Solutions

Chapter – 1
(Addition, Subtraction, Multiplication)

Exercise – 1(a)

Solutions for questions 1 to 30:

1. The sum is 23961.

2. The sum is 22707.

3. The sum is 132576.

4. The amount is 13410.

5. The answer is 93171.

6. The sum is 26558.

7. The sum is 24275.

8. The sum is 22500.

9. The sum is 8767.

10. The sum is 4323.

11. The answer is 17836.

12. The answer is 10853.

13. The answer is –2178.

14. The answer is 2172.

15. The answer is 1696.

16. The sum is 22,838.

17. The answer is 8730.

18. The answer is 15685.

19. The answer is 15836.

20. The answer is 2491.

21. Adding the last two digits of all the numbers, we have the following: (68 + 27 + 15 + 74 – 45) = 139
Also adding the remaining digits of all the numbers, we get,
(32 + 73 + 85 + 26 – 55) = 161
Carrying the one from previous case, we get,
(161 + 1) = 162
i.e., 16239

22. 6153

23. 11142

24. 17300

25. 9556

26. First add the two digits at a time (units and tens place).
21 + 86 + 38 + 56
To add 21 and 86, mentally treat 86 as 80 + 6
(80 would facilitate quick addition)
Thus 21 + 86 = (21 + 80) + 6 =107
Now (107 + 38) = (107 + 30 + 8) = 145
145 + 56 = (145 + 50) + 6 = 201
The last two digits (tens place and units place) of the addition are 01. While the digit 2 is to be carried forward. In the same way 2 + 34 + 75 + 15 + 93 = 219
The digits 19 occupy, the thousands place and the hundred's place of the addition, while 2 is carried forward.
2 + 5 + 6 + 8 + 6 = 27
The required sum is 271901.

27. Using the above method, the sum is 242058.

28. Using the above method, the sum is 216623.

29. The sum is 287040.

30. The sum is 197186.

Solutions for questions 31 to 45:

31. $328 \times 422 = 328\ (322 + 100)$
$= (328 \times 322) + (328 \times 100)$
In the product 328×322, both the factors are near to 320 and the sum of the units digits (8 + 2) is 10
Therefore the product will be in the form of $\frac{32 \times 33}{1056} \cdot \frac{8 \times 2}{16}$
The product is 105616
$\therefore (328 \times 322) + (328 \times 100) = 105616 + 32800 = 138416$

32. $764 \times 166 = (600 + 164) \times 166$
$= 600 \times 166 + 164 \times 166$
Using the above method
$164 \times 166 = 16 \times 17.4 \times 6 = 27224$
$600 \times 166 = 99600$
27224 + 99600 = 126824

33. 1012×98
$= (1000 + 12)\ (100 - 2)$
$= 100000 + 1200 - 2000 - 24 = 99176$

34. 564×636
$= (600 - 36)\ (600 + 36) = (600)^2 - (36)^2$
$= 360000 - 1296 = 358704$

35. $593 \times 607 = (600 - 7)\ (600 + 7)$
$= (600)^2 - (7)^2 = 360000 - 49$
$= 359951$

36. $(500 - 8)\ (500 + 8)$
$= (500)^2 - 8^2 + 500 - 8$
$= 250000 - 64 + 500 - 8 = 250428$

37. By three digit number multiplication with another three digit number multiplication, the answer is 192987.

38. $253 \times 247 = (250 + 3)\ (250 - 3)$
$= (250)^2 - (3)^2 = 62500 - 9 = 62491$

39. $1372 \times 125 = 1372 \times \frac{1000}{8}$

$= \frac{1372}{8} \times 1000 = 171.5 \times 1000 = 171500$

40. $356\ (250 - 2) = 356 \times 250 - 356 \times 2$

$= 356 \times \frac{1000}{4} - 712$

$= 89000 - 712 = 88288$

41. $(1000 - 1)\ (375)$
$= 375{,}000 - 375 = 374{,}625$

42. 2113 = 2110 + 3 and 2117 = 2110 + 7
The base for 2113 and 2117 is 2110.
And he sum of the units digits is 3 + 7 = 10
For such numbers, the ten's digit and units digit will be $3 \times 7 = 21$

The other five digits starting from the ten lakh's place to the hundred's place will be $211 \times 212 = 44{,}732$
(211 is common to both the numbers. Therefore the product of 211 and its successive positive integers should be considered)
$\therefore$ The product of 2113 and 2117 will be 4473221.

43. 1564 (500 + 25)

$$= 1564 \times 5000 + 1564 \times \frac{100}{4}$$

$$= 1564 \times \frac{1000}{2} + 1564 \times \frac{100}{4}$$

782000 + 39100 = 821100

44. (1800 + 31) (1800 – 31)
$= (1800)^2 - (31)^2$
= 3240000 – 961 = 3239039

45. $5324 \times 136 = 5324 \times (135 + 1)$

$$= 5324\left(100 + \frac{70}{2} + 1\right)$$

= 532400 + 186340 + 5324 = 724064

Exercise – 1(b)

Solutions for questions 1 to 30:

1. 642 + 513 + 675 + 963
= 600 + 42 + 500 + 13 + 600 + 75 + 900 + 63
= 600 + 500 + 600 + 900 + 42 + 13 + 75 + 63
= 2600 + 193 = 2793

2. 1325 + 2438 + 3612 + 4753 + 6540
= 1300 + 25 + 2400 + 38 + 3600 + 12 + 4700 + 53 + 6500 + 40
= (1300 + 2400 + 3600 + 4700 + 6500) + (25 + 38 + 12 + 53 + 40) = (18500) + (168) = 18668

3. 493 – 72 + 344 – 466 + 289 – 183 + 81
= (493 – 72) + (344 – 466) + 289 – 183) + 81
= 421 – 122 + 106 + 81 = 299 + 187 = 486

4. 7632 – 214 + 2463 + 3143 – 563
= 700 + 632 – 214 + 2000 + 463 + 3000 + 143 – 563
= 7000 + 418 + 2000 + 463 + 3000 – 420
= 7000 + 2000 + 3000 + (418 + 463 – 420)
= 12000 + (418 + 43) = 12461

5. 8123 + (426 – 9056) + (21 – 749)
= 8123 – 8630 – 728
= –507 – 728 = –1235

6. The sum is 23429.

7. The sum is 19296.

8. The sum is 27973.

9. The sum is 29659.

10. The answer is 391.

11. The sum is 32715.

12. (8888 – 7777) + (6688 – 6666) + 5937 + 5163
(1111) + 22 + 11100 = 12233

13. The sum is 24465.

14. The answer is (–146).

15. Considering the ten's digits and the units digits of the number,
38 + 62 + 54 + 46 + 80
100 + 100 + 80 = 280
2 is carried to the hundred's place of the sum.
Now considering the digit in the hundred's place and the thousand's place
2 + 17 + 81 + 39 + 51 + 39
100 + 90 + 39 = 229
The answer is 22980

16. The answer is 3687.

17. The answer is 1247.

18. The answer is 514.

19. The answer is 7018.

20. The answer is 6387.

21. Adding the last two digits of all the numbers, we have
(93 + 67) + (07 + 53) + (85 +48)
= 160 + 60 + 133 = 353
Then adding the hundred's digits also, we have
(7 + 4 + 3 + 2 + 8 + 8) + 3 = 35
$\therefore$ The required sum is 3553.

22. Repeating the steps given in the above solution, we have,
56 + 96 + 36 +79 + 89 + 95 = 451
Then required sum = (3 + 4 + 8 +7 + 5 + 2) + 4 = 33
i.e. 3351

23. 1550

24. 1516

25. 946

26. The sum is 169245.

27. The sum is 27227.

28. The answer is 755.

29. The answer is 3634.

30. The answer is 24166.

Solutions for questions 31 to 45:

31. 837×500

$$= (837) \times \left(\frac{1000}{2}\right) = 418500$$

$\therefore (837) \times (50) = 41850$
$(857) \times (5) = 4185$
$837 \times 555 = 464535$

32. 239 (250 + 1)

$$= 239 \times \frac{100}{4} + 239 \text{x} 1$$

= 59750 + 239 = 59989

33. 168×192
$= (180 - 12)(180 + 12) = (180)^2 - (12)^2$
= 32400 – 144 = 32256

34. 208 is 8 more than 200 and 207 is 7 more than 200. It can be written as follows:
208 + 8
207 + 7
In the ten's and units place we get $7 \times 8 = 56$, by cross addition
208 + 7 = 215 or
207 + 8 = 215
In ten thousands, thousands and hundreds place we get 2 (215) = 430
The product is 43056.

35. By the method of finding the product of two three-digit numbers, the answer is 216755.

36. $583 \times 621 = 583 \times (617 + 4)$
$= (583 \times 617) + (583 \times 4)$
$= (600 - 17)(600 + 17) + 583 \times 4$
$= (600)^2 - 17^2 + 2332 = 362043$

37. $239 \times 357 = (298 - 59)(298 + 59)$
$= (298)^2 - (59)^2$
$= (300 - 2)^2 - (60 - 1)^2$
$= 88804 - 3481 = 85323$

38. $(500 - (1))(351)$
$(500 \times 351) - (11 \times 351) = 175500 - 3861 = 171639$

39. By the method of finding the product of two three-digit numbers, the product is 130463

40. $560 \times 625 = 560 \times \frac{10000}{16} = 35 \times 10000 = 350{,}000$

41. $6832 \times 375 = 6832 \times 3 \times 125$
$= 6832 \times 3 \times \frac{1000}{8} = \frac{6832}{8} \times 3 \times 1000 = 2562000$

42. $7869 \times 982 = 7869 \times (1000 - (20 - 2))$
$= 7869000 - 141642 = 7727358$

43. $892 \times 404 = 892 \times (400 + 4)$
$= 356800 + 3568 = 360368$

44. 175×825
$= (500 - 325) \times (500 + 325) = 500^2 - 325^2$
$= 250000 - \left(\frac{650}{2}\right)^2$
$= 250000 - \frac{422500}{4}$
$= 250000 - 105625 = 144375$

45. $377 \times 38{\cdot}3 = 3774\ (300 + 80 + 3)$
$= 1132200 + 301920 + 11322 = 1445442$

Chapter – 2
(Squares and Cubes)

Exercise – 2(a)

Solutions for questions 1 to 25:

1. $(503)^2 = (500 + 3)^2$
$250000 + 3000 + 9 = 253009$

2. $(132)^2 = (100 + 32)^2$
$= 10{,}000 + 6400 + 1024 = 17424$

3. $(484 + 316)(484 - 316)$
$= 800 \times 168 = 134400$

4. $(400 - 2)^2 = (400)^2 - 2 \times 400 \times 1 + (2)^2$
$= 160000 - 1600 + 4 = 158404$

5. $(1000 - 18)^2$
$= (1000)^2 + 2(1000)(8) + 8^2$
$= 10{,}00{,}000 + 16{,}000 + 64 = 1016064$

6. $(10.12)^2$
$= (10)^2 + (0.12)^2 + 2(10)(0.12)$
$= 100 + 0.0144 + 2.4 = 102.4144$

7. $(400 - 8)^2$
$(400)^2 - 2(400)(8) + (8)^2$
$160{,}000 - 6400 + 64 = 153664$

8. $(14.85)^2 = (15 - 0.15)^2$
$= (15)^2 - 2(15)(0.15) + (0.15)^2$
$= 225 - 4.5 + 0.0225 = 220.5225$

9. $(260 + 4)^2$
$(260)^2 + 8 \times 260 + (4)^2 = 67600 + 2080 + 16 = 69696$

10. $(596)^2 = (600 - 4)^2$
$(600)^2 - 8 \times 600 + (4)^2$
$= 360000 - 4800 + 16 = 355216$

11. If a number lies between 76 and 125, the square of the number $= 100(2a \pm 2x - 100) + x^2$
When x = 100 – number
Hence x = 117 – 100 = 17
The square of 117 $= 100(200 + 2(17) - 100 + (17)^2$
$13400 + 289 = 13689$

12. $(69)^2 = (70 - 1)^2$
$4900 - 140 + 1 = 4761$

13. $(414)^2 = (410 + 4)^2 = (410)^2 + 2(410)(4) + (4)^2$
$= 168100 + 3280 + 16 = 171396$

14. $(235)^2 = \left(\frac{470}{2}\right)^2 = \frac{220900}{4} = 55225$

15. $473^2 = (470 + 3)^2 = 470^2 + (2)(470)(3) + 3^2$
$= 220900 + 2820 + 9 = 223729$

16. $126^2 = (3 \times 42)^2 = 3^2 \times 1764 = 15876.$

17. $4444^2 = (4 \times 1111)^2 = (4) \times (4) \times 1111^2$
$4 \times 4 \times 1234321 = 4 \times 4937284 = 19749136$

18. $576^2 = (64 \times 9)^2 = 64^2 \times 9^2 = 4096 \times (80 + 1)$
$= 327680 + 4096 = 331776$

19. $891^2 = (900 - 9)^2$
$= 900^2 - 2(900)(9) + 9^2 = 793881$
$819^2 = (800 + 19)^2$
$= 800^2 + 2(800)(19) + 19^2 = 60761$
$891^2 + 819^2 = 1464642$

