaya Public School, Ayodhya**  
**First Term Examination (2023-24)**  
**Class X Subject: Mathematics SET IV**

Time : 3 Hours

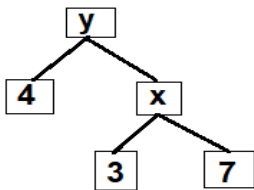
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**Instructions:**

1. This question paper contains 5 sections namely A, B,C,D and E.
2. Sections A has 20 MCQ questions 1 mark each.
3. Sections B has 5 questions 2 marks each.
4. Sections C has 6 questions 3 marks each.
5. Sections D has 4 questions 5 marks each.
6. Sections E has 3 case study-based questions 4 marks each.

**Section A (20x1=20 Marks)**

- Q1: A quadratic polynomial  $p(x)=(x-2)^2$  as no. of zeroes at most:  
 (a) 0 (b) 1 (c) 2 (d) None
- Q2: The total number factors of a prime number is:  
 (a) 1 (b) 0 (c) 2 (d) 3
- Q3: The LCM of two prime numbers number p and q ( $p>q$ ) is 221. Find the value of  $3p-q$ .  
 (a) 4 (b) 28 (c) 38 (d) 48
- Q4: If a and b are two co-prime numbers then  $a^3$  and  $b^3$  are:  
 (a) co-prime (b) not co-prime (c) even (d) odd
- Q5: The value of x and y in the below figure are:



- (a)  $x=10$   $y=14$  (b)  $x=21$   $y=84$  (c)  $x=21$   $y=25$  (d) none of these
- Q6: If  $\alpha$  and  $\beta$  are the zeros of a polynomial  $p(x)=x^2 - 4\sqrt{3}x+3$ , then find the value of  $\alpha + \beta - \alpha\beta$   
 (a)  $4\sqrt{3}$  (b) -3 (c)  $4\sqrt{3} - 3$  (d)  $-4\sqrt{3} - 3$
- Q7: If  $\alpha$  and  $\beta$  are the zeros of a polynomial  $5x^2 - 7x + 2$ , then sum of their reciprocal:  
 (a)  $7/2$  (b)  $7/5$  (c)  $2/5$  (d) None of these
- Q8: If  $\alpha, \beta$  are the zeros of a quadratic polynomial  $p(x)=x^2-(k+6)x+2(2k-1)$ , then the value of k. If  $\alpha + \beta = 1/2 \alpha\beta$ .  
 (a) 2 (b) 3 (c) 4 (d) None of these
- Q9: Which of these is polynomial whose zeroes  $1/3$  and  $(-3/4)$ ?  
 (a)  $12x^2+5x-3$  (b)  $12x^2-5x-3$  (c)  $12x^2-13x$  (d)  $12x^2-13x-3$
- Q10: If a pair of linear equations is consistent, then the lines will be:  
 (a) Parallel (b) Always coincident (c) Intersecting or coincident (d) Always intersecting
- Q11: The values of k for which the system of linear equation  $x+2y=3$ ,  $5x+ky=0$  has unique solution, then find the value of  $(x+y)$  :  
 (a)  $-14/3$  (b)  $2/3$  (c) 5 (d) 10
- Q12: The value(s) of k for which the quadratic equation  $2x^2+kx+2=0$  has equal roots is:  
 (a) 4 (b)  $\pm 4$  (c) -4 (d) 0
- Q13: For what value of k,  $kx^2+8x+2=0$  has distinct roots:  
 (a)  $K<8$  (b)  $k>8$  (c)  $k=2$  (d) None of these
- Q14: If  $ax+by=a^2 - b^2$  and  $bx+ay=0$ , then the value of  $(x+y)$  is:  
 (a)  $a^2-b^2$  (b)  $b-a$  (c)  $a-b$  (d)  $a^2+b^2$
- Q15: Which of following equations has 2 as a roots?  
 (a)  $x^2 - 4x+5=0$  (b)  $x^2+3x-12=0$  (c)  $2x^2-7x+6=0$  (d)  $3x^2-6x-2=0$
- Q16: If the system of equation  $3x+y=1$  and  $(2k-1)x + (k-1)y= 2k+1$  is consistent, then value of k is:  
 (a) -1 (b) 0 (c) 1 (d) 2
- Q17: If  $HCF(n,32)=4$  and  $LCM(n,32)=96$ , then  $n=?$   
 (a) 3 (b) 4 (c) 8 (d) 12
- Q18: If 1 is a zero of the polynomial  $p(x)=ax^2 - 3(a-1)x-1$ , then value of a is:  
 (a) 0 (b) 1 (c) 2 (d) -1
- Q19: The HCF of the smallest composite number and the smallest prime number is:  
 (a) 4 (b) 2 (c) 3 (d) 1

