4B

(i)(ii) $343 = \sqrt[3]{343} = 7 \times 7 \times 7 = 7$

7	343
7	49
7	7
	1

(iii) $729 = \sqrt[3]{729} = (3 \times 3 \times 3) \times (3 \times 3 \times 3) = 3 \times 3 = 9$

3	729
3	243
3	81
3	27
3	9
3	3
	1

(iv) $1728 = \sqrt[3]{1728} = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (3 \times 3 \times 3)$

$= 2 \times 2 \times 3 = 12$

2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

(vi) $4096 = \sqrt[3]{4096} = (2\times2\times2) \times (2\times2\times2) \times (2\times2\times2) \times (2\times2\times2)$

$= 2\times2\times2\times2 = 16$

2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

(vii) $8000 = \sqrt[3]{8000} = (4\times4\times4) \times (5\times5\times5) = 4\times5 = 20$

4	8000
4	2000
4	500
5	125
5	25
5	5
	1

(viii) $3375 = \sqrt[3]{3375} = (5\times5\times5)\times(3\times3\times3)$

$= 5\times3 = 15$

5	3375
5	675
5	135
3	27
3	9
3	3
	1

(2) Find the cube-roots of:

Sol: (i) $\frac{27}{64} = \sqrt[3]{\frac{27}{64}} = \frac{\sqrt{3\times3\times3}}{\sqrt{4\times4\times4}} = \frac{3}{4}$

(ii) $\frac{125}{216} = \sqrt[3]{\frac{125}{216}} = \frac{\sqrt{5\times5\times5}}{\sqrt{6\times6\times6}} = \frac{5}{6}$

(iii) $\frac{343}{512} = \sqrt[3]{\frac{343}{512}} = \frac{\sqrt{7\times7\times7}}{\sqrt{8\times8\times8}} = \frac{7}{8}$

(iv) $64\times729 = \sqrt[3]{64\times729}$

$= \sqrt{4\times4\times4\times9\times9\times9} = 4\times9 = 36$

(v) $64\times27 = \sqrt[3]{64\times27} = \sqrt{4\times4\times4\times3\times3\times3} = 4\times3 = 12$

(vi) $729 \times 8000 = \sqrt[3]{729 \times 8000}$

$= \sqrt{9 \times 9 \times 9 \times 20 \times 20 \times 20} = 9 \times 20 = 180$

(vii) $3375 \times 512 = \sqrt[3]{3375 \times 512}$

$= \sqrt{15 \times 15 \times 15 \times 8 \times 8 \times 8} = 15 \times 8 = 120$

(3) Find the cube-roots of:

(i) $-216 = \sqrt[3]{-216} = \sqrt{-6 \times -6 \times -6} = -6$

(ii) $-512 = \sqrt[3]{-512} = \sqrt{-8 \times -8 \times -8} = -8$

(iii) $-1331 = \sqrt[3]{-1331} = \sqrt{-11 \times -11 \times -11} = -11$

(iv) $-\frac{27}{125} = -\frac{\sqrt{27}}{\sqrt{125}} = -\sqrt{\frac{3 \times 3 \times 3}{5 \times 5 \times 5}} = -\frac{3}{5}$

(v) $\frac{-64}{343} = \frac{\sqrt[3]{-64}}{\sqrt[3]{343}} = \frac{\sqrt[3]{-4 \times -4 \times -4}}{\sqrt[3]{7 \times 7 \times 7}} = \frac{-4}{7}$

(vi) $-\frac{512}{343} = -\sqrt[3]{\frac{512}{343}} = -\sqrt[3]{\frac{8 \times 8 \times 8}{7 \times 7 \times 7}} = \frac{-8}{7}$

(vii) $-2197 = \sqrt[3]{-2197}$

13	2197
13	169
13	13
	1

$= \sqrt[3]{-13 \times -13 \times -13} = -13$

(viii) $-5832 = \sqrt[3]{-5832}$

2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

$= \sqrt{-2 \times -2 \times -2 \times -3 \times -3 \times -3 \times -3 \times -3 \times -3}$

$= -2 \times -3 \times -3 = -18$

(ix) $-2744000 = \sqrt[3]{-2744000}$

2	2744000
2	1372000
2	686000
7	343000
7	49000
7	7000
10	1000
10	100
10	10
	1

$= \sqrt{-2 \times -2 \times -2 \times -7 \times -7 \times -7 \times -10 \times -10 \times -10}$

$= -2 \times -7 \times -10 = -140$

④ Find the cube-roots of:

(i) $2.744 = \sqrt[3]{\frac{2744}{1000}}$

2	2744
2	1372
2	686
7	343
7	49
7	7
	1

$= \sqrt[3]{\frac{2\times2\times2\times7\times7\times7}{10\times10\times10}}$

$= \frac{2\times7}{10} = \frac{14}{10} = 1.4$

(ii) $9.261 = \sqrt[3]{\frac{9261}{1000}} = \sqrt[3]{\frac{3\times3\times3\times7\times7\times7}{10\times10\times10}}$

