Block 3

CODE : A-A712092-EI	**I Semester Exam - 2023-24**	3 x 2340
Std. : IX	Sub. : ALGEBRA	Marks : 40
Date : 31/10/2023	Roll No. _____	Time : 2 hrs.

Q.1 A) ***Choose the correct alternative answer and fill in the blanks.*** 4

1) *If U= {1, 3, 5, 7, 9, 11 } and P = {1, 5, 9 }, then P^1 = ...*

a) {1, 3, 7, 11} *b)* {3, 7, 9} *c)* {1, 7, 11} *d)* {3, 7, 11}

2) *Which of the following is a surd ?*

a) $\sqrt[4]{81}$ *b)* $\sqrt[3]{25}$ *c)* $\sqrt{16}$ *d)* $\sqrt[3]{125}$

3) *What is the value of the polynomial $3x^2 - 7x + 5$ when $x = 2$?*

a) 1 *b)* -3 *c)* 3 *d)* 2

4) *If $3x + 5y = 9$, and $5x + 3y = 7$, then what is the value of $x + y$?*

a) 2 *b)* 16 *c)* 9 *d)* 7

Q.1 B) ***Solve the following sub-questions.*** 4

1) *By using variables m and c form any 2 linear equations in two variables.*

2) *What is the coefficient form of the polynomial $x^4 + 3x^2 - 1$?*

3) *Find the value of $|7| \times |-4| = ?$*

4) *If U = {1, 3, 5, 7, 9, 11} and P = {3, 5, 9} then P^1 = ...?*

Q.2 A) ***Complete any two of the following activities.*** 4

1) *If the value of the polynomial $m^3 + 2m + a$ is 12. For $m = 2$, then find the value of a*

Solution :-

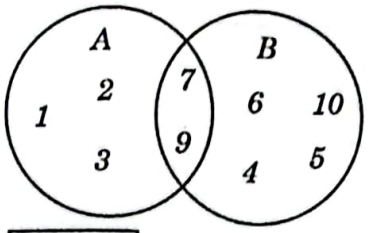
$p(m) = m^3 + 2m + a$

$p(2) = 2^3 +$ ☐ $+ a$

$\therefore \quad 12 =$ ☐ $+$ ☐ $+ a$

$a =$ ☐

2) *Observe the given Venn diagram and fill in the boxes.*



Set A = { ☐ } *Set B =* { ☐ }

Set $(A \cup B)$ = { ☐ } *Set $(A \cap B)$ =* { ☐ }

3) *Simplify* $9\sqrt{5} - 4\sqrt{5} + \sqrt{125}$

Solution :- $= 9\sqrt{5} - 4\sqrt{5} +$ ☐

$= 9\sqrt{5} - 4\sqrt{5} +$ ☐

$=$ ☐ $\times \sqrt{5}$

$=$ ☐

P.T.O.

Q.2 B) Solve any 4 sub - questions from the following. **8**

1) Solve the following set of simultaneous equation $x + y = 4$; $2x - 5y = 1$.

2) If the polynomial $y^3 - 5y^2 + 7y + m$ is divides by $y + 2$ and the remainder is 50, then find the value of m.

3) Solve $|7 - 2x| = 5$.

4) In a competitive exam 50 students passed in English, 60 students passed in Mathematics and 40 students pass in both the subjects. None of them failed in both the subjects. Find the total number of students.

5) Subtract the second polynomial from the first.
$(2ab^2 + 3a^2b - 4ab) - (3ab - 8ab^2 + 2a^2b)$

Q.3 A) Complete any one of the following activities. **3**

1) Solve the following set of simultaneous equation.
$2x + y = 5$; $3x - y = 5$

Solution :-

$2x + y = 5$ .....(1)
$3x - y = 5$ .....(2)

Adding equations (1) and (2),

$2x + y = 5$ .....(1)
$3x - y = 5$ .....(2)

$\square = \square$

$\therefore \quad x = \square$

Substituting $x = \square$ in equation (1),

$\square + y = 5$

$\therefore \quad y = \square$

$\square$ is the solution of the given equations.

2) Rationlize the following denominator $\frac{3}{2\sqrt{5} - 3\sqrt{2}}$

Solution :-

The conjugate of $2\sqrt{5} - 3\sqrt{2}$ is $\square$

$$\frac{3}{2\sqrt{5} - 3\sqrt{2}} = \frac{3}{2\sqrt{5} - 3\sqrt{2}} \times \frac{\square}{\square}$$

$$= \frac{3(2\sqrt{5} + 3\sqrt{2})}{\square}$$

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$$= \frac{3(2\sqrt{5} + 3\sqrt{2})}{\square}$$

Q.3 B) Solve any two of the following sub-questions. **6**

1) Find the value of the polynomial $2x - 2x^3 + 7$ using given values of x.
   i) $x = 3$
   ii) $x = -1$
   iii) $x = 0$

2) The sum of the ages of Priyanka and Dipika is 34 years. Priyanka is elder to Dipika by 6 years. Find their ages.

3) 70 trees were planted by Parth and 90 trees were planted by Pradnya on the occasion of Tree Plantation Week. Out of these, 25 trees were planted by both of them together. How many trees were planted by Parth or Pradnya ?

4) Represent the numbers $\sqrt{5}$ and $\sqrt{10}$ on a number line.

Q.4 Solve any two sub-questions from the following. **8**

1) Factorise the following polynomials.
   a) $(x^2 - x)^2 - 8(x^2 - x) + 12$
   b) $(x - 5)^2 - (5x - 25) - 24$

2) a) Out of 100 persons in a group 72 persons speak English and 43 persons speak French. Each one out of 100 persons speak at least one language. Then how many speak only English ? How many speak only French ? How many of them speak English and French both ?
   b) If $A = \{2, 5, 7, 9\}$ and $B = \{1, 4, 6, 8\}$. Find $A \cap B = ?$

3) a) Divide the first polynomial by the second polynomial and write the answer in the form 'Dividend = Divisor × Quotient + Remainder
   $5x^5 + 4x^4 - 3x^3 + 2x^2 + 2 \; ; \; x^2 - x$
   b) If $p(m) = m^3 + 2m^2 - m + 10$, then $p(a) + p(-a) = ?$

Q.5 Solve any one of the following questions. **3**

1) Sanjay has a fixed monthly salary. There is an yearly increment of a fix amount in the salary. After four years his monthly salary was ₹ 4500 and after ten years his monthly salary became ₹ 5400. Find his original salary and yearly increment.

2) Divide the following polynomials by synthetic division method and write the quotient and the remainder.
   $(2x^4 + 3x^3 + 4x - 2x^2) \div (x + 3)$