20. $(1531)^2 = (1500 + 31)^2$
$= 1500^2 + 3000(31) + 31^2 = 2343961$

21. $(2652)^2 = 7033104.$

22. $275^2 = 75625$

23. $146^2 = (145 + 1)^2 = 145^2 + 2(145)(1) + 1^2$
$= 21025 + 290 + 1 = 21316$

24. $24^3 + 18^3$ is of the form $a^3 + b^3$ where a and b are real numbers. $a^3 + b^3$ is defined as $(a + b) \times (a^2 - ab + b^2)$.
Taking a = 24 and b = 18, $24 + 18^3$
$= (24 + 18) \times (24^2 - 24 \times 18 + 18^2)$
$= 42 \times (468) = 19656$

25. $19^3 - 18^3$ is of the form $a^3 - b^3$ where a = 19 and b = 18.
$a^3 - b^3$ is defined as $(a - b)(a^2 + b^2 + ab)$.
Hence $19^3 - 18^3 = (19 - 18)$
$(19^2 + 18^2 + 19 \times 18) = 1027$

Solutions for questions 26 to 45:

26. $\frac{(5.672)^3 + 4.278)^3}{(5.672)^2 - (5.675) \times (4.278) + (4.278)^2}$

$\frac{[(5.672)^2 - (5.672)(4.278) + (4.278)^2](5.672 + 4.278)}{(5.672)^2 - (5.675) \times (4.278) + (4.278)^2}$

$\Rightarrow 5.672 + 4.278 = 9.95.$ Choice (D)

27. $(4.95)^3 - (4.00)^3 - (0.95)^3$
$a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$
If $a + b + c = 0$ then $a^3 + b^3 + c^3 = 3abc$
Here $4.95 - 4.00 - 0.95 = 0$
So, $(4.95)^3 - (4.00)^3 - (0.95)^3$
$= 3 \times 4.95 \times 4.00 \times 0.95 = 56.43$. Choice (A)

28. $\sqrt{4762} \times 79.43 = ?$
$\Rightarrow ? \simeq \sqrt{4761} \times 79$
$? = 69 \times 79 \Rightarrow ? = 5451$. Choice (C)

29. $\sqrt[3]{8000} + 375 = x \times \frac{1}{25}$
$\Rightarrow x \times \frac{1}{25} = 395$
$\Rightarrow x = 395 \times 25 = 9875$. Choice (B)

30. $\sqrt[3]{512000} + \sqrt{379} + \sqrt{580} = ?$
$\Rightarrow ? = 80 + 19.5 + 24$
$\Rightarrow ? = 123.5 \simeq 124$. Choice (D)

31. $198025 \times 64 + 35625 = (?)^2$
$\Rightarrow (?)^2 = 12709225$
$\Rightarrow ? = 3565$. Choice (D)

32. $\frac{?}{32768} = \left(\frac{15}{32}\right)^3 = \frac{3375}{32768}$
$\therefore ? = 3375$. Choice (A)

33. $\frac{64^2 \times 441}{441} = 64^2$. Choice (C)

34. $\sqrt[3]{343500} + \sqrt[3]{216600} + \sqrt[3]{125400}$
$\simeq 70 + 60 + 50 = 180$. Choice (D)

35. $\frac{(3.7+1.3)[(3.7)^2 - (3.7)\times(1.3) + (1.3)^2]}{13.69 - 4.81 + 1.69}$
$\Rightarrow ? = \frac{5(13.69 - 4.81 + 1.69)}{13.69 - 4.81 + 1.69} = 5$. Choice (A)

36. $(34)^2 + (27)^2 - (18)^2 = ?$
$\Rightarrow ? = 1156 + 729 - 324$
$\Rightarrow ? = 1561 \simeq 1560$. Choice (B)

37. $\sqrt{484} \simeq 22$; $\sqrt{1681} = 41$; and $\sqrt{121} = 11$
$\Rightarrow ? = 22 \times 41 \div \frac{1}{11} = 82$. Choice (C)

38. $\sqrt{?} + 28 = 64$
$\Rightarrow \sqrt{?} = 64 - 28 \Rightarrow ? = (36)^2$
$\therefore ? = 1296$. Choice (D)

39. $64 + 54 = 99 + \sqrt{?}$
$\Rightarrow \sqrt{?} = 64 + 54 - 99 = 19$
$\therefore ? = (19)^2 = 361$. Choice (B)

40. $\sqrt[3]{205379} = 59$. Choice (D)

41. $6561 \div \sqrt{?} = 81 \times 9$
$\Rightarrow \sqrt{?} = \frac{6561}{81 \times 9} = 9$
$\Rightarrow ? = (9)^2 = 81$. Choice (A)

42. $(?)^3 + 343 \times 15 = 9216 + 25$
$\Rightarrow (?)^3 = 9216 + 25 - 5145$
$\Rightarrow (?)^3 = 4096 \Rightarrow ? = \sqrt[3]{4096}$
$\Rightarrow ? = 16$. Choice (B)

43. $205 \times 59 - 6889 = \sqrt{?} + 5184$
$\Rightarrow \sqrt{?} = 12095 - 6889 - 5184$
$\Rightarrow \sqrt{?} = 22 \Rightarrow ? = (22)^2$
$\therefore ? = 484$. Choice (B)

44. $\sqrt{23716} + \sqrt{4096} = ? \div 32$
$\Rightarrow ? \div 32 = 154 + 64$
$\Rightarrow ? = 218 \times 32 = 6976$. Choice (D)

45. $\sqrt[3]{46656} + \sqrt{4096} \times 52 = (?)^2 + 115$
$\Rightarrow (?)^2 + 115 = 36 + 64 \times 52$
$\Rightarrow (?)^2 = 3364 - 115 = 3249$
$\Rightarrow ? = \sqrt{3249} = 57$. Choice (C)

Exercise – 2(b)

Solutions for questions 1 to 22:

1. $308^2 = (300 + 8)^2 = 94864$

Alternate method:

308^2 can be worked out using the method shown in solution 19.

2. $(1962)^2 = (2000 - 38)^2 = 3849444$

3. $131^2 - 169^2 = (100 + 31)^2 + (200 - 31)^2$
$= 17161 + 28561 = 45722$

4. $1024^2 - 576^2$ is of the form $a^2 - b^2$ which is defined as $(a - b) \times ((a + b)$.
Hence $1024^2 - 576^2 = (1024 - 576) \times (1024 + 576)$
$= 448 \times 1600 = 448 \times (2000 - 400) = 716800$

5. $(1667)^2 = (1600 + 67)^2 = 1600^2 + 2 \times 1600 \times 67 + 67^2$
$= 22560000 + 3200 \times (60 + 7) + 4489 = 2778889$

6. $83^2 = (80 + 3)^2 = 6400 + 480 + 9 = 6889$

7. $(127)^2 = (125 + 2)^2$
$= 15625 + 4 + 500$ i.e. 16129

8. $39^2 - 27^2 = 1521 - 729 = 792$

9. $(491)^2 = (500 - 9)^2$
$= 250000 + 81 - 9000 = 241081$

10. $45^2 - 30^2 = (45 + 30)(45 - 30)$
$= 2025 - 900 = 1125$

11. $(152)^2 = (150 + 2)^2$
$= 22500 + 4 + 600 = 23104$

12. $72^2 - 48^2 = (72 + 48)(72 - 48)$
$= 120 \times 24 = 2880$

13. $75^2 - 65^2 = (75 + 65)(75 - 65)$
$= 140 \times 10 = 1400$

14. $(212)^2 = (210 + 2)^2$
$= 44100 + 840 + 4 = 44944$

15. $(153)^2 = (150 + 3)^2$
$= 22500 + 9 + 900 = 23409$

16. 169744

17. 620944

18. 423801

19. 544644

20. 16384

21. 399424

22. 57121

Solutions for questions 23 to 45:

23. $(?)^2 = 1600 + 1764 = 3364$
$? = \sqrt{3364} = 58.$ Choice (C)

24. $(32 \times 7)^2 - 126^2 = (?) \times 5^2$
$\Rightarrow (?) \times 25 = (224)^2 - (126)^2$
$\Rightarrow ? \times 25\ (224 + 126)\ (224 - 126)$
$\Rightarrow ? = \dfrac{350 \times 98}{25}$
$\therefore ? = 1372.$ Choice (A)

25. $(?)^2 \times 36 = 294 \times 294$
$\Rightarrow (?)^2 = \dfrac{294 \times 294}{36} = 49 \times 49 \Rightarrow (?)^2 = 7^2 \times 7^2 = (7 \times 7)^2$
$\therefore ? = 49.$ Choice (B)

26. $52 \times ? = 1820$
$\Rightarrow ? = \dfrac{1820}{52} = 35.$ Choice (C)

27. $2401 + (?)^2 = 6497 \Rightarrow ?^2 = 6497 - 2401 = 4096$
$\Rightarrow ? = \sqrt{4096} = 64.$ Choice (D)

28. $? = \dfrac{1225 - 225}{36 + 64}$
$? = \dfrac{1000}{100} = 10.$ Choice (A)

29. $(14)^3 \times (?)^2 \times \dfrac{1}{56} = 2401 \Rightarrow (?)^2 = \dfrac{2401 \times 56}{2744} = 49$
$\Rightarrow ? = \sqrt{49} = 7.$ Choice (C)

30. $? \simeq (39)^2 - (60)^2 + (48)^2 \Rightarrow ? \simeq 1521 - 3600 + 2304$
$\therefore ? \simeq 225.$ Choice (B)

31. $? \simeq \dfrac{\sqrt{6400} \times \sqrt{1296}}{\sqrt{8100}} \Rightarrow ? \simeq \dfrac{80 \times 36}{90} = 32.$ Choice (A)

32. $(?)^2 = 225 \times 225 \times \dfrac{1}{25} \Rightarrow (?)^2 = 2025 \Rightarrow ? = \sqrt{2025}$
$\therefore ? = 45.$ Choice (C)

33. $\dfrac{\sqrt{36 \times 10^{-2} \times 81 \times 10^{-6}}}{18 \times 10^{-4}} = ?$
$\Rightarrow ? = \dfrac{6 \times 10^{-1} \times 9 \times 10^{-3}}{18 \times 10^{-4}} = 300.$ Choice (D)

34. $\dfrac{54}{16} = \dfrac{?}{48}$
$\Rightarrow ? = \dfrac{54 \times 48}{16} = 162.$ Choice (B)

35. $\sqrt{2016 \times \dfrac{1}{63} \times \dfrac{1}{8}} = ?$
$\Rightarrow ? = \sqrt{\dfrac{2016}{504}} = \sqrt{4} = 2.$ Choice (B)

36. $314432 \times 64 - 12802084 = ?$
$\Rightarrow ? = 20123648 - 12802084$
$\Rightarrow ? = 7321564.$ Choice (C)

37. $? = \dfrac{\sqrt{725200 \div 45325}}{4}$
$\Rightarrow ? = \dfrac{\sqrt{16}}{4} = \dfrac{4}{4} = 1.$ Choice (B)

38. $2.25 \times 3.2 \times ? = 468$
$\Rightarrow ? = \dfrac{468}{2.25 \times 3.2} = 65.$ Choice (A)

39. $\dfrac{1225 - 225 + 64}{28} = ?$
$\Rightarrow ? = 38.$ Choice (D)

40. $\sqrt{729.03} - \sqrt{523.98} = ?$
$\Rightarrow ? \simeq 27 - 23 = 4.$ Choice (D)

41. $? \simeq \sqrt{121} + \sqrt[3]{729}$
$\Rightarrow ? = 11 + 9 = 20.$ Choice (D)

42. $? \simeq \sqrt[3]{1331} - \sqrt{81}$
$\Rightarrow ? = 11 - 9 = 2.$ Choice (B)

43. $\dfrac{\sqrt{9218} \times \sqrt{2210}}{\sqrt{1028}} = ? \Rightarrow \dfrac{\sqrt{9216} \times \sqrt{2209}}{\sqrt{1024}} = ?$
$\Rightarrow ? = \dfrac{96 \times 47}{32} = 141.$ Choice (C)

44. $3969 - 2025 = (?)^2 - 81$
$\Rightarrow (?)^2 = 3969 - 2025 + 81 = 2025$
$\Rightarrow ? = \sqrt{2025} = 45.$ Choice (C)

45. $(84)^3 - (84)^2 = ?$
$\Rightarrow ? = (84)^2\ [84 - 1] = 84 \times 83$
$\therefore ? = 585648.$ Choice (D)

Chapter – 3
(Fractions and Percentages)

Exercise – 3(a)

Solutions for questions 1 to 45:

By using ten percent one percent concept, we can calculate the required percentage values.