3	9261
3	3087
3	1029
7	343
7	49
7	7
	1

$= \frac{3\times7}{10} = \frac{21}{10} = 2.1$

(iii) $0.000027 = \sqrt[3]{\frac{27}{1000000}}$

$= \sqrt[3]{\frac{3\times3\times3}{100\times100\times100}} = \frac{3}{100} = 0.03$

(iv) $-0.\bar{5}12 = \sqrt[3]{\frac{-\bar{5}12}{1000}} = \sqrt[3]{\frac{-8 \times -8 \times -8}{10 \times 10 \times 10}}$

$= \frac{-8}{10} = -0.8$

(v) $-10.6\bar{2}5 = \sqrt[3]{\frac{-10\bar{6}2\bar{5}}{1000}}$

$\bar{5}$	$10\bar{6}2\bar{5}$
$\bar{5}$	$3\bar{1}2\bar{5}$
$\bar{5}$	$6\bar{2}5$
$\bar{5}$	$1\bar{2}5$
$\bar{5}$	$2\bar{5}$
$\bar{5}$	$\bar{5}$
	1

$\sqrt[3]{\frac{-(\bar{5} \times \bar{5} \times \bar{5}) \times (\bar{5} \times \bar{5} \times \bar{5})}{10 \times 10 \times 10}}$

$= \frac{-\bar{5} \times \bar{5}}{10} = \frac{-2\bar{5}}{10} = -2.\bar{5}$

(vi) $-12\bar{5} \times 1000 = \sqrt{-12\bar{5} \times 100}$

$= \sqrt{-(\bar{5} \times \bar{5} \times \bar{5}) \times (10 \times 10 \times 10)} = -\bar{5} \times 10 = -\bar{5}0$

(5) Find the smallest number by which 26244 may be divided so that the quotient is a perfect cube.

Solution: The prime factores of 26244 are

2	26244
2	13122
3	6561
3	2187
3	729
3	243
3	81
3	27
	9

$= 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

$= (3 \times 3 \times 3) \times (3 \times 3 \times 3) \times 3^2 \times 2 \times 2$

$= \sqrt[3]{\frac{27}{1000}} = \frac{3}{10} = 0.3$

Clearly, 26244 must be divided by
$3 \times 3 \times 2 \times 2 = 36$

(6) What is the least number by which 30375 should be multiplied to get a perfect cube?

Solution:-
The prime factors of 30375 are

3	30375
3	10125
3	3375
3	1125
3	375
5	125
5	25
5	5
	1

$= 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5$

$= (3 \times 3 \times 3) \times (5 \times 5 \times 5) \times 3 \times 3$

Clearly, 30375 must be multiplied with

(7) Find the cube-roots of:

Solution:-

(i) $700 \times 2 \times 49 \times 5$

2	700
2	350
5	175
5	35
7	7
	1

$= 2 \times 2 \times 5 \times 5 \times 7 \times 7 \times 7 \times 5$

$= (2\times2\times3) \times (5\times5\times5) \times (7\times7\times7)$

$= 2\times5\times10 = 70$

(ii) -216×1728

2	216
2	108
2	54
3	27
3	9
3	3
	1

2	1728
2	864
2	432
	216

$= -(2\times2\times2\times3\times3\times3) \times (2\times2\times2\times2\times2\times2\times3\times3\times3) = -2\times3\times2\times2\times3 = -72$

(iii) -64×-125

$= -(4\times4\times4) \times -(5\times5\times5)$

$= -4 \times -5 = 20$

(iv) $\frac{-27}{343} = \frac{3\times3\times3}{7\times7\times7} = -\frac{3}{7}$

(v) $\frac{729}{-1331} = \frac{(9\times9\times9)}{-(11\times11\times11)} = \frac{9}{11}$

(vi) $250.047 = \frac{250047}{1000}$

3	250047
3	83349
3	27783
7	9261
3	3087
3	1029

7	343
7	49
7	7
	1

$\sqrt{\frac{27}{1000}} = \sqrt[3]{\frac{27}{1000}} = \frac{3}{10} = 0.3$

$= \frac{(3\times3\times3)\times(3\times3\times3)\times(7\times7\times7)}{(10\times10\times10)}$

$= \frac{3\times3\times7}{10} = \frac{63}{10} = 6.3$

(vii) - 175616

2	175616
2	27808
2	43904
2	21952
2	10976
2	5488
2	2744
2	1372
2	686
7	343
7	49
7	7
	1

$= \sqrt{} - [(2\times2\times2) \times (2\times2\times2) \times (2\times2\times2) \times (7\times7\times7)]$