Q20: If the sum of the zeroes of the quadratic polynomial  $3x^2-kx+6$  is 3, then the value of k is:  
 (a) 6, (b) 7 (8) (d) 9

**Section -B (5x2=10 marks)**

Q21: If  $\frac{x}{2} + \frac{2y}{3} = -1$ ,  $x - \frac{y}{3} = 3$  then find the value of x and y.

Q22: Given that  $HCF(306,657)=9$ , find  $LCM(306,657)$ .

Q23: Find a quadratic polynomial, the sum and product of whose zeroes are  $-3/4$  and  $2/3$  respectively.

Q24: Find the roots of the quadratic equation  $3x^2 - 2\sqrt{6}x + 2 = 0$

Q25: Show that  $5 - \sqrt{3}$  is an irrational. Given that  $\sqrt{3}$  is irrational.

**Section-C (6x3=18 Marks)**

Q26: Half the perimeter of rectangular garden, whose length is 4 cm. more than its width is 36 cm. Find the dimension of the garden.

Q27: Solve  $2x+3y=11$  and  $2x - 4y = -24$  and hence find the value of m for which  $y = mx + 5$ .

Q28: The sum of the two digit number is 9. Also 9 times this number is twice the number obtained by reversing the order of the digits. Find the number.

Q29: The product of two consecutive positive integers is 306. We need to find the integers.

Q30: The altitude of a right triangle is 7 cm. less than its base. If the hypotenuse is 13 cm. Find the other two sides.

Q31: Find the zeroes of the quadratic polynomial  $x^2+7x+10$  and verify that relationship between the zeroes and the coefficients.

**Section -D (4x5=20 marks)**

Q32: Prove that  $\sqrt{7}$  is an irrational.

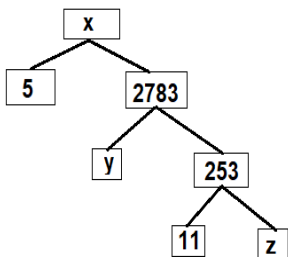
Q33: Draw the graphs of the equations  $x-y+1 = 0$  and  $3x+2y-12=0$ . Determine the coordinates of the vertices of the triangle formed by these lines and the x- axis, and shade the triangular region. Also find its area.

Q34: DC motor boat whose speed 18km/hrs. in still water takes 1 hour more to go 24km upstream. then to return downstream to the same spot. Find the speed of the stream.

Q35: If the zeroes of the polynomials  $x^2+px+q$  are double in value to the zeroes of  $2x^2-5x-3$ , find the value of p and q.

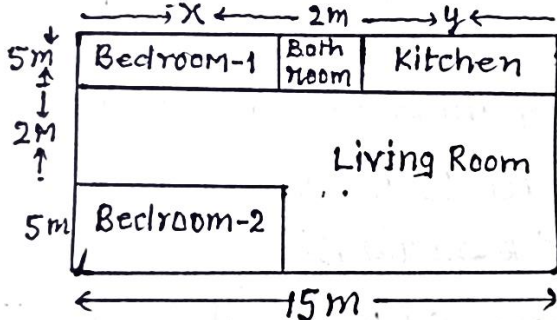
**Section-E( 3x4=12 marks)**

Q36: A mathematics exhibition is being conducted in your school and one of your friends is making a modal of a factor tree. He has some difficulty and asks for your help in completing a quiz for the audience. Observe the following factor tree and answer the questions:



- A. Find the value of x
- B. Find the prime factorization of 13915.

Q37: Amit is planning to buy a house and the layout is given below figure. The design and measurement has made such that areas of two bedrooms and kitchen together is 95sq.m.



- A. Form the linear equations for above situation.
- B. Solve these pair of linear equations to find lengths of bedroom and kitchen.

Q38: Raj and Ajay are very close friends. Both the families decide to go to Ranikhet by their own cars. Raj's car travels at a speed of x km/hrs. while Ajay's car travels 5 km/hrs. faster than Raj's car. Raj took 4 hrs. more than Ajay to complete the journey of 400 km.

- A. What will be the distance covered by Ajay's car in two hours.
- B. The quadratic equation in terms of speed of Raj's car.