MODEL QUESTION PAPER 2021-2022

PERIODIC TEST – 1

MATHEMATICS

CLASS: X MAX. MARKS: 40

DURATION: 1.5Hrs

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 two sections- I and II.
2. Section I has 7 questions of 1 mark each. Internal choice is provided in 2 questions.
3. Section II has 2 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

Part-B:

1. Question No 10 to13 are very short answer type questions of 2 marks each.
2. Question No 14 to 17 are Short answer type questions of 3 marks each.
3. Question No 18 is a Long answer type question of 5 marks.
4. Internal choices have been provided. You will have to attempt only one of the alternatives in all such questions.

PART-A

Section-I

Question numbers 1 to 7 carry 1 mark each

1. Express 5050 as the product of its prime factors.

2. Find a quadratic polynomial whose sum and product of its zeroes respectively are $-\frac{2}{5}$ and 3.

3. If the HCF of 420 and 130 can be expressed in the form $3x+4$, find x.

4. Find the value(s) of k so that the pair of equations x +2y=5 and 3x+ky+15=0 has unique solution.

OR

How many solutions does the system of equations 2x+3y-7=0 and 6x+9y-11=0 have?

5. After how many decimal places will the decimal expansion of $\frac{23}{2^4 \times 5^3}$ terminate?

OR

Use Euclid's division algorithm to find the HCF of 726 and 275.

6. If the sum of the zeroes of the quadratic polynomial $ky^2+2y-3k$ is equal to twice their product, find the value of k.

7. If $x = 3$ is one root of the quadratic equation $x^2 - 2kx - 6 = 0$, then find the value of k.

Section –II

Case study based questions are compulsory. Attempt any four sub parts of each question. Each sub part carries 1 mark.

8. Case study based 1:

A seminar is being conducted by an Educational Organisation, where the participants will be educators of different subjects. The number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively.

1. In each room the same number of participants are to be seated and all of them being in the same subject, hence maximum number participants that can accommodated in each room are

a) 14 b) 12 c) 16 d) 18

2. What is the minimum number of rooms required during the event?

a) 11 b) 31 c) 41 d) 21

3. The LCM of 60, 84 and 108 is _____

a) 3780 b) 3680 c) 4780 d) 4680

4. The product of HCF and LCM of 60,84 and 108 is _____

a) 55360 b) 35360 c) 45500 d) 45360

5. 108 can be expressed as a product of its primes as _____

a) $2^3 \times 3^2$ b) $2^3 \times 3^3$ c) $2^2 \times 3^2$ d) $2^2 \times 3^3$

9.Case study based 2:

The below picture are few natural examples of parabolic shape which is represented by a quadratic polynomial. A parabolic arch is an arch in the shape of a parabola. In structures, their curve represents an efficient method of load, and so can be found in bridges and in architecture in a variety of forms.

1. In the standard form of quadratic polynomial, $ax^2 + bx + c$, a, b and c are

a) All are real numbers b) All are rational numbers
c) 'a' is a non zero real number and b and c are any real numbers
d) All are integers.

2. The product of the zeroes of $-2x^2 + kx + 6$ is

a) 3 b) 2 c) -2 d) -3

3. If α and $\frac{1}{\alpha}$ are the zeroes of the quadratic polynomial $2x^2 - x + 8k$ then k is

a) 4 b) $\frac{1}{4}$ c) $-\frac{1}{4}$ d) 2

4. The graph of $x^2+1=0$

a) Intersects x-axis at two distinct points b)Touches x-axis at a point.
c) Neither touches nor intersects x-axis d)Either touches or intersects x-axis

5. If the sum of the roots is –p and product of the roots is $-\frac{1}{p}$, then the quadratic polynomial is

a) $k(-px^2 + \frac{x}{p} + 1)$ b) $k\ (px^2 - \frac{x}{p} - 1)$ c) $k\ (x^2 + px - \frac{1}{p})$ d) $k(x^2 - px + \frac{1}{p})$

PART B

Questions 10 to13 carry 2 marks each.

10. If α and β are the zeroes of the quadratic polynomial $p(x) = x^2 - 4x + 3$, then find the value of $\alpha^4\beta^3 + \alpha^3\beta^4$.

11. For what value of k will the system of linear equations has infinite number of solutions?

$4x + 2y = 3$, $2x + ky = 6$

12. Find the HCF and LCM of 404 and 96 and verify that HCF X LCM = product of the two given numbers.

OR

Show that any positive odd integer is of the form 6q+1or 6q+3 or 6q+5 where q is some integer.

13. Prove that $\sqrt{3}$ is irrational

Questions 14 to17 carry 3 marks each.

14. Find all the zeroes of $2x^4 - 3x^3 - 3x^2 + 6x - 2$, if its two zeroes are $\sqrt{2}$ and $-\sqrt{2}$

15. 5 years hence, the age of father shall be three times the age of his son while 5 years earlier the age of the father was 7 times the age of his son. Find their present ages.

OR

Solve for x and y : $7x - 2y = 9$; $4x + 6y = 15$

16. Find the root of the quadratic equation $3\sqrt{3}\,x^2 + 10x + \sqrt{3}$.

17. Find the zeroes of $x^2 - 17x + 30$ and verify the relationship between the coefficients and the zeroes of the polynomials

Question 18 carries 5 marks

18. Solve for x: $\frac{5}{x-1} + \frac{1}{y-2} = 2$

$\frac{6}{x-1} - \frac{3}{y-2} = 1$

OR

Solve the following pair of linear equation graphically: $x + 3y = 6$ and $2x - 3y = 12$. Find the area of the triangle formed by the lines representing the given equations with Y- axis.

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