1. 63.52% of 968 is 614.87

2. 14.28% of 322 is 45.98

3. 28.28% of 420 is 118.78

4. 88.5% of 885 is 783.23

5. 63.666% of 936 is 595.91

6. 78% of 240 = 80% of 240 – 2% of 240
$= \frac{4 \times 240}{5} - 2(2.4)$
= 192 – 4.8 = 187.2

7. 42.85% of 455 $= \frac{3}{7} \times 455 = 195$

8. 60.55% of 1440 = 55.55% of 1440 + 5% of 1440
$= \frac{5}{9} \times 1440 + \frac{1}{20} \times 1440$
= 800 + 72 = 872

9. 33.75% of 368 = 37.5% of 368 – 3.75% of 368
= 138 – 13.8 = 124.2

10. 17.5% of 720 = 35% of 360
i.e., $\frac{7}{20} \times 360 = 126$

11. 18.18% of 726 $= \frac{2}{11} \times 726 = 132$

12. 6.25% of 384 $= \frac{1}{16} \times 384 = 24$

13. 38.46% of 286 $= \frac{5}{13} \times 186 = 110$

14. 63% of 1818 = 70% of 1818 – 7% of 188
= 1272.6 – 127.26 = 1145.34

15. $\frac{369}{1440} = \frac{41}{160} \times 100$
$= \frac{40 \times 100}{160} + \frac{1}{160} \times 100$
= 25% + 0.625% = 25.625%

16. 20.83% of 360
= 12.5% of 360 + 8.33% of 360
$= \frac{360}{8} + \frac{360}{12} = 75$

17. 90.9% of 1331 $= \frac{10}{11} \times 1331 = 1210$

18. 35.2% of 1560 = 32% of 1560 + 3.2% of 1560
= 499.2 + 49.92 = 549. 12

19. 67.5% of 4848 = 75% of 4848 – 7.5% of 4848
$= \frac{3}{4} \times 4848 - \frac{3}{40} \times 4848$
= 3636 – 363.6 = 3272.4.

20. $\frac{3672}{4}$ = 918 i.e. 25%
$\frac{9}{3672} = \frac{1}{408}$ i.e. 0.245%
∴ 927 is 25.245% of 3672

21. $\frac{1}{4} \times 144 = 361$
Now, 433 – 361 i.e. 72 is very close to 5% of 1440.
∴ The required answer is 29.98%

22. 65% of 8888 = 62.5% of 888 + 2.5% of 8888
i.e. $\frac{5}{8} \times 888 + \frac{1}{40} \times 8888$
= 555 + 222.2 = 5777.2

23. 57.14% of 1351 $= \frac{4}{7} \times 1351 = 772$

24. 1% of 7272 = 72.72
96 – 72.72 = 23.28
0.1% of 7272 = 7.272
3 times of 0.1% of 7272 = 21.816
∴ 1.3% of 7272 = 94.536
Now, 96 – 94.536 = 1.464
Clearly 1.464 is 0.02% of 7272
∴ The required answer is 1.32%

25. 362 is close to half of 751.
∴ By using the ten percent one percent concept, we can find that 362 is 48.20% of 751.

26. 203 is 23.27% of 872

27. 182 is 28.30% of 643

28. 341 is 50% of 682

29. 131 is 20.76% of 631

30. 17·9% of 10·87 = (18 – 0·1)%
$1087 = \frac{(2)(9)(1087)}{100} - \frac{1087}{1000} = \frac{2(9783)}{100}$
1·087 = 195·66 – 1·087 = 194·573

31. 250·25% of 548 $= \frac{1001}{4}\%$ of 548
Any three-digit number of the form xyz when multiplied by 1001 becomes a six digit number of the form xyz xyz
Hence 548 × 1001 = 548548
The result is $\frac{548548}{400} = 1371.37$

32. 12·625% of 74 $= \frac{101}{8}\%$ of 74
Any two-digit number of the form xy when multiplied with 74 becomes a four digit number of the form xyxy
Hence 74 × 101 = 7474. The result is $\frac{7474}{800} = 9.34$

33. 28·9% of 361 $= \frac{289}{1000} \times 361 = \frac{[17] \times [19]^2}{1000}$ = 104·329

34. 92·5 is $92\frac{1}{2} = \frac{185}{2}$.
It is $\frac{5}{12}$th of 222.
Hence it is $41\frac{2}{3}\%$ of 222.

35. $69\frac{3}{8}\%$ of 6568
$= \left(70 - \frac{5}{8}\right)\%$ of 6568 = 4556.55

36. 200% of 25360 = 50720
50% of 25360 = 12680
Hence 250% of 25360 is 63400.

63983·28 is 583·28 more than 63400 2% of 25360 = 507·2. 583·28 is 76·08 more than 507·02.
76·08 is 0·3% of 25360.
Hence 583·28 is ·3% of 25230. Hence 63983·28 is 252. 3% of 25360.

37. $18\frac{18}{19}\%$ of $9709 = \left(19 - \frac{1}{19}\right)\%$ of 9709.

19% of 9709 = (20 – 1)% of 9709 = 1844·71

$\frac{1}{19}\%$ of 9709 = 5·11

Hence $18\frac{18}{19}\%$ of 9709 = 1844·71 – 5·11 = 1839·6

38. 21·63% of 1296 = 21 (1·03)% of 1296

$= \frac{21(1+.03)}{100} \times 1296 = \frac{1296(1+.03)21}{100} = 280.32$

39. $\frac{37}{72} + \frac{11}{144} = \frac{74}{144} + \frac{11}{144} = \frac{85}{144} = \frac{20}{27} + \frac{8}{45}$

$= \frac{100}{135} + \frac{24}{135} = \frac{124}{135}$

$\frac{85}{144} + \frac{124}{135} = \frac{85\times15}{144\times15} + \frac{124\times16}{135\times16}$

$= \frac{1275}{2160} + \frac{1984}{2160} = \frac{3259}{2160}$

40. $\frac{29}{48} + \frac{17}{24}$

$= \frac{29}{48} + \frac{34}{48} = \frac{63}{48}$

$\frac{37}{64} + \frac{11}{16} = \frac{37}{64} + \frac{44}{64} = \frac{81}{64}$

$\frac{63}{48} + \frac{81}{64}$

$= \frac{63\times4}{48\times4} \times \frac{81\times3}{64\times3}$

$\frac{252}{192} + \frac{243}{192}$

$\frac{495}{192} = \frac{165}{64}$

41. $\frac{5}{7} = \frac{5\times10}{7\times10} = \frac{50}{70}$

$\frac{9}{10} = \frac{9\times7}{10\times7} = \frac{63}{70}$

$\frac{11}{14} = \frac{11\times5}{14\times5} = \frac{55}{70}$

$\frac{8}{35} = \frac{8\times2}{35\times2} = \frac{16}{70}$

$\frac{50}{70} + \frac{63}{70} + \frac{55}{70} + \frac{16}{70} = \frac{184}{70} = 92/35.$

42. The LCM of 16, 24 and 487 is 48.
The LCM of 48 and 80 is 240.

$\frac{9}{16} = \frac{9\times15}{16\times15} = \frac{135}{240}$

$\frac{7}{24} = \frac{7\times10}{24\times10} = \frac{70}{240}$

$\frac{13\times5}{48\times5} = \frac{65}{240}$

$\frac{17\times3}{80\times3} = \frac{51}{240}$

The sum is $\frac{321}{240} = \frac{107}{80}$

43. The LCM of 24 and 48 is 48.
By prime factorisation $36 = 2^2 \times 3^2$
And $48 = 2^4 \times 3^1$
The LCM of 36 and 48 = $2^4 \times 3^2 = 144$

$\frac{5}{24} = \frac{5\times6}{24\times6} = \frac{30}{144}$

$\frac{7}{36} = \frac{7\times4}{38\times4} = \frac{28}{144}$

$\frac{11}{48} = \frac{11\times3}{48\times3} = \frac{33}{144}$

$\therefore \frac{30}{144} + \frac{28}{144} + \frac{33}{144} = \frac{91}{144}$

44. $\frac{12}{17} - 1 + \frac{4}{15} + 1 - \frac{1}{19}$

$= \frac{4}{15} + \frac{12}{17} - \frac{1}{19} = \frac{4457}{4845}$

45. By prime factorisation
$14 = 2 \times 7$
$21 = 3 \times 7$
$35 = 5 \times 7$
Their LCM $2 \times 3 \times 5 \times 7 = 210$

$\frac{9}{14} + \frac{5}{21} + \frac{11}{35} = \frac{135 + 50 + 66}{210} = \frac{251}{210}$

Exercise – 3(b)

Solutions for questions 1 to 20:

1. 87.5% of $784 = \frac{7}{8} \times 784 = 7 \times 98 = 686$

2. 31.5% of 1960 = 35% of 1960 – 3.5% of 1960

$= \frac{7}{20} \times 1960 - \frac{7}{200} \times 1960$

= 686 – 68.6 = 617.4

3. 128.57% of 1694 = 100% of 1694 + 28.57% of 1694

$= 1694 + \frac{2}{7} \times 1694 = 1694 + 484 = 2178$

4. 10% of 490 = 49
Now, 58 – 49 = 9 is less than 2% of 490 by 0.8
And 0.8 is almost 0.16% of 490.
∴ The required answer is 10% + 2% – 0.16%
i.e. 11.84%

5. 10% of 875 = 87.5
Now, 7 times of 87.5 is 612.5
∴ 624 – 612.5 = 11.5 is 1.3% of 875
∴ The required answer is 71.3%

6. 71.42% of $434 = \frac{5}{7} \times 434 = 310$

7. 54.16% of 1824 = 41.66% of 18.24 + 12.5% of 1824

$= \frac{5}{12} \times 1824 + \frac{1}{8} \times 1824 = 760 + 228 = 988$

8. 46.2% of 4880 = 42% of 4880 + 4.2% of 4880

= 40% of 4880 + 2% of 4800 + $\left(42\%\text{ of }\frac{4880}{10}\right)$

= $\frac{2}{5}\times 4880+\frac{1}{50}\times 4880+\frac{42\%}{10}$ of 4880

= 1952 + 97.6 + 204.96 = 2254.56

9. $\frac{1}{3}\times 927 = 309$

334 – 309 i.e. 25 is more than $\frac{1}{40}^{\text{th}}$ of 927 i.e. 2.5% of 927. And it is exactly 2.69% of 927.

∴ The required answer is 33.33% + 2.69% i.e. 36.02%

10. 10% of 728 = 72.8
75 – 72.8 i.e., 2.2 is almost 0.3% of 728
∴ The required answer is 10% + 0.3% i.e., 10.3%.

11. 63.5% can be written as 62.5% (which is 5/8) + 1%
Now we can calculate 62.5% using (5/8 x 382)
= 238.75
1% using ten percent
One percent concept
1% of 382 = 3.82
∴ The answer is 238.75 + 3.82 = 242.57

12. Using ten percent one percent concept the answer is 568.62

13. 153.72

14. 37.83

15. 36.02

16. By using ten percent one percent concept we can calculate the percentage values.
980 is 90.74% of 1080

17. 741 is 78.75% of 941

18. 230 is 53.49% of 430

19. 209 is 51.10% of 409

20. 437 is 77.07% of 567

Solutions for questions 21 to 25:

By using ten percent one percent concept, we can calculate the values.

21. 15.8% of 480 is 75.84

22. 25.2% of 728 is 183.46

23. 19.8% of 320 is 63.36

24. 45% of 630 is 283.50

25. 67.5% of 820 is 553.5

Solutions for questions 26 to 45:

26. 38.5% of 680
= (37.5 + 1)% of 680 = 261.80

27. 84.71% of 742
= (85.71 – 1)% of 742 = 628.55.

28. 63% of 1023 = 644.49

29. 13.5 is 20% of 67.5

30. 24 is $6^2/_3$% of 360

31. 30% of 2009 = 602·7
1% of 2009 = 20·09
31% of 2009 = 622·79
632·835 is 10·045 more than 622·79.
10·045 is 0·5% of 2009. Hence 632·835 is 31·5% of 2009.

32. 4·504% of 9·08 = $\frac{9\cdot 08}{2}$% of 9·08

= $\frac{(9\cdot 08)^2}{200}=\frac{(908)^2}{200\,(100)^2}$

908 is a three digit number with ten's digit of 0. Such three digit numbers have their squares calculated as follows: The last two digits of its square will be the square of its unit's digit. The product of the hundreds and units digit of the number is calculated and doubled. The first two digits will the sum of quotient of this result divided by 100 and square of the hundred's digit. The remainder of this result divided by 100 forms the digits in between the first two and last two digits. Hence 908^2 = 824464. The final result is 0·412232.

33. 84% of 564 = $\left(83\frac{1}{3}+\frac{2}{3}\right)$% of 564

= $\left(\frac{5}{6}+\frac{\frac{2}{3}}{100}\right)564$ = 473·76

34. 11·4% of 18·2 = $\frac{114}{1000}\times 18\cdot 2$

= $\frac{114}{1000}\times(2\times 9+0\cdot 2)$

= $\frac{228\times 9+228}{1000}$ = 2·0748

14·1% of 12·8

= $\frac{141}{1000}\times(10+2+0\cdot 8)$

= $\frac{1410+282+11\cdot 28}{1000}=1\cdot 804$

= $\frac{2.07-1.80}{1.80}\times 100=15\%$ (approximately).

35. 4·2857% of 168 = (14·2857 – 10)% of 168

As 14·2857% is approximately $\frac{1}{7}$, 4·2857% of 168

= $\left(\frac{1}{7}-\frac{10}{100}\right)\times 168$

= 24 – 16·8 = 7 to the nearest integer.

36. 4·3% of 16·1

= $16\cdot 1\times\frac{(4+0\cdot 3)}{100}$

= 0·644 + 0·0483 = 0·6923

37. 25% of 464·4 = 116·10
106·812 is 9·288 less than 464·4. As 9·288 is 2% of 464·4, 106·812 is 23% of 464·4.

