PT- 1M - Solution $\boxed{30^{th} \text{ Apr.' } 18}$

9th - CBSE

1) ~~A~~ zero

2) If $p(x)$ be any polynomial of degree greater than or equal to one and let a be any real number.
If, $p(x)$ is divided by linear polynomial $x-a$, then the remainder is $p(a)$.

3) $2x+5 = 0$

$2x = -5$

$\boxed{x = -5/2}$ is a zero of $p(x)$.

5) $\rightarrow$ 3.105987694......

$\rightarrow$ 3.102003000.....

$\rightarrow$ 4.98764592......

4) $\frac{3}{5} = \frac{21}{35}, \frac{22}{35}, \frac{23}{35}, \frac{24}{35}, \frac{25}{35}, \frac{26}{35}, \quad \frac{4}{5} = \frac{28}{35}$

6) $\frac{1}{3+\sqrt{2}} \times \frac{3-\sqrt{2}}{3-\sqrt{2}} = \frac{3-\sqrt{2}}{9-2} = \frac{1}{7}(3-\sqrt{2})$.

Section : B

7) $x = 0.12\overline{3}$

$= 0.123333....$

$100x = 12.333....$

$1000x = 123.333....$

$1000x - 100x = 123.333.... - 12.333....$

$900x = 111$

$x = \frac{111}{900} = \frac{37}{300}$ $\therefore$ $\boxed{0.12\overline{3} = \frac{37}{300}}$

8) $p(x) = x^3 - 3x^2 + 4x - 12$

$p(3) = (3)^3 - 3(3)^2 + 4(3) - 12$

$= 27 - 27 + 12 - 12$

$= 0$

$\therefore$ By using factor thm. we have,
$x-3$ is a factor of $p(x)$ as $P(3) = 0$.

Section: C

9) L.H.S.
$= \frac{1}{3-\sqrt{8}} \times \frac{3+\sqrt{8}}{3+\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} \times \frac{\sqrt{8}+\sqrt{7}}{\sqrt{8}+\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} \times \frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}+\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} \times \frac{\sqrt{6}+\sqrt{5}}{\sqrt{6}+\sqrt{5}}$
$+ \frac{1}{\sqrt{5}-2} \times \frac{\sqrt{5}+2}{\sqrt{5}+2}$

$= \frac{3+\sqrt{8}}{9-8} - \frac{\sqrt{8}+\sqrt{7}}{8-7} + \frac{\sqrt{7}+\sqrt{6}}{7-6} - \frac{\sqrt{6}+\sqrt{5}}{6-5} + \frac{\sqrt{5}+2}{5-4}$

$= 3+\sqrt{8} - \sqrt{8} - \sqrt{7} + \sqrt{7} + \sqrt{6} - \sqrt{6} - \sqrt{5} + \sqrt{5} + 2$

$= 5$

$=$ R.H.S.

10) As $x = 2$ is a root of $f(x)$.

$\to \therefore f(2) = 0$

$2(2)^3 - 5(2)^2 + a(2) + b = 0$

$\therefore 16 - 20 + 2a + b = 0$

$\therefore 2a + b = 4$ —(i)

$\to$ Also $f(0) = 0$ as $x = 0$ is a root of $f(x)$.

$f(0) = 2(0)^3 - 5(0)^2 + 2(0) + b$

$0 = 0 - 0 + 0 + b$

$\therefore \boxed{b = 0}$ —(ii)

$\therefore$ By using (i) & (ii) $\boxed{a = 2}$

11) $x = \frac{4}{3}$ is root of $f(x)$.

$\therefore f(\frac{4}{3}) = 0$

$f(4/3) = 6(\frac{4}{3})^3 - 11(\frac{4}{3})^2 + k(\frac{4}{3}) - 20$

$0 = \cancel{6} \times \frac{64}{27} - 11(\frac{16}{9}) + \frac{4k}{3} - 20$

$0 = \frac{128}{9} - \frac{176}{9} + \frac{4k}{3} - 20$

$\frac{4k}{3} = \frac{48}{9} + 20$

$\frac{4k}{3} = \frac{48 + 180}{9}$

$\frac{4k}{3} = \frac{228}{9}$

$k = \frac{\overset{\cancel{57}\ 19}{\cancel{228}} \times \cancel{3}}{\cancel{3}9 \times \cancel{4}}$

$\boxed{k = \cancel{8}19}$

12) If, $f(x)$ is divided by $g(x) = 3x - 1$
$= 3(x - 1/3)$

then, by using the remainder theorem, remainder will be: $f(1/3)$.

$f(1/3) = (1/3)^3 - 6(1/3)^2 + 2(1/3) - 4$

$= \frac{1}{27} - \frac{2}{3} + \frac{2}{3} - 4$

$= \frac{1}{27} - 4$

$\boxed{f(1/3) = -\frac{107}{27}}$