

Pre Placement Training and Aptitude

Find $n + \frac{1}{n} = 3$

i) Find $n^5 + \frac{1}{n^5}$

ii) $n^7 + \frac{1}{n^7}$

Ai) $n^5 + \frac{1}{n^5} = \left(n^3 + \frac{1}{n^3}\right) \left(n^2 + \frac{1}{n^2}\right) - \left(n + \frac{1}{n}\right)$

$$= (k^3 - 3k) (k^2 - 2) - k$$

$$= (27 - 9) (9 - 2) - 3 = 123 \text{ (Ans)}$$

$$n^5 + n + \frac{1}{n} + \frac{1}{n^5} - n - \frac{1}{n}$$
$$n^5 + \frac{1}{n^5} \cdot$$

Aii) $n^7 + \frac{1}{n^7} = \left(n^4 + \frac{1}{n^4}\right) \left(n^3 + \frac{1}{n^3}\right) - \left(n + \frac{1}{n}\right)$

$$47 \times (27 - 9) - 3$$

$$= 879 \text{ (Ans)}$$

$$\left[\begin{array}{l} n + \frac{1}{n} = 3 \\ n^2 + \frac{1}{n^2} = 9 - 2 = 7 \\ n^4 + \frac{1}{n^4} = 7^2 - 2 = 47 \\ n^8 + \frac{1}{n^8} = 47^2 - 2 \end{array} \right.$$

$$\Rightarrow n^7 + n + \frac{1}{n} + \frac{1}{n^7} - n - \frac{1}{n}$$

Q1)

Q1) If $n^2 + 3n + 3 = 0$

$$(n+2)^2 + \frac{1}{(n+2)^2} = ?$$

A) $y^2 + \frac{1}{y^2} = 1 - 2$
 $= -1$

$$y = n+2$$

$$n = y-2$$

$$\begin{aligned} (y-2)^2 + 3(y-2) + 3 &= 0 \\ y^2 - 4y + 4 + 3y - 6 + 3 &= 0 \\ y^2 - y + 1 &= 0 \\ \text{Divide by } y \text{ both sides} \\ y - 1 + \frac{1}{y} &= 0 \\ \text{So } y + \frac{1}{y} &= 1 \end{aligned}$$

Q2) $n^2 + n = 5$

Find $(n+3)^3 + \frac{1}{(n+3)^3} = ?$

Q3) If $n^3 + 2n - 7 = 0$

find $(n+4)^3 + \frac{1}{(n+4)^3} = 0$

$$y^3 + \frac{1}{y^3} - 15 = 125$$

$$y^3 + \frac{1}{y^3} = 140$$

$$y^3 + \frac{1}{y^3}$$

$$y = n+3$$

$$(y-3)^2 + (y-3) = 5$$

$$\Rightarrow y^2 - 6y + 9 + y - 3 = 5$$

$$y^2 - 5y + 6 = 5$$

$$y^2 - 5y + 1 = 0$$

$$y - 5 + \frac{1}{y} = 0$$

$$y + \frac{1}{y} = 5$$

$$y^3 + \frac{1}{y^3}$$

$$-3\left(y + \frac{1}{y}\right) = 25$$

$$y^3 + \frac{1}{y^3} - 15 = 125$$

$$y^3 + \frac{1}{y^3} = 140$$

~~Q3)~~ • If $n + \frac{1}{n} = 2$

then $n = 1$ always

• If $n - \frac{1}{n} = 2$ then n is always

-1

Q4) $n + \frac{1}{n} = 2 \Rightarrow n^5 + \frac{1}{n^5} = ?$

Q5) $n + \frac{1}{n} = -2$ then $n^{32} + \frac{1}{n^{32}} = ?$

Q6) $n^2 + 1 = 2n$ then $n^5 - \frac{1}{n^5} = ?$

Q7) $n^{31} + \frac{1}{n^{79}} = 2$ then $n^{79} - \frac{1}{n^{31}} = ?$

Q8) $\frac{a}{b} + \frac{b}{a} = 2$ then $a-b = ?$

Q9) $n^3 + \frac{1}{n^3} = 2$ then $(a^2+1)/a = ?$

$n + \frac{1}{n-3} = 5 \Rightarrow (n-3)^3 + \frac{1}{(n-3)^3} = ?$

A4) $n + \frac{1}{n} = 2 \Rightarrow n^5 + \frac{1}{n^5} = (k^3 - 3k)(k^2 - 2) - k$
 $= (8 - 6)(4 - 2) - 2$
 $= 4 - 2 = 2$