38. $345\frac{5}{9}=\frac{3110}{9}$

Which is 55·55% of 622.

39. By prime factorisation of the denominators,
35 = 5 × 7
$49 = 7^2$

$70 = 2 \times 5 \times 7$

LCM $2 \times 5 \times 7^2 = 490$

$$\frac{17}{35} + \frac{12}{49} + \frac{8}{50}$$

$$= \frac{(14 \times 17) + (10 \times 12) + (7 \times 8)}{490}$$

$$= \frac{238 + 120 + 56}{490} = \frac{414}{490} = \frac{207}{245}.$$

40. $30 = 2 \times 3 \times 5$

$24 = 2^3 \times 3$

$36 = 2^2 \times 3^2$

LCM $= 2^2 \times 3^2 \times 5 = 360$

$$\frac{19}{30} + \frac{11}{24} + \frac{7}{36}$$

$$\frac{(12 \times 19) + (15 \times 11) + (10 \times 7)}{360}$$

$$\frac{228 + 165 + 70}{360}$$

$$\frac{463}{360} = 1\frac{103}{360}$$

41. $40 = 2^3 \times 5$

$25 = 5^2$

$60 = 2^2 \times 3 \times 5$

LCM $= 23 \times 3 \times 52 = 600$

$$\frac{17}{40} + \frac{13}{25} + \frac{11}{60}$$

$$= \frac{(15 \times 17) + (24 \times 13) + (10 \times 11)}{600}$$

$$= \frac{255 + 315 + 110}{600} = \frac{677}{600} = 1\frac{77}{600}$$

42. $77 = 7 \times 11$

$66 = 2 \times 3 \times 11$

$88 = 2^3 \times 11$

LCM $= 2^3 \times 3 \times 7 \times 11 = 1848$

$$\frac{18}{77} + \frac{23}{66} + \frac{31}{88}$$

$$= \frac{(24 \times 18) + (28 \times 23) + (21 \times 31)}{1848}$$

$$= \frac{432 + 644 + 651}{1848} = \frac{1727}{1848} = \frac{157}{168}.$$

43. The LCM of 18 and 36 is 36.

The LCM of 24 and 36 is 72.

$$\frac{17}{24} - \frac{7}{18} - \frac{5}{36}$$

$$= \frac{51 - 28 - 10}{72} = \frac{13}{72}$$

44. $4\frac{2}{7} + 3\frac{4}{5} - 2\frac{1}{3} + 5 \cdot 5$

$$= \frac{30}{7} + \frac{19}{5} - \frac{7}{3} + \frac{11}{2}$$

$$= \frac{(30)(30) + 19(42) - 7(70) + 11(105)}{210} = \frac{2363}{210}$$

45. $$\frac{5}{54} + \frac{7}{72} + \frac{11}{180}$$

$$= \frac{5(20) + 7(15) + 11(6)}{1080} = \frac{271}{1080}$$

Chapter – 4

(Comparison of fractions)

Exercise – 4(a)

Solutions for questions 1 to 15:

1. Each of the given fraction is less than 1 and the difference between the numerator and the denominator for each fraction is 17. In such case, the fraction with the larger values of numerator and denominator will be the greatest.

i.e., $\frac{61}{78}$

2. $$\frac{12}{31} = \frac{1}{2.5}$$

$$\frac{17}{48} = \frac{1}{2.8}$$

$$\frac{21}{51} = \frac{1}{2.4}$$

$$\frac{34}{87} = \frac{1}{2.5}$$

$\frac{21}{51}$ is the greatest.

3. $$\frac{79}{29} = 2.7$$

$$\frac{91}{31} = 2.9$$

$$\frac{129}{34} = 3.7$$

$$\frac{206}{59} = 3.4$$

$\frac{129}{34}$ is the greatest.

4. $$\frac{7}{29} = \frac{1}{4.1}$$

$$\frac{11}{51} = \frac{1}{4.5}$$

$$\frac{21}{97} = \frac{1}{4.6}$$

$$\frac{18}{89} = \frac{1}{5}$$

$$\frac{28}{125} = \frac{1}{4.4}$$

The greatest of the fraction is $\frac{7}{29}$ or $\frac{1}{4.1}$

Because the denominator is the least.

5. $$\frac{19}{61} = \frac{1}{3}$$

$$\frac{27}{73} = \frac{1}{2.7}$$

$$\frac{31}{98} = \frac{1}{3}$$

$$\frac{11}{49} = \frac{1}{4}$$

$$\frac{61}{193} = \frac{1}{3}$$

$\frac{27}{73}$ is the greatest.

6. $\frac{123}{172} = \frac{1}{1.4}$

$\frac{81}{97} = \frac{1}{1.2}$

$\frac{81}{97} > \frac{79}{101}$

$\frac{41}{63} = \frac{1}{1.5}$

$\frac{53}{97} = \frac{1}{1.8}$

$\frac{1}{1.2}$ or $\frac{81}{97}$ is the greatest

7. $\frac{13}{123} = \frac{1}{9}$

$\frac{18}{147} = \frac{1}{8}$

$\frac{7}{93} = \frac{1}{13}$

$\frac{11}{81} = \frac{1}{7}$

$\frac{16}{157} = \frac{1}{9}$

$\frac{1}{7}$ or $\frac{11}{81}$ is the greatest fraction.

8. $\frac{39}{161} = \frac{1}{4.1}$

$\frac{21}{93} = \frac{1}{4.4}$

$\frac{17}{77} = \frac{1}{4.5}$

$\frac{28}{113} \cong \frac{1}{43}$

$\frac{32}{147} = \frac{1}{4.6}$

The greatest of the fractions is $\frac{28}{113}$.

9. $\frac{163}{183} = \frac{1}{1.12}$

$\frac{103}{123} = \frac{1}{1.2}$

$\frac{151}{199} = \frac{1}{1.3}$

$\frac{127}{151} = \frac{1}{1.4}$

The greatest is $\frac{163}{183}$

10. As (7) (15) > (8) (13),

$\frac{7}{8} > \frac{13}{15}$

As (7) (119) > (8) (104),

$\frac{7}{8} > \frac{104}{119}$

As (7) (139) < (8) (122)

$\frac{7}{8} < \frac{122}{139}$

The greatest is $\frac{122}{139}$.

11. $\frac{19}{99} > \frac{19}{100} = 0 \cdot 19$

$\frac{228}{1201} < \frac{228}{1200} = 0 \cdot 19$

$\frac{342}{1801} < \frac{342}{1800} = 0 \cdot 19$

$\frac{304}{1599} < \frac{304}{1600} = 0 \cdot 19$

Hence the greatest of the given fractions is $\frac{19}{99}$.

12. Whenever there are two fractions $\frac{a}{b}$ and $\frac{c}{d}$, such that $\frac{a}{b} > \frac{c}{d}$ and x is a real number satisfying $x^2 > 1$,

$\frac{ax + c}{bx + d} > \frac{a + cx}{b + dx}$

$\frac{9}{202} = \frac{26(3) + 21}{53(3) + 43}$

$\frac{89}{199} = \frac{21 + 26(3)}{53 + 43(3)}$

As $26 \times 43 > 21 \times 53$,

$\frac{26}{53} > \frac{21}{43}$. Hence, $\frac{89}{102} > \frac{99}{202}$

As $\frac{89}{102}$ is close to $\frac{89}{100}$ i.e. 0·89 and $\frac{26}{53}$ is close to $\frac{26}{50}$ i.e. 0·52, $\frac{89}{102} > \frac{26}{53}$. Hence $\frac{89}{102}$ is the greatest.

13. $\frac{78}{153}$ can be obtained from $\frac{16}{31}$ by multiplying the numerator of $\frac{16}{31}$ by 5 and subtracting 2 from it and multiplying the denominator of $\frac{16}{31}$ by 5 and subtracting 2 from it.

Hence $\frac{78}{153} = \frac{16(5) - 2}{31(5) - 2} = \frac{16(5) - 2}{31(5 - 2)}$

As $\frac{16}{31}$ is a proper fraction,

$\frac{16}{31} = \frac{16(5)}{31(5)} > \frac{16(5) - 2}{31(5) - 2} = \frac{79}{153}$.

The fraction $\frac{65}{126}$ and $\frac{16}{31}$ have reciprocals of $\left|\frac{61}{65}$ and $\left|\frac{15}{16}$ respectively.

As $\frac{15}{16}$ is a proper fraction,

$\frac{15}{16} = \frac{15(4)}{16(4)} < \frac{15(4) + 1}{16(4) + 1} = \frac{61}{65}$.

Hence $\left|\frac{61}{65} > \right|\frac{15}{16}$

Hence $\frac{65}{126} < \frac{16}{31}$

Hence $\frac{16}{31}$ is the greatest.

14. Of the given fractions $\frac{17}{30}$ and $\frac{221}{435}$ are close to $\frac{1}{2}$, $\frac{43}{69}$ is close to $\frac{2}{3}$.

Now $\frac{79}{108} \cong \frac{80}{110}$ i.e. $\frac{8}{11}$

and $\frac{102}{129} \cong \frac{100}{130}$ i.e. $\frac{10}{13}$

As $\frac{8}{11}$ and $\frac{10}{13}$ have the same difference between numerator and denominator and $\frac{10}{13}$ has greater numerator it is the greatest.

$\frac{102}{129}$ is the greatest of all given fractions.

15. $\frac{8}{35} \cong \frac{1}{4.3}$; $\frac{17}{71} \cong \frac{1}{4.2}$

$\frac{43}{175} \cong \frac{1}{4.06}$; $\frac{91}{400} \cong \frac{1}{4.6}$ $\frac{113}{450} \cong \frac{1}{3.98}$

$\therefore$ $\frac{113}{450}$ is the greatest.

Solutions for questions 16 to 30:

16. Among the numerators of the given fractions, 12 is the smallest. Among the denominators 87 is the greatest.

Hence $\frac{12}{87}$ will be the smallest.

17. $\frac{47}{27} < \frac{47}{21}$

(Numerators equal but among denominators 27 > 21)

$\frac{61}{44} < \frac{68}{43}$

(61 < 68 but 44 > 43)

$\frac{47}{21}$ or $\frac{68}{43}$ Cannot be the smallest

$\frac{29}{11} = 2.63$

$\frac{47}{27} = 1.74$

$\frac{61}{44} = 1.3$

$\frac{61}{44}$ is the least.

18. $\frac{17}{70} = \frac{1}{4.1}$

$\frac{8}{51} = \frac{1}{6.3}$

$\frac{19}{96} = \frac{1}{5}$

$\frac{21}{141} = \frac{1}{7}$

$\frac{33}{193} = \frac{1}{6}$

$\frac{21}{141}$ is the least .

19. $\frac{13}{14} > \frac{21}{23}$ (Proper Fraction)

$\frac{21}{23} > \frac{61}{93}$ or $\frac{37}{43}$ or $\frac{29}{49}$

$\frac{13}{14}$ or $\frac{21}{23}$

Cannot be the smallest

$\frac{61}{93} = \frac{1}{1.5}$

$\frac{37}{43} = \frac{1}{1.7}$

$\frac{29}{49} = \frac{1}{1.7}$

$\frac{1}{1.7}$ is the smallest

$\frac{29}{49}$ is the smallest.

20. $\frac{23}{57} = \frac{1}{2}$

$\frac{37}{83} = \frac{1}{2.2}$

$\frac{18}{41} = \frac{1}{2.3}$

$\frac{29}{71} = \frac{1}{2.4}$

$\frac{29}{71} = \frac{1}{2.4}$

$\frac{33}{92} = \frac{1}{3}$

$= \frac{1}{3}$ or $\frac{33}{92}$ is the smallest.

21. $\frac{15}{47} = \frac{1}{3.1}$

$\frac{7}{29} = \frac{1}{4.1}$

$\frac{11}{37} \cong \frac{1}{3.4}$

$\frac{18}{65} = \frac{1}{3.6}$

$\frac{22}{89} = \frac{1}{4}$

The smallest of the fractions is $\frac{7}{29}$.

22. $\frac{47}{161} = \frac{1}{4}$

$\frac{68}{243} > \frac{1}{4}$

$\frac{51}{216} < \frac{1}{4}$

$\frac{91}{478} < \frac{1}{5}$

$\frac{78}{352} < \frac{1}{4}$

$\frac{91}{478}$ is the smallest.

23. $\frac{18}{36}=\frac{1}{2}$

$\therefore \frac{18}{35}>\frac{1}{2}$

Similarly,

$\frac{31}{63}<\frac{1}{2}$

$\frac{12}{23}>\frac{1}{2}$

$\frac{16}{33}<\frac{1}{2}$

$\frac{25}{49}>\frac{1}{2}$

The answer has to be

$\frac{31}{63}$ or $\frac{16}{33}$

$\frac{31}{63}=\frac{1}{2\frac{1}{31}}$

$\frac{16}{33}=\frac{1}{2\frac{1}{16}}$

$\therefore 2\frac{1}{\frac{1}{31}} > \frac{1}{2\frac{1}{16}}$

$\frac{16}{33}$ will be the least.

24. $\frac{47}{23}=2+\frac{1}{23}$

$\frac{613}{300}=2+\frac{13}{300}$

$\frac{1277}{625}=2+\frac{27}{624}$

$\frac{13}{300}$ and $\frac{27}{624}$ can be written as $\frac{13}{13(23)+1}$ and $\frac{27}{27(23)+3}$ respectively.

