General Instructions:

1) This question paper contains two parts A and B.

2) Both Part A and Part B have internal choices.

Part – A:

1) It consists three sections – I and II.

2) Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

3) Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examines is to attempt any 4 out of 5 sub-parts.

Part – B:

1) Question No. 21 to 26 are Very short answer Type questions of 2 marks each.

2) Question No. 27 to 33 are Short Answer Type questions of 3 marks each.

3) Question No. 34 to 36 are Long Answer Type questions of 5 marks each.

4) Internal choice is provided in 2 questions of 2 mars, 2 questions of 3 marks and 1 question of 5 marks.

Section – I

1) If $xy = 180$ and HCF$(x, y) = 3$, then find the LCM(x, y).

OR

If the sum of the zeroes of the quadratic polynomial $3x^2 - kx + 6$ is 3, then find the value of k.

2) For what value of k, the pair of linear equation $3x + y = 3$ and $6x + ky = 8$ does not have a solution.

3) Find the value of 'p' from the polynomial $x^2 + 3x + p,$ if one of the zeroes of the polynomial is 2.

4) If 3 chairs and 1 table costs Rs. 1500 and 6 chairs and 1 table costs Rs. 2400. Form linear equations to represent this situation.

5) Which term of the A.P: 27, 24, 21, …………… is zero?

OR

In an Arithmetic Progression, if d = $-4,\ n = 7,\ an = 4$, then find a.

6) For what values of k, the equation $9x^2 + 6kx + 4 = 0$ has equal roots?

7) Find the roots of the equation $x^2 + 7x + 10 = 0$

OR

For what values of 'a' quadratic equation 30, $ax^2 - 6x + 1 = 0$ has no real roots?

8) Find HCF and LCM of 13 and 17 by prime factorization method.

9) Show that $3\sqrt{7}$ is an irrational number.

10) If the sum of zeroes of the quadratic polynomial $3x^2 - kx + 6$ is 3, then find the value of k.

11) If α and β are the zeroes of a polynomial such that $\alpha + \beta = -6$ and $\alpha\beta = 5,$ then find the polynomial.

12) Write a quadratic polynomial, sum of whose zeroes is $2\sqrt{3}$ and product is 5.

13) The nth term of sequence is $(2n - 3)$, find its fifteenth term.

OR

Find the 24th term of the sequence:

12, 10, 8, 6, …………………….

14) If $x = 5$ a solution of the quadratic equation $x^2 - 2x - 15 = 0$?

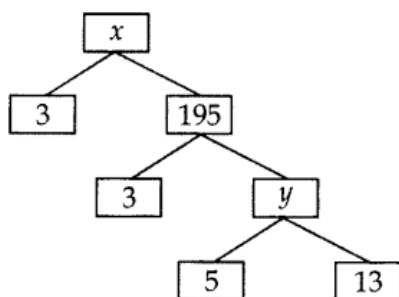15) If the lines given by $3x + 2ky = 2$ and $2k + 5y + 1 = 0$ are parallel, then find value of k.

OR

Is the following pair of linear equations consistent? Justify your answer

$2ax + by = a,\ 4ax + 2by - 2a = 0; a \neq 0$

16) Find the co-ordinate where the line $x - y = 8$ will intersect $y - $ axis.

Section – II

17) Complete the following factor tree.

a) Find x

b) Find y

c) Find the LCM of x and y

d) Write first 10 prime numbers in between x and y.

e) HCG of x and y is?

18) Ram asks the labour to dig a well upto a depth of 10 metre. Labour charges Rs. 150 for first metre and Rs. 50 for each subsequent metres. As labour was uneducated, he claims Rs. 550 for the whole work. It should be the actual amount to be paid to

a) What should be the actual amount to be paid to the labours?

b) What values of Ram is depicted in the question if he pays Rs. 600.

c) If total labours are 10 how much amount get each?

d) If labour charge 200 then what is the actual amount to be paid by Ram?

e) If labour charge Rs. 200 what should be the actual amount to be paid to labours?

19) Nidhi saves Rs. 2 on first day of the month, Rs. 4 on second day, Rs. 6 on third day and so on…..

    a) What will be her saving in the month of February 2012?

    b) What value is depicted by Nidhi?

    c) What will be her saving in the month of January (days in January 31)?

    d) Write first 10 terms of AP according to above question.

    e) Find 20th term of AP (follow the bit iv answer)