A5) $n^2 + \frac{1}{n^2} = 2$ $n^8 + \frac{1}{n^8} = 2$

$n^4 + \frac{1}{n^4} = 2$

$n^{16} + \frac{1}{n^{16}} = 2$

$n^{32} + \frac{1}{n^{32}} = 2$

A6) $n^2 + 1 = 2n$

$n + \frac{1}{n} = 2$

of
(A6)

~~$n^2 - 2n + 1 = 0$~~
 ~~$n = 1; n^5 + \frac{1}{n^5} = 0$~~

A7) $n^{31} + \frac{1}{n^{79}} = 2$

then $n^{79} - \frac{1}{n^{31}} = ?$

$\Rightarrow n^{31} = 2 - \frac{1}{n^{79}}$

A8) $\frac{a}{b} + \frac{b}{a} = 2$

$\Rightarrow a^2 + b^2 = 2ab$

$a^2 - 2ab + b^2 = 0$

$(a-b)^2 = 0 \Rightarrow a-b = 0$

Q10) If $1 + \frac{n}{1+n} = 1$ then

i) $n^{70} + n^{73} + n^{19} + n^{22} + n^{50} + n^{53} = ?$

Q11) If ~~$\left(\frac{n}{1+n}\right)^2 = 1$~~ $\left(\frac{n}{1+n}\right)^2 = 1$ $\left(n + \frac{1}{n}\right)^2 = 1$
 $n + \frac{1}{n} = n^3$ $n^3 + 1 = 0$

then i) $n^{135} + n^{133} + n^{156} + n^{153} + n^{33} + n^{30} = ?$

~~Q12)~~

$\frac{n}{1+n} = 1$ then $n^3 = -1 \rightarrow n^3 + 1 = 0$

Note \rightarrow $\frac{n}{1+n} = -1$ then $n^3 = 1 \rightarrow n^3 - 1 = 0$

~~Q12)~~ $n^2 + y^2 = 0$ then $n^2 = 0$ & $y = 0$

$n^2 + y^2 + z^2 = 0$ then $n = 0, y = 0$
 & $z = 0$

Q12) If $(a-1)^2 + (b+2)^2 + (c-1)^2 = 0$,

then find the value of $-3b + 2a + 7c = ?$

Q13) If $n^2 + y^2 + \dots = 0$

Find the value of $n^{31} + y^{31} = ?$

If $n^2 + y^2 - 4y - 4n + 8 = 0$ then
 find $n - yz = ?$

~~Q14) If $n^2 + y^2 - 4y - 4n + 8 = 0$ then~~

$$Q14) \text{ If } (x+y-z)^2 + (y+z-x)^2 + (z+x-y)^2 = 0 \text{ then find } x+y+z$$

$$A10) \frac{x}{1+x} = 1$$

$$\Rightarrow x^3 = -1$$

$$x^3 + 1 = 0$$

$$x^{183} + x^{180} + \dots = ?$$

$$x^{180} (x^3 + 1) + x^{253} (x^3 + 1) + \dots$$

$$\Rightarrow 0 + 0 + 0 + \dots = 0$$

$$Q14) (a-1)^2 = 0 \mid (b+2)^2 = 0 \mid (c-1)^2 = 0$$

$$\Rightarrow a=1 \mid b=-2 \mid c=1$$

$$\therefore 2a - 3b + 7c = 2 + 6 + 7 = 15$$

$$A14) x+y+z$$

$$x+y-z=0 \mid y+z-x=0 \mid$$

$$z+x-y=0$$

$$1+2 \quad 2y=0 \quad 2+3 \quad 2z=0$$

$$y=0$$

$$\Rightarrow z=0$$

$$1 + 3 = 2n = 0$$

$$\Rightarrow n = 0$$

$$\therefore n + y + z = 0 \text{ (Ans)}$$