SURDS

$\sqrt[n]{a}$ is calleda surd or radical.

1. (i) What is 'a' called?
   (ii) What is 'n' called?
   (iii) What condition must 'a' satisfy?
   (iv) What condition must 'n' satisfy?

2. (i) Give an example of a pure surd.
   (ii) Give an example of a mixed surd.

3. Express in simplest form:
   (i) $\sqrt[6]{1458}$
   (ii) $2\sqrt[3]{270}$
   (iii) $\sqrt[4]{\frac{16}{27}}$

4. Express as a pure surd:
   (i) $2\sqrt[3]{5}$ (ii) $\frac{3}{4}\sqrt{32}$ (iii) $a\sqrt{a+b}$ (iv) $a\sqrt[3]{b^2}$

5. Convert $\sqrt[4]{3}$ and $\sqrt[6]{2}$ into surds of the same but smsllest order.

6. Arrange the following surds in increasing order:
   $\sqrt[3]{2}$, $\sqrt[6]{3}$, $\sqrt[9]{4}$

7. Find the rationalising factor of:
   $\sqrt[3]{32}$, $\sqrt[5]{a^2b^3c^4}$

8. Simplify the following by rationalizing the denominator:
   (i) $\frac{6}{\sqrt{3}}$ (ii) $\frac{\sqrt[3]{3}}{2\sqrt[3]{5}}$

9. If $\sqrt{5} = 2.236$ and $\sqrt{10} = 3.162$, find $\frac{\sqrt{10}-\sqrt{5}}{\sqrt{2}}$.

10. Express $\frac{1}{5+\sqrt{6}}$ with a rational denominator.

11. Let $\frac{\sqrt[2]{6}-\sqrt{5}}{\sqrt[3]{5}-2\sqrt{6}}=a+\sqrt{30}b$, find a and b.

12. Simplify: $\frac{7\sqrt{3}}{(\sqrt{10}+\sqrt{3}} - \frac{2\sqrt{5}}{(\sqrt{6}+\sqrt{5}} - \frac{3\sqrt{2}}{(\sqrt{15}+3\sqrt{2}}$

13. Express each of the following with a rational denominator:
    (i) $\frac{1}{1-\sqrt{2}+\sqrt{3}}$
    (ii) $\frac{\sqrt{2}}{\sqrt{2}+\sqrt{3}-\sqrt{5}}$

14. If $x = \frac{\sqrt{3}+1}{\sqrt{3}-1}$ and $y = \frac{\sqrt{3}-1}{\sqrt{3}+1}$, find the value of
    (i) $x^2 + y^2$ (ii) $x^3 + y^3$