Question 10: If

$$p\lambda^4+q\lambda^3+r\lambda^2+s\lambda+t=\begin{vmatrix}\lambda^2+3\lambda & \lambda-1 & \lambda+3\\ \lambda+1 & 2-\lambda & \lambda-4\\ \lambda-3 & \lambda+4 & 3\lambda\end{vmatrix},$$

then the value of t is _____.

Solution:

Since it is an identity in

$$\begin{vmatrix}a(1+w) & bw^2 & aw\\ b(w+w^2) & c & bw^2\\ c(w^2+1) & aw & c\end{vmatrix}$$

is satisfied by every value of λ.

Now put BC =

$$[-b \ -a]$$
$$\begin{pmatrix}a\\ -a\end{pmatrix}$$

= [a^2 -ab] in the given equation, we have

$$\begin{vmatrix}0 & -1 & 3\\ 1 & 2 & -4\\ -3 & 4 & 0\end{vmatrix}$$

= -12 + 30

= 18