Time : 45 minutes

Maximum

1. Simplify: $(3+\sqrt{3})(3-\sqrt{3})$.

2. What is the $\dfrac{p}{q}$ form of the number $0.\bar{3}$?

3. Find the rationalising factor for the denominator of the expression $\dfrac{1}{\sqrt{5}-2}$.

4. Find the value of $\dfrac{2^0+7^0}{5^0}$.

5. Simplify $\left(\dfrac{64}{125}\right)^{-2/3}$.

6. If $x = 3 + 2\sqrt{2}$ then find whether $x + \dfrac{1}{x}$ is rational or irrational.

7. Prove that $\dfrac{1}{2+\sqrt{3}} + \dfrac{2}{\sqrt{5}-\sqrt{3}} + \dfrac{1}{2-\sqrt{5}} = 0$.

8. If $x = 5 - 2\sqrt{6}$ then find the value of $x^2 + \dfrac{1}{x^2}$.

9. Simplify: $3\sqrt{45} - \sqrt{125} + \sqrt{200} - \sqrt{50}$.

10. Find the values of a and b if $\dfrac{7+3\sqrt{5}}{3+\sqrt{5}} - \dfrac{7-3\sqrt{5}}{3-\sqrt{5}} = a + \sqrt{5}b$.

11. If $x = (2+\sqrt{5})^{1/2} + (2-\sqrt{5})^{1/2}$ and $y = (2+\sqrt{5})^{1/2} - (2-\sqrt{5})^{1/2}$ then evaluate $x^2 + y^2$.