Dividing the re-written forms of the fractions $\frac{13}{300}$ and $\frac{27}{624}$ by their respective numerators, the fractions become $\frac{1}{23+\frac{1}{13}}$ and $\frac{1}{23+\frac{1}{4}}$ respectively.

As $\frac{1}{23}>\frac{1}{23+\frac{1}{13}}>\frac{1}{23+\frac{1}{9}}, \frac{47}{23}>\frac{613}{300}>\frac{1277}{625}$.

Hence $\frac{1277}{625}$ is the least.

25. Given fractions can be written as following:

$\frac{465}{226}=2+\frac{13}{226}; \frac{49}{22}=2+\frac{5}{22}$

$\frac{83}{40}=2+\frac{3}{40}; \frac{97}{47}=2+\frac{3}{47}$

and $\frac{834}{398}=2+\frac{38}{398}$

As $\frac{13}{226}\cong\frac{1}{17}$, it is the smallest.

Hence $\frac{465}{226}$ is the smallest.

26. $\frac{7}{9}=1-\frac{2}{9}, \frac{29}{39}=1-\frac{10}{39}$

$\frac{24}{29}=1-\frac{5}{29}, \frac{16}{19}=1-\frac{3}{19}$

Clearly $\frac{10}{39}$ is the highest among 2/9, 10/39, 5/29, 3/19

$\therefore$ 29/39 is the least.

27. $\frac{43}{90}\cong\frac{1}{2.09}$

$\frac{59}{100}\cong\frac{1}{1.69}$

$\frac{67}{120}\cong\frac{1}{1.79}$

$\frac{71}{140}$ and $\frac{81}{160}$ need not be computed as they are very close to $\frac{1}{2}$.

$\therefore \frac{43}{90}$ is the smallest.

28. $\frac{335}{1089}, \frac{493}{1584}$ and $\frac{524}{1725}$ are close to $\frac{1}{3}$ whereas $\frac{784}{3107}$ is close to $\frac{1}{4}$.

Hence, $\frac{784}{3107}$ is the smallest.

29. $\frac{29}{12}\cong 2.5$; $\frac{225}{113}\cong 2$

$\frac{825}{408}\cong 2.02$; $\frac{1089}{516}\cong 2.11$

$\frac{101}{47}\cong 2.14$

$\therefore \frac{12}{29}$ is the least.

30. By observation $\frac{9}{5}$ and $\frac{11}{6}$ are close to 2, hence they cannot be the smallest.

Among $\frac{29}{18}, \frac{23}{14}$ are more than 1.5 whereas $\frac{17}{12}$ is less than 1.5, hence $\frac{17}{12}$ is the least.

Solutions for questions 31 to 40:

31. $a=\frac{16}{11}=1+\frac{5}{11}$, $b=\frac{26}{21}=1+\frac{5}{21}$

$c=\frac{32}{27}=1+\frac{5}{27}, d=\frac{39}{34}=1+\frac{5}{34}$

As 11 < 21 < 27 < 34, $\frac{5}{11}>\frac{5}{21}>\frac{5}{27}>\frac{5}{34}$

Hence d < c < b < a.

32. $a=\frac{76}{129}, b=\frac{76(2)-1}{129(2)-1}, c=\frac{375}{640}=\frac{75}{128}=\frac{76-1}{129-1}$

If p, q and r are real number and p < r,

$\frac{p-q}{r-q}<\frac{p}{r}<\frac{p+q}{r+q}$

Taking p as 76, q as 1 and r = 129,

$\frac{75}{128} < \frac{76}{129} < \frac{77}{130}$

$\frac{77}{130} = \frac{77(2)}{130(2)} = \frac{154}{260}$

Which is less than $\frac{154+1}{260+1}$ i.e $\frac{155}{261}$ for the same reason as given above. Hence c < b < a < d.

33. $\frac{1730}{19} = 91\frac{1}{19}$

$\frac{2639}{29} = 91, \frac{2790}{31} = 90$

Hence $\frac{1}{c} < \frac{1}{b} < \frac{1}{a}$

Hence a < b < c.

34. In proper fraction $\frac{x}{y}$ and $\frac{a}{b}$

If y – x = b – a and x > a

Then $\frac{x}{y} > \frac{a}{b}$

$\therefore \frac{31}{41} > \frac{21}{31} > \frac{17}{27}$

In improper fraction $\frac{p}{q}$ and $\frac{r}{s}$

If p – q = r – s and p > r then $\frac{p}{q} < \frac{r}{s}$

$\frac{27}{17} > \frac{37}{27}$

Any improper fraction is greater than any proper fraction

$\therefore \frac{27}{17} > \frac{37}{27} > \frac{31}{41} > \frac{31}{41} > \frac{21}{31} > \frac{17}{27}$

The ascending order is $\frac{17}{27}, \frac{21}{31}, \frac{31}{41}, \frac{37}{27}, \frac{27}{17}$.

35. $\frac{67}{155} = \frac{1}{2.3}$

$\frac{39}{141} = \frac{1}{23.6}$

$\frac{71}{152} = \frac{1}{2.1}$

$\frac{83}{206} = \frac{1}{2.5}$

$\frac{47}{142} = \frac{1}{3}$

The descending order is $\frac{39}{141}, \frac{47}{142}, \frac{83}{206}, \frac{67}{155}, \frac{71}{152}$.

36. $\frac{17}{67} = \frac{1}{3.9}$

$\frac{25}{71} = \frac{1}{2.8}$

$\frac{31}{96} = \frac{1}{3.2}$

$\frac{23}{70} = \frac{1}{3}$

Since the numerators are equal $\frac{1}{2.8}$ i.e., $\frac{25}{71}$ will have the greatest value. The ascending order is

$\frac{1}{3.9}, \frac{1}{3.2}, \frac{1}{3}, \frac{1}{2.8}$ i.e., $\frac{17}{67}, \frac{31}{96}, \frac{23}{70}, \frac{25}{71}$.

37. If $\frac{a}{b}, \frac{c}{d}$ & $\frac{e}{f}$ are proper fractions (where numerator is less than the denominator) and a – b = c – d = e – f

then $\frac{a}{b} > \frac{c}{d} > \frac{e}{f}$

Therefore $\frac{13}{17} > \frac{17}{21} > \frac{15}{22}$

Between $\frac{15}{22}$ and $\frac{28}{37}$

$\frac{15}{22} = \frac{1}{1.46}$

$\frac{28}{37} = \frac{1}{3.2}$

$\therefore \frac{28}{37} > \frac{15}{22}$

The ascending order is $\frac{15}{22}, \frac{28}{37}, \frac{13}{17}, \frac{17}{21}$.

38. $\frac{21}{53} = \frac{1}{2.5}$

$\frac{33}{69} = \frac{1}{2}$

$\frac{18}{41} = \frac{1}{2.3}$

$\frac{53}{126} = \frac{1}{2.4}$

$\frac{17}{48} = \frac{1}{2.8}$

The ascending order is

$\frac{1}{2.8}, \frac{1}{2.5}, \frac{1}{2.4}, \frac{1}{2.3}, \frac{1}{2}$

$\frac{17}{48}, \frac{21}{53}, \frac{53}{126}, \frac{18}{41}, \frac{33}{69}$.

39. $\frac{12}{17} = \frac{1}{1.41}$

$\frac{17}{21} = \frac{1}{1.2}$

$\frac{29}{48} = \frac{1}{1.6}$

$\frac{31}{47} = \frac{1}{1.51}$

$\frac{41}{63} = \frac{1}{1.53}$

The ascending order is $\frac{29}{48}, \frac{41}{63}, \frac{31}{47}, \frac{12}{17}$ and $\frac{17}{21}$

40. The fractions can be written as

$2\frac{2}{101}, 2\frac{4}{10201}, 2\frac{7}{1300}, 2\frac{343}{219700}$

By observing the fractional part

$\frac{2}{101}, > \frac{7}{1300}, > \frac{343}{219700} > \frac{4}{10201}$

The ascending order is

$\frac{20406}{10201} < \frac{439743}{219700} < \frac{2607}{1300} < \frac{204}{101}$.

Solutions for questions 41 to 45:

41. All fraction are close to 2/3

$\frac{22}{34}<\frac{2}{3},\frac{54}{79}>\frac{2}{3}\ \frac{78}{109}>\frac{2}{3}$

but $\frac{78}{109}>\frac{7}{10}$ but $\frac{54}{79}<\frac{7}{10}$

$\therefore$ The order is $\frac{78}{109}>\frac{54}{79}>\frac{2}{3}>\frac{22}{34}$

d > c > b > a.

42. All fractions are close to 1/3

$\frac{16}{43}>\frac{1}{3},\frac{27}{83}<\frac{1}{3},\frac{43}{126}=\frac{1}{3}$

$\frac{23}{63}>\frac{1}{3}$

also $\frac{23}{63}<\frac{16}{43}$

The order is $\frac{16}{43}>\frac{23}{63},>\frac{42}{126}>\frac{27}{83}$

a > d > c > b.

43. All fractions are close to 1/3

$\frac{19}{56}>\frac{1}{3},\frac{17}{51}=\frac{1}{3},\frac{21}{69}<\frac{1}{3},\frac{24}{79}<\frac{1}{3}$

also $\frac{21}{69}>\frac{24}{79}$

$\therefore$ The order is $\frac{19}{56}>\frac{17}{51}>\frac{21}{69}>\frac{24}{79}$

a > b > c > d.

44. All fractions are close to 1/4

$\frac{23}{98}<\frac{1}{4},\frac{28}{103}>\frac{1}{4},\frac{45}{181}<\frac{1}{4}$

$\frac{51}{204}=\frac{1}{4}\text{also}\frac{45}{181}>\frac{23}{98}$

$\frac{28}{103}>\frac{51}{204}>\frac{45}{181}>\frac{23}{98}$

b > d > c > a.

45. All fractions are close to 1/6

$\frac{25}{161}<\frac{1}{6},\frac{93}{555}>\frac{1}{6},\frac{44}{264}=\frac{1}{6},\frac{11}{65}>\frac{1}{6}$

$\frac{11}{65}>\frac{93}{555}$

$\frac{11}{65}>\frac{93}{555}>\frac{44}{264}>\frac{25}{161}$

d > b > c > a.

Exercise – 4(b)

Solutions for questions 1 to 15:

1. $\frac{43}{18}\cong 2.38$; $\frac{94}{45}\cong 2.08$

$\frac{188}{91}\cong 2.06$; $\frac{435}{289}<2$

$\frac{729}{361}\cong 2.01$

$\therefore$ $\frac{43}{18}$ is the largest.

Alternately by observation, only $\frac{43}{18}$ is very much greater closer to 2.5. Whereas all other fractions are very close to 2.

Hence $\frac{43}{18}$ is the largest.

2. $\frac{18}{75}\cong\frac{1}{4.16}$

$\frac{21}{85}\cong\frac{1}{4.04}$

$\frac{23}{95}\cong\frac{1}{4.13}$

$\frac{43}{185}\cong\frac{1}{4.30}$

$\therefore$ $\frac{21}{85}$ is the largest.

3. $\frac{37}{14}\cong 2.64$; $\frac{85}{41}\cong 2.07$

$\frac{121}{49}\cong 2.46$; $\frac{385}{169}\cong 2.27$

$\frac{202}{81}\cong 2.5$

$\therefore$ $\frac{37}{14}$ is the largest.

Alternately only $\frac{37}{14}$ > 2.5 whereas all others are less than or equal to 2.5

Hence $\frac{37}{14}$ is the largest.

4. By observation $\frac{7}{12}$ is the least. In the remaining fractions, as the difference between numerator and denominator is the same, $\frac{43}{45}$ is the greatest.

5. Except $\frac{13}{22}$, all the other fractions are less than 0.5.

Hence $\frac{13}{22}$ is the greatest.

6. By observation, $\frac{957}{356}$ is the greatest as it is more than 2.5, whereas other fractions are close to 2.2.

7. Converting the given fractions into percentage we've 7/8 as 87.5% as the highest.

8. Except for $\frac{835}{1302}$, in all other cases denominator is more than 1.5 times the numerator, hence $\frac{835}{1302}$ is the greatest.

9. Clearly 17/25 = 68%. While all other are close to 1/2 and less than 2/3. Hence 17/25 is the greatest.

10. Inverting every fraction we can observe

$\frac{56}{27}=2+\frac{2}{27},\frac{76}{37}=2+\frac{2}{37}$

$\frac{96}{47}=2+\frac{2}{47},\frac{116}{57}=2+\frac{2}{57}$

Since 116/57 is the least

$\therefore$ 57/116 is the highest

11. Applying the same rule as above we find that

$\frac{63}{24}=2+\frac{15}{24},\frac{93}{36}=2+\frac{21}{36}$

$\frac{103}{42}=2+\frac{19}{42},\frac{113}{45}=2+\frac{23}{45}$

Only 19/42 is less than 1/2

All other i.e., 15/24, 21/36, 23/45 are more than 1/2

$\therefore$ 103/42 is the least among all

i.e. 42/103 is the highest.

12. The difference between numerator and denominator is constant (i.e., 9) in all the fractions and all the fractions are less than 1.

$\therefore$ The fraction with the highest numerator or denominator is the highest i.e. 56/65 is the highest.

