9.3 USE OF PARTIAL FRACTION

To decompose a fraction into partial fraction, the degree of numerator must be less than the degree of denominator.

Working Rule to find Partial Fractions:

(i) First of all we have to factorise the denominator if it is not so.

(ii) $\dfrac{p(x)}{(x-a)(x-b)(x-c)} = \dfrac{A}{x-a} + \dfrac{B}{x-b} + \dfrac{C}{x-c}$

(iii) $\dfrac{p(x)}{(x-a)^2(x-b)} = \dfrac{A}{x-a} + \dfrac{B}{(x-a)^2} + \dfrac{C}{x-b}$

Here the power of factor $(x-a)$ is 2, therefore it is written twice as above.

(iv) $\dfrac{p(x)}{(x-a)^3(x-b)} = \dfrac{A}{x-a} + \dfrac{B}{(x-a)^2} + \dfrac{C}{(x-a)^3} + \dfrac{D}{x-b}$

Here the power of factor $(x-a)$ is 3, therefore it is written thrice as above.

(v) $\dfrac{p(x)}{(x-a)(x-b)(px^2+qx+r)} = \dfrac{A}{x-a} + \dfrac{B}{x-b} + \dfrac{Cx+D}{px^2+qx+r}$

(vi) If the degree of x in numerator is greater than that of x in denominator, then we divide the numerator by the denominator so that the degree of numerator becomes less than the degree of the denominator.

For Example: $\dfrac{x^3+2x^2+3x+4}{x^2-3x+2} = (x+5) + \dfrac{16x-6}{x^2-3x+2}$