SHIKSHA CLASSES

Sub : Maths **ANSWER PAPER** **Total Marks : 30**

Class : IX **2 : Polynomials**

Section 1 (Each 1 Marks)

Multiple choice Questions (MCQs)

Q.1 : Which of the following is quadratic polynomial

Ans.: b) $x^2 + 2$

Q.2 : If $x^{51} + 51$ is divided by $(x + 1)$ the remainder is :

Ans.: d) 50

Q.3 : If a polynomial f(x) is divided by x – a the remainder is

Ans.: b) f(a)

Q.4 : Zero of the polynomial p(x) = cx + d is :

Ans.: c) $-d/c$

Q.5 : Degree of the polynomial

$p(x) = 4x^4 + 2x^2 + x^5 + 2x + 7$

Ans.: c) 5

Q.6 : If 3 + 5 – 8 = 0, then the value of $(3)^3 + (5)^3 – (8)^3$ is

Ans.: b) –360

Q.7 : **The value of**

$$\frac{(361)^3 + (139)^3}{(361)^2 - 361 \times 139 + (139)^2}$$ **is.**

Ans.: b) 500

Q.8 : If x + 2 is a factor of $x^3 – 2ax^2 + 16$, then value of a is

Ans.: b) 1

Q.9 : Identify the polynomial

Ans.: d) $3x^2 + 7$

For question number 10 to 11 two statement are given one labeled Assertion and other labeled Reason select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below

Q.10 : Assertion : The degree of the polynomial $(x^2 – 2)(x – 3)(x + 4)$ is 3.

Reason : A polynomial of degree 3 is called a cubic polynomial.

Ans.: d) Assertion is wrong statement but Reason is correct statement.

Q.11 : Assertion : If $2x^2 – 32$ is the volume of a cuboid, then length of cuboid can be x – 8.

Reason : Volume of a cuboid = l × b × h.

Ans.: d) Assertion is wrong statement but Reason is correct statement.

Section B

Q.12 : Factorize : $125x^3 + 27y^3$.

Ans : $125x^3 + 27y^3 = (5x)^3 + (3y)^3$

$= (5x + 3y)\left((5x)^2 + (3y)^2 - 5x \times 3y\right)$

$[\because a^3 + b^3 = (a + b)(a^2 + b^2 - ab)$

$= (5x + 3y)(25x^2 + 9y^2 - 15xy)$

Q.13 : Factorise $6x^2 + 17x + 5$ splitting the middle term.

Ans : $6x^2 + 17x + 5$

$= 6x^2 + 2x + 15x + 5$

$= 2x(3x + 1) + 5(3x + 1)$

$= (2x + 5)(3x + 1)$

OR

: Factorize : $x^3 - 2x^2 - x + 2$.

Ans.: $x^3 - 2x^2 - x + 2 = x^2(x - 2) - 1(x - 2)$

$= (x - 2)(x^2 - 1)$

$= (x - 2)(x - 1)(x + 1)$

$(\because a^2 - b^2 = (a + b)(a - b)$

Section C (Each 3 Marks)

Q.14 : If $x^2 + \frac{1}{x^2} = 51$, then find the value of $x - \frac{1}{x}$.

Ans : Given $x^2 + \frac{1}{x^2} = 51$

$\Rightarrow x^2 + \frac{1}{x^2} - 2 = 51 - 2$

(subtracting 2 from both sides)

$\Rightarrow \left(x - \frac{1}{x}\right)^2 = 49$

$\left[\left(x - \frac{1}{x}\right)^2 = x^2 + \frac{1}{x^2} - 2\right]$

Taking root of both sides...

$\Rightarrow x - \frac{1}{x} = \pm\sqrt{49}$

$\Rightarrow x - \frac{1}{x} = \pm 7$

OR

: If $3x + 2y = 8$ and $xy = 4$ then find the value of $9x^2 + 4y^2$.

Ans : Given : $3x + 2y = 8$ – (i) and $xy = 4$ – (ii)

squaring both sides of equation (i) we get

$(3x + 2y)^2 = (8)^2$

$\Rightarrow 9x^2 + 4y^2 + 12xy = 64$

$\Rightarrow 9x^2 + 4y^2 + 12 \times 4 = 64$

$\Rightarrow 9x^2 + 4y^2 = 64 - 48$

$\Rightarrow 9x^2 + 4y^2 = 16$.

Q.15 : If $x + \frac{1}{x} = 7$, then find the value of $x^3 + \frac{1}{x^3}$.

Ans : Given $x + \frac{1}{x} = 7$ ---(i)

$\therefore \left(x + \frac{1}{x}\right)^3 = (7)^3$ (Taking cube both sides)

$\Rightarrow x^3 + \frac{1}{x^3} + 3x\frac{1}{x}(x + \frac{1}{x}) = 343$

using identify $(a + b)^3 = a^3 + b^3 + 3ab(a + b)$

$\Rightarrow x^3 + \frac{1}{x^3} + 3\left(x + \frac{1}{x}\right) = 343$

$\Rightarrow x^3 + \frac{1}{x^3} + 3 \times 7 = 343$ ---(from(1))

$\Rightarrow x^3 + \frac{1}{x^3} = 343 - 21$

$\Rightarrow x^3 + \frac{1}{x^3} = 322$.

Section D

Q.16 : Simplify :

$$\frac{(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3}{(a-b)^3+(b-c)^3+(c-a)^3}$$

Ans : If $x + y + z = 0$ then $x^3 + y^3 + z^3 = 3xyz$

(By identity)

Here. $a^2 - b^2 + b^2 - c^2 + c^2 - a^2 = 0$

So, $(a^2 - b^2)^3 + (b^2 - c^2)^3 + (c^2 - a^2)^3$

$= 3\,(a^2 - b^2)\,(b^2 - c^2)\,(c^2 - a^2)$ and

$a - b + b - c + c - a = 0$

So, $(a - b)^3 + (b - c)^3 + (c - a)^3$

$= 3\,(a - b)\,(b - c)\,(c - a)$

Thus $\dfrac{(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3}{(a-b)^3+(b-c)^3+(c-a)^3}$

$$=\frac{3(a^2-b^2)(b^2-c^2)(c^2-a^2)}{3(a-b)(b-c)(c-a)}$$

$$=\frac{(a-b)(a+b)(b+c)(b-c)(c+a)(c-a)}{(a-b)(b-c)(c-a)}$$

$$\left[\because x^2-y^2=(x-y)(x+y)\right.$$

$= (a + b)(b + c)(c + a)$.

OR

: Factorize : $a^2 + b^2 - 2(ab - ac + bc)$

Ans : $a^2 + b^2 - 2\,(ab - ac + bc)$

$= a^2 + b^2 - 2ab + 2ac - 2bc$

$= (a^2 + b^2 - 2ab) + 2c\,(a - b)$

$= (a - b)^2 + 2c\,(a - b)$

$= (a - b)\,(a - b + 2c)$.

SECTION E

Q.17 : Case study : (Any four) **4**

A maths teacher explain the concept of polynomial. He told them about the types of polynomial as linear , quadratic cubic concept of degree of polynomial, remainder theorem and factor theorem based on the information solve the following questions.

i) Write how many variable are present in $4x^2 - 3x + 7$.

Ans : a) one

ii) $x - x^3$ is ..... type of polynomial.

Ans : c) cubic

iii) The value of polynomial

$q(y) = 3y^3 - 4y + \sqrt{11}$ at $y = 2$ is

Ans : a) $16 + \sqrt{11}$

iv) $(104)^3$ =

Ans : a) 1124864

v) Every linear polynomial in one variable has a .....zero.

Ans : a) unique

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