13. Using the method of inverting and comparing

$\frac{89}{67}=1+\frac{22}{67},\frac{34}{24}=1+\frac{10}{24}$

$\frac{87}{74}=1+\frac{13}{74},\frac{71}{63}=1+\frac{8}{63}$

Clearly 71/63 is the smallest.

Hence 63/71 is the largest.

14. Inverting every fraction. We can say

$\frac{59}{28}=2+\frac{3}{28},\frac{83}{38}=2+\frac{7}{38}$

$\frac{74}{35}=2+\frac{4}{35},\frac{93}{43}=2+\frac{7}{43}$

Clearly 3/28 is the least

Hence 28/59 is the highest

15. All the given fractions are close to 1/2 or 0.5 but only 23/45 is more than 0.5 all other fractions are less than 0.5

$\therefore$ The answer is 23/45

Solutions for questions 16 to 30:

16. By observation, $\frac{721}{175}$ is much less than 4.5, whereas other fractions are more than 4.5, hence $\frac{721}{175}$ is the least.

17. By observation, all the fractions have numerators as one less than half the denominator. Hence the fraction having the least i.e. $\frac{5}{12}$

18. Of all the given fractions, only 7/15 < 0.5. Hence 7/15 is the least.

19. As 75/39 < 2, clearly it is the least.

20. By observation, $\frac{17}{36}$ is the least as it is $\frac{1}{2}$, whereas other fractions are $\frac{1}{2}$.

21. $\frac{23}{16}=1+\frac{7}{16},\frac{43}{26}=1+\frac{17}{26}$

$\frac{33}{22}=1+\frac{11}{22}$

$\frac{43}{26}>\frac{33}{22}>\frac{23}{16}$

$\frac{23}{16}$ is the lowest

22. 94/108, 60/68 are less than 0.9

but 72/78 is greater than 0.9

among 94/108 and 60/68

$\frac{94}{108}=1-\frac{14}{108},=1-\frac{7}{54}$

$\frac{60}{68}=1-\frac{8}{68}$

Since 7/54 > 8/68

$\therefore$ 60/68 > 94/108

94/108 is the lowest

23. By inverting the fractions.

$\frac{21}{16}=1+\frac{5}{16},\frac{41}{34}=1+\frac{7}{34}$

$\frac{51}{38}=1+\frac{13}{38},\frac{31}{25}=1+\frac{6}{25}$

Clearly 13/38 is the greatest among

5/16, 7/34, 13/38, 6/25

$\therefore$ 38/51 is the least.

24. Inverting the fractions

$\frac{63}{14}=5-\frac{1}{2},\frac{72}{17}=5-\frac{13}{17}$

$\frac{94}{19}=5-\frac{1}{19},\frac{201}{41}=5-\frac{4}{41}$

Clearly 1/19 is the least among

1/2, 13/17, 1/19, 4/41

$\therefore$ 19/94 is the least among all the given fractions.

25. Only 93/467 is close to 1/5 all others fractions are close to 1/3 or 1/4.

$\therefore$ 93/467 is the least.

26. Only $\frac{12}{15}$ is equal to 0·8 all other fractions are greater than 0·8

$\therefore \frac{12}{15}$

27. All fraction except $\frac{21}{45}$ are very close to $\frac{1}{2}$

$\therefore$ $\frac{21}{45}$ is lesser than $\frac{1}{2}$

28. Only $\frac{16}{39}$ is close to 0·4, all others are greater than 0·45

$\therefore$ $\frac{16}{39}$ is the smallest

29. All fractions are close to $\frac{1}{2}$

Only $\frac{71}{151}$ is less than $\frac{1}{2}$

All other fractions are greater than $\frac{1}{2}$

30. Observing the reciprocals of the given fractions,

$\frac{43}{11}=3+\frac{10}{11},\ \frac{73}{21}=3+\frac{10}{21}$

$\frac{123}{31} = 3 + \frac{30}{31}$, $\frac{163}{41} = 3 + \frac{40}{41}$

$\frac{163}{41}$ is the highest value

$\therefore$ $\frac{41}{163}$ is the least value

Solutions for questions 31 to 40:

31. $\frac{35}{68} = \frac{1}{1.9}$

$\frac{47}{86} = \frac{1}{1.8}$

$\frac{29}{41} = \frac{1}{1.4}$

$\frac{19}{40} = \frac{1}{2.1}$ $\frac{41}{83} = \frac{1}{2}$

The Ascending order is $\frac{19}{40}, \frac{41}{83}, \frac{35}{68}, \frac{47}{86}$ and $\frac{29}{41}$

32. $\frac{71}{129} = \frac{1}{1.8}$

$\frac{58}{119} = \frac{1}{2}$

$\frac{32}{79} = \frac{1}{2.2}$

$\frac{87}{139} = \frac{1}{1.6}$

The ascending order is $\frac{32}{79}, \frac{58}{119}, \frac{71}{129}$ and $\frac{87}{139}$

33. $\frac{121}{396} = \frac{1}{3.2}$

$\frac{183}{403} = \frac{1}{2.2}$

$\frac{97}{234} = \frac{1}{2.4}$

$\frac{107}{421} = \frac{1}{2.6}$

$\frac{141}{421} = \frac{1}{2.9}$

The ascending order is $\frac{121}{396}, \frac{141}{421}, \frac{107}{281}, \frac{97}{234}$ and $\frac{183}{403}$.

34. $\frac{18}{157} = \frac{1}{8.7}$

$\frac{27}{179} = \frac{1}{6.6}$

$\frac{41}{203} = \frac{1}{4.9}$

$\frac{32}{189} = \frac{1}{5.9}$

$\frac{69}{335} = \frac{1}{4.8}$

The ascending order is $\frac{18}{157}, \frac{27}{179}, \frac{32}{189}, \frac{41}{203}$ and $\frac{69}{335}$.

35. Multiplying the denominators of $\frac{102}{37}$, $\frac{228}{83}$ and $\frac{1376}{499}$ by $\frac{11}{4}$, the results are 101·75, 228·25 and 1372·25 respectively.

As 102 > 101·75, 228·25 > 228 and 1376 > 1372·25, $\frac{102}{37}$ as well as $\frac{1376}{499}$ are greater than $\frac{11}{4}$ while $\frac{228}{83}$ is less than $\frac{11}{4}$.

(102) (499) = (102) (500 – 1)

= 51000 – 102 = 50898

(1376) (37) = (1376) (40 – 3)

= 55040 – 4128 = 50912.

As (102) (499) < (1376) (37), $\frac{102}{37} < \frac{1376}{499}$

Hence, $\frac{228}{83} < \frac{11}{4} < \frac{102}{37} < \frac{1376}{499}$.

36. Multiplying both the numerator and denominator of $\frac{43}{51}$ by 2, it becomes $\frac{86}{102}$

$\frac{86}{101} < \frac{86}{102}$.

$\frac{86}{101}$ and $\frac{6}{7}$ can be compared by cross-multiplication.

(86) (7) < (101) (6)

Hence $\frac{86}{101} < \frac{6}{7}$

Similarly $\frac{43}{51} < \frac{86}{101} < \frac{6}{7}$.

37. $\frac{157}{120} = \frac{156+1}{120} = 1 \cdot 3 + \frac{1}{120}$

$\frac{17}{13} = \frac{16 \cdot 9 + 0 \cdot 1}{13} = 1 \cdot 3 + \frac{1}{130}$

$\frac{144}{110} = \frac{143+1}{110} = 1 \cdot 3 + \frac{1}{110}$

$\frac{209}{160} = \frac{208+1}{160} = 1 \cdot 3 + \frac{1}{160}$

As 110 < 120 < 130 < 160, $\frac{1}{160} < \frac{1}{130} < \frac{1}{120} < \frac{1}{110}$

Hence $\frac{209}{160} < \frac{17}{13} < \frac{157}{120} < \frac{144}{110}$.

38. $\frac{176}{225} = \frac{176(4)}{225(4)} = \frac{704}{900}$

= 0·782 (to 3 decimal places)

$\frac{98}{125} = \frac{98(8)}{125(8)} = 0 \cdot 784$

$\frac{39}{50} = 0 \cdot 78$

(453) (50) = 22650

(584) (39) = 584 (40 – 1) = 22776

As (453) (50) < (584) (39),

$\frac{453}{584} < \frac{39}{50}$

Hence $\frac{453}{584} < \frac{39}{50} < \frac{176}{225} < \frac{98}{125}$.

39. $(333) \times (333) = 3\,(111) \times 3\,(111)$
$= 9\,(111)^2 = 9\,(12321)\ 110889$
$(1669) \times (64) = 1669 \times (60 + 4)$
$= 100140 + 6676 = 106816$

As $(1669) \times (64) < (333) \times (333)$, $\frac{333}{1669} > \frac{64}{333}$

If a, b, c and d are positive real numbers satisfying $\frac{a}{b} > \frac{c}{d}$,

then fraction $\frac{a+c}{b+d}$

Always lies between these two and the fraction $\frac{a-c}{b-d}$ is always greater than these two.

Hence $\frac{333+64}{1669+333} = \frac{397}{2002}$

Lies between $\frac{333}{1669}$ and $\frac{64}{333}$.

$\frac{333-64}{1669-333} = \frac{269}{1336}$ is greater than $\frac{333}{1669}$ and $\frac{64}{333}$

Hence $\frac{64}{333} < \frac{397}{2002} < \frac{333}{1669} < \frac{269}{1336}$.

40. $\frac{204}{101} = 2\frac{2}{101}$

$\frac{20406}{10201} = 2\frac{4}{10201}$

$= 2\left(\frac{2}{101}\right)^2$

Any fraction less than 1 has its squared value less than itself.

Hence $\left(\frac{2}{101}\right)^2 < \frac{2}{101}$.

Hence $\frac{20406}{10201} < \frac{204}{101}$.

$\frac{2607}{1300} = 2\frac{7}{1300} = 2 + \frac{1}{100}\left(\frac{7}{13}\right)$

$\frac{439743}{219700} = \frac{343}{219700} = 2 + \frac{1}{100}\left(\frac{7}{13}\right)^3$.

As the cube of any fraction less than 1 is less than itself,

$\left(\frac{7}{13}\right)^3 < \frac{7}{13}$. Hence $\frac{439743}{219700} < \frac{2607}{1300}$.

$\frac{2607}{1300} < \frac{20406}{10201}$ since $2607 \times 10201 < 1300 \times 20406$.

Hence $\frac{439743}{219700} < \frac{2607}{1300} < \frac{20406}{10201} < \frac{204}{101}$.

Solutions for questions 41 to 45:

41. By observing we see that all the fractions are close to 1.5

$\frac{27}{18} = \frac{18+9}{18} = 1.5$

$\frac{39}{25} = \frac{25+14}{25}, \frac{50}{29} = \frac{29+21}{29}$

$\frac{45}{31} = \frac{31+14}{31}$

Since $\frac{21}{29} > \frac{14}{25} > \frac{9}{18} > \frac{14}{31}$

$\frac{50}{29} > \frac{39}{25} > \frac{27}{18} > \frac{45}{31}$

c > b > a > d.

42. Reverse the fractions and compare, we find

$\frac{51}{16} = 3 + \frac{3}{16}, \frac{72}{21} = 3 + \frac{9}{21}$

$\frac{94}{31} = 3 + \frac{1}{31}, \frac{183}{49} = 3 + \frac{36}{49}$

since $\frac{183}{49} > \frac{72}{21} > \frac{51}{16} > \frac{94}{31}$

$\therefore \frac{31}{94} > \frac{16}{51} > \frac{21}{72} > \frac{49}{183}$

c > a > b > d.

43. Using the method in question (11) above

$\frac{37}{12} = 3 + \frac{1}{12}, \frac{38}{13} = 3 - \frac{1}{13}$

$\frac{40}{14} = 3 - \frac{2}{14}, \frac{45}{17} = 3 - \frac{6}{17}$

$\frac{37}{12} > \frac{38}{13} > \frac{40}{14} > \frac{45}{17}$

a > b > c.> d.

44. Use the method in question (12) above

$\frac{82}{23} = 3 + \frac{13}{23}, \frac{108}{39} = 2 + \frac{30}{39}$

$\frac{96}{35} = 2 + \frac{26}{35}, \frac{138}{41} = 3 + \frac{15}{41}$

$\frac{82}{23} > \frac{138}{41} > \frac{108}{39} > \frac{96}{35}$

$\frac{35}{96} > \frac{39}{108} > \frac{41}{138} > \frac{23}{82}$

b > c > d > a.

45. $\frac{31}{139} = \frac{1}{4.4}$

$\frac{51}{193} = \frac{1}{3.7}$

$\frac{43}{169} \cong \frac{1}{4}$

$\frac{123}{647} = \frac{1}{5}$

The descending order is $\frac{1}{3.7}, \frac{1}{4}, \frac{1}{4.4}, \frac{1}{5}$

$\frac{51}{193}, \frac{43}{169}, \frac{31}{139}, \frac{123}{647}$.

Chapter – 5
(Approximations)

Exercise – 5(a)

Solutions for questions 1 to 6:

1. $\frac{681}{540} \cong \frac{680}{540} = 1.26$

Let $x \times 1.25 = 237$

$x = 237 \times \frac{4}{5} = 189.6$

Since $x \times 1.25 = 237$

$x \times 1.26 < 237$

Hence, the answer will be approximately 188.

