CBSE TEST PAPER-02

Class X - Mathematics (polynomials)

[ANSWERS]

Ans01. (d)

Ans02. (b)

Ans03. (c)

Ans04. (a)

Ans05. Sum of the zeros = $\frac{1}{2}$ product of the zeros

$$\Rightarrow \quad (k+6)=\frac{1}{2}\left[2(2k+1)\right]$$

$$\Rightarrow \quad k+6=2k+1$$

$$\Rightarrow \quad k=5$$

Ans06.

$$f(x)=x^2-p(x+1)-c$$

$$=x^2-px-(p+c)$$

$$\therefore \quad \alpha+\beta=p \text{ and } \alpha\beta=-(p+c)$$

$$\text{Now} \quad (\alpha+1)(\beta+1)=\alpha\beta+(\alpha+\beta)+1$$

$$=-p-c+p+1$$

$$=1-c$$

Ans07.

$$f(t)=kt^2+2t+3k$$

Sum of the zeros = Product of the zeros

$$\Rightarrow \quad \frac{-2}{k}=\frac{3k}{k}$$

$$\Rightarrow \quad k=-\frac{2}{3}$$

Ans08.

$$
\begin{array}{r}
-x^2-2 \\
2-x^2\overline{)x^4-5x+6} \\
\underline{\mp x^4 \pm 2x^2} \\
2x^2-5x+6 \\
\underline{\mp 2x^2 \quad \pm 4} \\
-5x+10
\end{array}
$$

Quotient = $-x^2-2$

Remainder = -5x + 10

Ans09. $\sqrt{2}$ *and* $-\sqrt{2}$ are the zeros.

$\therefore \left(x-\sqrt{2}\right)\left(x+\sqrt{2}\right)$ is the factor of the given polynomial.

$$
\begin{array}{r}
2x^2-3x+1 \\
x^2-2\overline{)2x^4-3x^3-3x^2+6x-2} \\
\underline{\mp 2x^4 \quad \mp 4x^2} \\
-3x^3+x^2+6x-2 \\
\underline{\mp 3x^3 \quad \pm 6x} \\
x^2-2 \\
\underline{\mp x^2 \quad \pm 2} \\
0
\end{array}
$$

$$
\begin{aligned}
q(x) &= 2x^2-3x+1 \\
&= 2x^2-2x-x+1 \\
&= 2x(x-1)-1(x-1) \\
&= (2x-1)(x-1)
\end{aligned}
$$

$\therefore$ other two zero's are

$x=1$ and $x=\dfrac{1}{2}$

Ans10. $p(x)=q(x)\times g(x)+r(x)$

$$
\begin{aligned}
g(x) &= \frac{p(x)-r(x)}{q(x)} \\
&= \frac{x^3-3x^2+x+2+2x-4}{x-2}
\end{aligned}
$$

$$
\begin{array}{r}
x^2 - x + 1 \\
x - 2 \overline{)\, x^3 - 3x^2 + 3x - 2} \\
\underline{-\,x^3 \mp 2x^2} \\
-x^2 + 3x - 2 \\
\underline{\mp\, x^2 \pm 2x} \\
x - 2 \\
\underline{\mp\, x \pm 2} \\
0
\end{array}
$$

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

Ans11. $f(x) = 2x^4 - 2x^3 - 7x^2 + 3x + 6$

Two zeros are $\pm\sqrt{\frac{3}{2}}$

$\therefore \quad \left(x + \sqrt{\frac{3}{2}}\right)\left(x - \sqrt{\frac{3}{2}}\right) = \frac{1}{2}\left(2x^2 - 3\right)$

$\therefore \quad \left(2x^2 - 3\right)$ is the factor of $f(x)$.

$$
\begin{array}{r}
x^2 - x - 2 \\
2x^2 - 3 \overline{)\, 2x^4 - 2x^3 - 7x^2 + 3x + 6} \\
\underline{-\,2x^4 \quad \mp 3x^2} \\
-2x^3 - 4x^2 + 3x + 6 \\
\underline{\mp\, 2x^3 \quad \pm 3x} \\
-4x^2 + 6 \\
\underline{\mp\, 4x^2 \pm 6} \\
0
\end{array}
$$

$$
\begin{aligned}
g(x) &= x^2 - x - 2 \\
&= x^2 - 2x + x - 2 \\
&= x(x-2) + 1(x-2) \\
&= (x+1)(x-2)
\end{aligned}
$$

$\therefore$ other two zeros are

$x + 1 = 0$ or $x = -1$

and $x - 2 = 0$ or $x = 2$

$\therefore$ other two zeros are -1 and 2

Ans12. $f(x) = 2x^4 + x^3 - 14x^2 - 19x - 6$, two zeros are -2 *and* -1

$\therefore$ $(x+2)$ and $(x+1)$ are the factors of $f(x)$.

$\therefore$ $(x+2)(x+1) = x^2 + 3x + 2$

$$
\begin{array}{r}
2x^2 - 5x - 3 \\
x^2 + 3x + 2 \overline{)\,2x^4 + x^3 - 14x^2 - 19x - 6} \\
\underline{\mp 2x^4 \pm 6x^3 \pm 4x^2} \\
-5x^3 - 18x^2 - 19x - 6 \\
\underline{\pm 5x^3 \pm 15x^2 \pm 10x} \\
-3x^2 - 9x - 6 \\
\underline{\pm 3x^2 \pm 9x \pm 6} \\
0
\end{array}
$$

Now $2x^2 - 5x - 3$

$= 2x^2 - 6x + x - 3$

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

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

$\therefore$ *zeros* are

$x - 3 = 0$

$\Rightarrow x = 3$

and $2x + 1 = 0$

$\Rightarrow x = -\frac{1}{2}$

other two zeros are 3 and $-\frac{1}{2}$