20) Applications of Parabolas-Highway Overpasses / Underpasses. A highway underpass is parabolic in shape. Parabola – A parabola is the graph that results from $p(x) = ax^2 + 2bx + c$. Parabolas are symmetric about a vertical line known as the Axis of Symmetry. The Axis of Symmetry runs through the maximum or minimum point of the parabola which is called the

    a) If the highway overpass is represented by $x^2 - 2x - 8$. Then its zeroes are

        i) $(2, -4)$ ii) $(4, -2)$ iii) $(-2, -2)$ iv) $(-4, -4)$

    b) The highway overpass is represented graphically. Zeroes of a polynomial can be expressed graphically. Number of zeroes of polynomial is equal to number of points where the graph of polynomial;

        i) Intersects $x - axis$

        ii) Intersects $y - axis$

        iii) Intersects $y - axis$ or $x - axis$

        iv) None of the above

    c) Graph of a quadratic polynomial is a

        i) Straight line   ii) Circle   iii) Parabola   iv) Ellipse

    d) The representation of Highway underpass whose one zero is 6 and sum of the zeroes is 0, is

        i) $x^2 - 6x + 2$ ii) $x^2 - 36$ iii) $x^2 - 6$ iv) $x^2 - 3$

    e) The number of zeroes that polynomial $f(x) = (x - 2)^2 + 4$ can have is

        i) 1   ii) 2   iii) 0   iv) 3

Part B – Section I

21) Prove that $\sqrt{5}$ is irrational and hence show that $3 + \sqrt{5}$ is also irrational.

OR

Three alarm clocks ring at intervals of 4, 12 and 20 minutes respectively. If they start ringing together, after how much time will they next ring together?

22) Find the condition that zeroes of polynomial $p(x) = ax^2 + bx + c$ are reciprocal of each other.

OR

Find the quadratic polynomial whose zeroes are -2 and -5. Verify the relationship between zeroes and coefficients of the polynomial.

23) How many solutions does the pair of equations y=0 and y=-5 have?

OR

Find whether the following pair of linear equations is consistent or inconsistent:

$3x + 2y = 8, \quad 6x - 4y = 9$

24) If $x = \frac{2}{3}$ and $x = -3$ are roots of the quadratic equations $ax^2 + lx + b = 0$ find the values of a and b.

25) How many terms of the A.P 18, 16, 14 …… Be taken so that their sum is zero?

26) The angles of a triangle are in A.P., the least being half the greatest. Find the angles.

Section – II

27) Which term of the progression 4, 9, 14, 19, ………….. is 109?

28) Find the HCF and LCM of 306 and 657 and verify that $LCM \times HCF = Product$ of the two numbers.

29) Two tankers contain 850 litres and 680 litres of petrol respectively. Find the maximum capacity of a container which can measure the petrol of either tanker in exact number of times.

OR

Amita, Sneha and Raghav start preparing cards for all persons of an old age home. In order to complete one card, they take 10, 16 and 20 minutes respectively. If all of them started together, after what time will they start preparing a new card together?
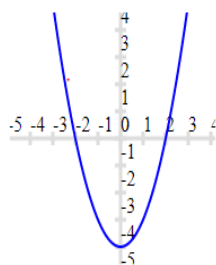
30) Draw the graph of $2y = 4x - 6; 2x = y + 3$ and determine whether this system of linear equations has a unique solution or not.
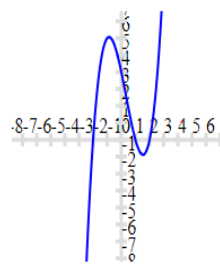
OR

The graphs of $y = p(x)$ are given in below figure, for some polynomials $p(x)$. Find the number of zeroes of $p(x)$ in each case.
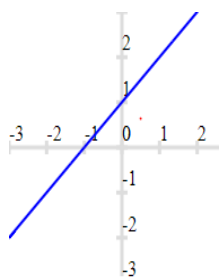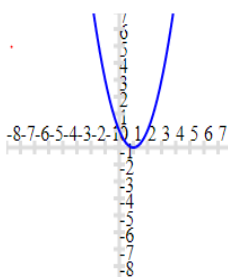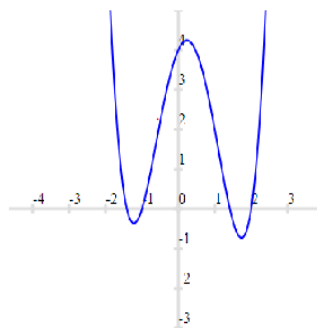

(i)

(ii)

(iii)

(iv)

(v)

31) In school, students decided to plant trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be double of the class in which they are studying. If there are 1 to 12 classes in the school and each class has two sections, find how many trees were planted by the students. Which value is shown in this question?

32) If $\frac{241}{4000} = \frac{241}{2^m 5^n}$ find the values of m and n where m and n are non-negative integers. Hence write its decimal expansion without actual division.

33) Prove that $\frac{2\sqrt{3}}{5}$ is irrational.

Section – III

34) Students of a school thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g., a section of class I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. Find the total number of trees planted by the students of the school. Pollution control is necessary for everybody's health. Suggest one more role of students in it.

OR

4 chairs and 3 table cost? 2100 and 5 chairs and 2 tables cost? 1750. Find the cost of one chair and one table separately.

35) Five years ago, A was thrice as old as B and ten years later. A shall be twice as old as B. What are the present ages of A and B?

36) Three consecutive natural numbers are such that the square of the middle number exceeds the difference of the squares of the other two by 60. Find the numbers.