2. $538 \div 173 = 3.11$
or $173 \times 3.11 = 538$
$\therefore x = 71 \times 3.11 = 220.81$ or 220.8

3. $961 \div 384 = 2.5$ (approximately)
$\therefore x = 283 \times 2.5 = 707.5$ or 708

4. $x = (1864 \times 174)/523 \simeq \dfrac{1864}{3} = 621.3$

5. $x = \dfrac{416}{585} = \dfrac{13 \times 32}{13 \times 45} = \dfrac{32}{45}$

6. $x = \dfrac{17}{667} \times 1334 = \dfrac{17}{29 \times 23} \times 29 \times 46 = 34$

Solutions for questions 7 to 14:

7. $x = \dfrac{(39)(41)}{29}$

$= \dfrac{(40-1)(40+1)}{29}$

$= \dfrac{40^2 - 1^2}{29} = \dfrac{1599}{29}$

$= \dfrac{1450 + 145 + 4}{29}$

$= 50 + 5 + \dfrac{4}{29} = 55$ to the nearest integer.

8. $x = \dfrac{(91)(476)}{36}$

$= \dfrac{90}{36} \times 476 + \dfrac{476}{36}$

$= 1190 + 13\dfrac{4}{18}$

$= 1203$ to the nearest integer.

9. $x = \dfrac{(32)(638)}{209}$

$= \dfrac{(32)(11)(58)}{(11)(19)}$

$= \dfrac{32(57+1)}{19} = 96 + \dfrac{32}{19}$

$= 98$ to the nearest integer.

10. $x = \dfrac{(440)(35)}{(4)(19)}$

$= \dfrac{440 \times \frac{70}{2}}{76} = \dfrac{15200 + 200}{76} = 200 + 2\dfrac{48}{76}$

$= 203$ to the nearest integer

11. $x = \dfrac{(41)(29)}{18} = \dfrac{(41)(30-1)}{18} = \dfrac{1189}{18} = 66.05 \simeq 66.$

12. $\dfrac{16}{59} = \dfrac{73}{x}$

$x = \dfrac{(73)(59)}{16} = \dfrac{(66-7)(66+7)}{16}$

$= \dfrac{66^2 - 7^2}{16} = \dfrac{4356 - 49}{16} = 269 \cdot 1875 \simeq 269.$

13. $x = \dfrac{864}{9 \times 7} \times 294 = \dfrac{864}{9 \times 7} \times 7 \times 42 = 4032.$

14. $x = \dfrac{16}{215} \times 12 = \dfrac{192}{215}$ which is slightly more than $\dfrac{192}{216} = \dfrac{8}{9} = 0 \cdot \overline{8}$.

Among the choices, 0·89 is the only choice more than $0 \cdot \overline{8}$.

Solutions for questions 15 to 45:

15. $x = \dfrac{247}{2197} \times \dfrac{221}{187}$

$= \dfrac{19 \times 13}{13^3} \times \dfrac{17 \times 13}{17 \times 11} = \dfrac{19}{143}$. Choice (C)

16. $? = 120 \times 5 + 6 \times 80 = 600 + 480 = 1080$ Choice (D)

17. $?$ = 28% of 200 + 18% of 120 + 26% of 300

$= \dfrac{28}{100} \times 200 + \dfrac{18}{100} \times 120 + \dfrac{26}{100} \times 300$

$= 56 + 21.6 + 78 = 155.6$

Closest answer is 156 Choice (B)

18. $? = \sqrt{729} \div \sqrt{9} \times 6$

$= \sqrt{\dfrac{729}{9}} \times 6 = 9 \times 6 = 54$ Choice (A)

19. $? = \dfrac{321}{107} + \dfrac{16}{4} = 3 + 4 = 7$ Choice (C)

20. $? = 485 + 285 - 827 + 74 = 770 + 74 - 827 = 844 - 827$
$= 17$ Choice (D)

Solutions for questions 21 to 45:

21. $111.9 \times 5.01 + 4.01 \times 89.9$
$\cong 112 \times 5 + 4 \times 90 = 560 + 360 = 920$ Choice (D)

22. $\sqrt{225.01} \times \sqrt{8.98} + 26.9 \times 5.01$
$\cong \sqrt{225} \times \sqrt{9} + 27 \times 5$
$\cong 15 \times 3 + 27 \times 5$
$= 45 + 135 = 180.$ Choice (A)

23. $19.98 \times 39.01 \div 20.01 + 18.03 = ?$
$\cong 20 \times 39 \div 20 + 18$
$\cong 39 + 18 = 57.$ Choice (D)

24. 24% of 300.13 + 17.9% of 90 + 11.9% of 400 = ?
$\cong \dfrac{24}{100} \times 300 + \dfrac{18}{100} \times 90 + \dfrac{12}{100} \times 40$
$\Rightarrow 72 + 16.2 + 48 = 136.$ Choice (C)

25. $\dfrac{(9.99)(7.01)(2.05) + (17.05)(2.95)(15.01)}{13^2 + 12}$

$\cong \dfrac{10 \times 7 \times 2 + 17 \times 3 \times 15}{169 + 12}$

$= \dfrac{905}{181} \cong 5.$ Choice (D)

26. 34% of 400.17 + 27.9% of 90 – 23.9% of 200 = ?
$\cong \dfrac{34}{100} \times 300 + \dfrac{28}{100} \times 90 - \dfrac{24}{100} \times 200$
$= 102 + 25.2 - 48 = 40.$ Choice (D)

27. $\frac{28.1\%\text{ of }300+57.1\%\text{ of }500}{37.9\%\text{ of }200}$

$\cong \frac{\frac{28}{100}\times300+\frac{57}{100}\times500}{\frac{38}{100}\times200}$

$\cong \frac{84+285}{76} = \frac{369}{76} = 4.8.$ Choice (C)

28. $\frac{16\%\text{ of }700+20\%\text{ of }500.01}{8\%\text{ of }690+5.1\%\text{ of }200.09}$

$\cong \frac{\frac{16}{100}\times700+\frac{20}{100}\times500}{\frac{8}{100}\times690+\frac{5}{100}\times200}$

$\cong \frac{112+100}{56+10} = \frac{212}{66} \cong 3.$ Choice (C)

29. $\frac{(8.99)(7.01)(2.05)+(17.05)(29.88)(15.01)}{(2.01)(16.01)(19.9)}$

$\cong \frac{9\times7\times2+17\times30\times15}{2\times16\times20}$

$= \frac{7776}{640} \cong 12.$ Choice (D)

30. $\sqrt[3]{343.01}\times\sqrt[3]{124.99}\times\sqrt[3]{64.02}$ =

$\cong \sqrt[3]{343}\times\sqrt[3]{125}\times\sqrt[3]{64} = 7\times5\times4 = 140.$ Choice (C)

31. $\sqrt{146}\times18 = ?^2 + 3\%\text{ of }5973$

$\sqrt{144}\times18 \simeq ?^2 + 179.19$

$? \simeq \sqrt{216-179.19} = \sqrt{36.81} \simeq 6.$ Choice (A)

32. $6^4/_7 + 8^1/_2 + 66^7/_8 = ?$

$? = \frac{46}{7}+\frac{17}{2}+\frac{95}{8}$

$= \frac{368+476+665}{56} = \frac{1509}{50} \simeq 27.$ Choice (B)

33. $12467 - 6490 + 11812 = ? + 7829$

$? \simeq 9960.$ Choice (A)

34. a = 6/7, b = 13/16, c = 9/11

$\therefore \frac{ac}{b} = \frac{13\times11}{7\times8\times3}$ i.e

$= \frac{143}{168} \simeq 0.85.$ Choice (B)

35. $\sqrt{36.1}\times34 + 15\sqrt{8.92} = ?\times(14.28\%\text{ of }217)$

$\Rightarrow 6\times34 + 15\times3 = ?\times \frac{1}{7}\times217$

$\Rightarrow 249 = ?\times31 \Rightarrow ? = \frac{249}{31} = 8.$

Choice (C)

36. $1256 \div 45896 + 205 - 15 = ?$

$\simeq 0.02 + 190$

$\therefore ? \simeq 190.$ Choice (C)

37. $8589.4 - 56983 + 5263.2 - 1256$

$\simeq 8600 - 5700 + 5250 - 1250$

$\simeq 6900.$ Choice (A)

38. $4659.3 - 7895.8 + ? + 125 = 5368$

$\simeq 4660 - 7900 + ? + 125 = 5370$

$? = 8500.$ Choice (C)

39. $\frac{42}{15} = \frac{x}{122}$

$\frac{42\times122}{15} = x\ ;\ \frac{5124}{15} = x$

$341.6 \simeq x\ (\because (15)\ (34.2) = 5130).$ Choice (D)

40. $196\%\text{ of }73 = ?^2$

$1.969 \times 73 = 143.737 = ?^2$

$? \simeq 12.$ Choice (C)

41. $? \simeq 535 - 15 + 35\times7 + 191$

$\Rightarrow ? = 956.$ Choice (D)

42. $? \simeq \frac{\frac{60}{100}\times42+92}{\frac{7.2}{1.2}\times8+16}$

$\Rightarrow ? = \frac{344}{64} \simeq 5.$ Choice (B)

43. $? = 147\times9\times7\times3+4$

$\Rightarrow = 27{,}783 + 4 = 27{,}787.$ Choice (D)

44. $?^3 \simeq 4.5\times77.76$

$?^3 = 351$

$\Rightarrow ?^3 \simeq 7^3 \Rightarrow \therefore ? = 7.$ Choice (C)

45. $? \simeq 4972 - 14$

$\Rightarrow ? \simeq 4958.$ Choice (C)

Exercise – 5(b)

Solutions for questions 1 to 15: Using approximations, the following solutions can be obtained for the value of x.

1. x = 139.29

2. x = 30.67

3. x = 57.73

4. x = 119.83

5. x = 117

6. $x = \frac{69\times504}{112} = 69\times4.5 = 310.5$

7. $x = \frac{93\times246}{185} = \frac{246}{2} = 123$

8. $x = \frac{3748}{1249}\times749$

$= \frac{(3(1249)+1)\,749}{1249}$

$= 3(749) + \frac{(749)}{1249}$

= 2247 + (some proper fraction greater than 0·5).

As $\frac{749}{1249}$ is greater than 0·5, x has a value of 2248 to the nearest integer.

9. $x = \frac{53}{83} \times 159$

$= \frac{53}{83} \times (166 - 7) = 106 - \frac{371}{83}$

$4 \times 83 = 332$.

371 is 39 above 332.

39 is 2·50 less than 50% of 83.

As 2·50 is approximately 3% of 83, 39 is 47% of 83 approximately.

Hence $\frac{371}{83} = 4 \cdot 47$ = 101·53 approximately to two decimal places.

10. $X = \frac{19 \times 142}{297} = \frac{2698}{297}$

Dividing both numerator and denominator by 3,

$X = \frac{899\frac{1}{3}}{99}$ which is slightly more than $\frac{899\frac{1}{3}}{100}$ i.e., 9 to the nearest integer

11. $x = \frac{30}{97} \times 107 = \frac{30}{97} \times (97 + 10)$

$= 30 + \frac{300}{97} = 30 + 3\frac{9}{97}$

As $\frac{9}{97} = 0 \cdot 09$, x = 33·1 to one decimal place.

12. $x = \frac{24 \times 88}{75} = \frac{8 \times 88}{25} = \frac{8 \times 88 \times 4}{100}$

$= \frac{2816}{100} = 28.16$

13. $x = \frac{126 \times 648}{375} = 217.728$

$\cong 218$

14. $x = \frac{63 \times 39}{33} = \left(\frac{21 \times 39}{11}\right) = 74.45$

15. $x^2 = 338 \times 72$

$x^2 = 169 \times 2 \times 72$

$\therefore x = 13 \times 12 = 156$

Solutions for questions 16 to 45:

16. $\frac{1}{2}$ (2304) – 0.5% of 2304 = 1152 – 11.52 = 1140.48

Choice (B)

17. $x = \frac{267 \times 279}{123} = 605.6$ Choice (A)

18. 18.17% of 229 = (18.18% – 0.01%) of 229

$= \frac{2}{11} \times 229 - 0.0229 = 41.636 - 0.0229 = 41.613$

Choice (C)

19. $31^2 - 29^2 = (31 + 29)(31 - 29) = 120$ Choice (B)

20. 345×109

$345 \times (100 + 10 - 1) = 37605$ Choice (D)

21. $105.126 \times 35.201 - 90.23 \times 3 + 55.11 \times 27.01$

$= 105 \times 35 - 90 \times 3 + 55 \times 27 = 3675 - 270 + 1485$

$= 5160 - 270 = 4890$ Choice (A)

22. $105 \times 99.9 \times 299.8 \simeq 105 \times 100 \times 300 = 3150000$

Choice (B)

23. $\sqrt[3]{216400} + \sqrt{280} + \sqrt{322}$

$= 60 + 16.5 + 18 = 94.5 \cong 95$ Choice (D)

24. $\frac{15}{100} \times 199 + \frac{14}{100} \times 202 = \frac{15}{100} \times 200 + \frac{14}{100} \times 200$

$= 30 + 28 = 58$ Choice (C)

25. $\frac{19}{52} = \frac{?}{71}$

$\frac{1}{2} \times 52 = 26$

$26 - 19 = 7 = 5.2 + 3 \times 0.52$

So, $19 = 1/2 \times 52 - [5.2 + 3 \times 0.52] + 0.26$

$\therefore ? = 1/2 \times 71 - [7.1 + 3 \times 0.71\ 9 + 0.35] = 25.91$

Alternate solution

$? = \frac{19 \times 71}{52} \simeq \frac{19 \times 18}{13} = \frac{342}{13}$ i.e. 26 Choice (A)

26. $? = \frac{920 \times (0.125)}{729} \Rightarrow ? = \frac{920 \times \left(\frac{1}{8}\right)}{729}$

$\Rightarrow ? = \frac{115}{729} \simeq 0.15$. Choice (B)

27. $659 \div 13 + ?^2 \times 15.6 = 2051 \Rightarrow 51 + ?^2 \times 15.6 = 2051$

$\Rightarrow ?^2 \times 15.6 = 2051 - 51 = 2000$

$\Rightarrow ?^2 = \frac{2000}{15.6} \Rightarrow ? = \sqrt{128.20}$

$\therefore ? \simeq 11$. Choice (A)

28. $7874 \times \frac{1}{14} \times 12 - 4 = ?$

$\Rightarrow ? \simeq 562 \times 12 - 4$

$\Rightarrow ? = 6744 - 4 \simeq 6740$. Choice (C)

29. $\frac{17.43}{32} \times 0.01 = ? \times \frac{1}{1000}$

$\Rightarrow 0.54 \times 0.01 = ? \times \frac{1}{1000}$

$\Rightarrow 0.0054 = ? \times \frac{1}{1000} \Rightarrow ? = 0.0054 \times 1000$

$\Rightarrow ? 5.4 \simeq 5$. Choice (C)

30. $(?^3 + 2210) = 25 \times 31421 \Rightarrow ?^3 = 785525 - 2210$

$\Rightarrow ?^3 = 783315 \Rightarrow ? = \sqrt[3]{783315}$

$\therefore ? \simeq 43$. Choice (D)

31. $? = \frac{184900}{24262} \times 0.44$

$\Rightarrow ? = 7.62 \times 0.44 \Rightarrow ? \simeq 3$. Choice (A)

32. $\frac{7}{9} \times 3.5 \times \frac{3.5}{5} = ?$

$\Rightarrow ? = 0.77 \times 3.5 \times 0.7$

$\Rightarrow ? = 1.9 \simeq 2$. Choice (C)

33. $?^2 \times 3.5 = 245 + 63 = 308$

$\Rightarrow ?^2 = \frac{308}{3.5} = 88 \Rightarrow ? = \sqrt{88} \simeq 9$. Choice (D)

34. $\frac{64.85}{100} \times 4200 = ?^3$

$\Rightarrow ?^3 = 64.85 \times 42 \simeq 2725$

$\Rightarrow ? = \sqrt[3]{2725} \simeq 14.$ Choice (C)

35. $? = (8 + 7 - 9 - 3) + \left(\frac{1}{5} + \frac{5}{6} - \frac{1}{5} - \frac{1}{3}\right)$

$\Rightarrow ? = 3 + \frac{3}{6} = 3 + \frac{1}{2}$

$\therefore ? \simeq 3.$ Choice (C)

36. $? \simeq \frac{45}{88} \times 32$

$\therefore ? \simeq 16.$ Choice (D)

37. $? \simeq 625 - 9 \times 70 + 200.$

$\Rightarrow ? = 825 - 630 = 195.$ Choice (B)

38. $\frac{\sqrt{532.69} + \sqrt{230.15}}{\sqrt{290.96} + \sqrt{364.56}} = ?$

$\Rightarrow ? \simeq \frac{23+15}{17+19} = \frac{38}{36}$

$\Rightarrow ? \simeq 1.$ Choice (A)

39. $? \simeq 1009 + 3952 = 4961.$ Choice (C)

40. $? = 176.06 + 3423.6925$

$\Rightarrow ? = 3599.75 \simeq 3600.$ Choice (D)

41. $256 \div 45 - 205 + 45 = ?$

$\Rightarrow 5.68 - 160 \simeq -154$ Choice (C)

42. $569.4 + 5698.3 - 5263.2 + 1256$

$\simeq 569 + 5700 - 5263 + 1256$

$\cong 2260$ Choice (B)

43. $459.3 + 7895.8 - ? - 125 = 536$

$? = 7950.$ Choice (A)

44. $\frac{92}{15} = \frac{?}{314}$

$? \simeq 1926$ Choice (D)

45. 96% of 83 = $?^2$

$?^2 = 7968$

$? = 8.9$ Choice (C)

Chapter – 6
(VBODMAS)

Exercise – 6(a)

Solutions for questions 1 to 30:

1. $? = 7 \times 11 \times (49 - 36) \times (125 - 121)$

$= 7 \times 11 \times 13 \times 4 = 1001 \times 4 = 4004$

Choice (D)

2. $? = 13^2 - 5^2 - \frac{1}{8}$ of $\frac{1}{7}$ of $\frac{7}{3}$ of 144

$169 - 25 - \frac{1}{8} \times \frac{1}{7} \times \frac{7}{3} \times 144$

$= 144 - 6 = 138$ Choice (D)

3. $? = \frac{4^2 \times 5^3 + 6 \times 4 \times 5^2}{4 \times 5}$

$= \frac{4^2 \times 5^3}{4 \times 5} + \frac{6 \times 4 \times 5^2}{4 \times 5} = 4 \times 5^2 + 6 \times 5$

$= 100 + 30 = 130$ Choice (B)

4. $? = \frac{1}{2} + \frac{1}{4} + \frac{2}{3} \quad \frac{1}{3} - \frac{1}{2} + \frac{1}{4} + \frac{1}{3} = \frac{6+4+3}{12} = \frac{13}{12}$

Choice (D)

5. $? = 3298 + 5397 - (4253 + 4386) = 8695 - 8639 = 56$

Choice (B)

6. $(15^2 + 16^2 + 13^2 + 1^2) \div (9^2 + 11^2 + 3^2 + 6)$

$= 651 \div 217 = 3$ Choice (D)

7. $8 - \{7 \text{ of } 16 \div 8 - 10 + 7\} \times \left[\frac{36 \times 14 \times 81}{7 \times 72 \times 3} + 30\right]$

$\Rightarrow \left[8 - \left(\frac{7 \times 16}{8} - 10 + 7\right)\right] \times 57 = -171$ Choice (A)

8. $\sqrt{(24-20)^3 + (24-25)^3} + (24 - 25)^3 \times 16\frac{2}{3}\%$ of ? = 84

$\Rightarrow (64 - 1) \times \frac{1}{6}$ of ? = 84 $\Rightarrow ? = 8$ Choice (C)

9. $625 - (81 + 16^2) + \frac{3}{4}$ of $\frac{76}{18} \div \left(\frac{19}{72 \times 24}\right)$

$\Rightarrow 625 - (81 + 256) + \frac{3}{4} \times \frac{76}{18} \times \frac{72 \times 24}{19} = 288 + 288 = 576$

Choice (B)

10. $\left(17\% \text{ of } \frac{4}{3} \div \frac{17}{630}\right) \div (3^4 + 2^3 + 200 - 3^2)$

$= 17 \times \frac{4}{3} \times \frac{630}{17} \div (81 + 8 + 200 - 9) = 840 \div 280 = 3$

Choice (D)

11. $? = [12 - \{216 \div 12 - 14 - 5\}] \times \left[\frac{48}{96} \times \frac{22}{11} \times \frac{108}{9} + 36\right]$

$[12 - \{18 - 14 + 5\}] \times \left[\frac{1}{2} \times 2 \times 12 + 36\right]$

$= [12 - 9] \times [12 + 36]$

$= 3 \times 48 = 144$ Choice (D)

12. $? = [420 + 200 + 7] \div ((21 + 20)(21 - 20) - 40)$

$= 627 \div (41 - 40) = 627 \div 1 = 627$ Choice (C)

13. $3025 = 25 \times 121 = 5^2 \times 11^2$

$\sqrt{3025} = 5 \times 11 = 55$

$\sqrt{30.25} = \sqrt{\frac{3025}{100}} = \frac{55}{10} = 5.5$

$\sqrt{0.003025} = \sqrt{\frac{30.25}{10000}} = \frac{5.5}{100} = 0.055$

$? = 55 - 5.5 + 0.055 = 49.555$ Choice (C)

14. $? = \frac{4.5 \times 18 + 12.5 \times 13.5}{22.5} = \frac{4.5}{22.5} \times 18 + 12.5 \times \frac{13.5}{22.5}$

$= \frac{1}{5} \times 18 + 12.5 \times \frac{3}{5} = 3.6 + 7.5 = 11.1$ Choice (B)

15. $? = \left(5^2 + \frac{1}{4^2}\right)(16-9)(4)^2 = \frac{5^2.4^2+1}{4^2}.7.4^2$

$= ((5.4)^2 + 1).7$

$= 401.7 = 2807$ Choice (A)

16. $\frac{(1.2)^3 - (0.9)^3}{(1.2)^2 + (0.9)^2 + (1.2)\times(0.9)}$

$= \frac{\left|(1.2)-(0.9)\right|(1.2)^2 + (0.9)^2 + (1.2)\times(0.9)}{(1.2)^2 + (0.9)^2 + (1.2)\times(0.9)}$

$= (1.2) - (0.9) = 0.3$ Choice (B)

17. $279 + (234 + 126) \times 2 \times 4 - 72$

$= 279 + (360) \times 8 - 72 = 279 + 2880 - 72$

$= 3087$ Choice (D)

18. $\frac{6\times4\div2-4}{6\times4\div2+4} = \sqrt{?}$

$\frac{12-4}{12+4} = \sqrt{?}$

$\frac{1}{2} = \sqrt{?}$

$? = \left(\frac{1}{2}\right)^2 = \frac{1}{4}$ Choice (D)

19. $0.54 \times 514 + 0.32 \times 514$

$= 514 \times (0.54 + 0.32) = 514 \times (0.86)$

$= 442.04$ Choice (B)

20. $9026 - 4128 + 3264 = 8162.$ Choice (C)

21. $\{12 - (37 + 22 \div 11 \times 4)\} + \{28 + (4 \text{ of } 9 - 17 - 52)\}$

$= 12 - \{36 + 2 \times 8\} + (28 + 36 - 17 - 52) = -33 - 5 = -38$

Choice (C)

22. $\frac{30(7+4-12)}{-5+6+9} \div \frac{(8\times9-32)3}{(17+15-31)10}$

$= -3 \div 12 = -1/4.$ Choice (D)

23. $(8 \text{ of } 7 + 49 - 11^2 + 17) - (45 \times 6 \div 3 - 63) + (7 \times 9 \times 3 - 13^2 + 53) = (56 + 49 - 121 + 17) - (45 \times 2 - 63 = 27) + (189 - 169 + 53) = 1 - 27 + 73 = 47.$ Choice (A)

24. $\left(\frac{-15-(16-\overline{12+12})2}{18\times4-2\times6^2-1}\right) \times \frac{1^2+2^2+3^2-11}{78-(4^2+5^2+6^2+2)}$

$= \left(\frac{15-(16-24)2}{72-72-1}\right) \times \frac{3}{-1}$

$= -1 \times -3 = 3$ Choice (B)

25. $9 \times 5^2 \times 4 \times 6 \times 3 \div (225 \times 8 \text{ of } 3) + 3^2 - 5^2 + 4^2$

$= 3 + 9 - 25 + 16 = 3$ Choice (B)

26. $(0.004)^2 + (0.04)^2 + (0.4)^2 + 4^2 = ?$

$= 0.000016 + 0.0016 + 0.16 + 16 = 16.161616$

Choice (A)

27. $\frac{85^2 + 115^2 + 170 \times 115}{200} = ?$

$= \frac{85^2 + 115^2 + 2 \times 85 \times 115}{200}$

$= \frac{(85 + 115)^2}{200} = \frac{(200)^2}{200} = 200.$ Choice (A)

28. $\frac{26^3 + 24^3 + 72 \times 26^2 + 78 \times 24^2}{50} = ?$

$= \frac{26^3 + 24^3 + 3 \times 24 \times 26^2 + 3 \times 26 \times 24^2}{50}$

$= \frac{(26 + 24)^3}{50} = \frac{(50)^3}{50} = 50^2 = 2500.$ Choice (D)

29. 24% of 2325 = ? % of 232.5

$\Rightarrow \frac{24 \times 2325}{100} = \frac{x \times 232.5}{100}$

Clearly, x = 240 Choice (A)

30. $42^2 + ? = 40 \times 58$

$\Rightarrow 42^2 + ? = 2320$ or

$= 2320 - 42^2 = 2320 - 1764 = 556$ Choice (C)

Exercise – 6(b)

Solutions for questions 1 to 30:

1. $\sqrt{3249} - \sqrt{2209} = ?$

$= \sqrt{57^2} - \sqrt{47^2} = 57 - 47 = 10$ Choice (A)

2. $\sqrt{3136} \times 3 + \sqrt{12544} \times 4 = ?$

$= \sqrt{56^2} \times 3 + \sqrt{112^2} \times 4$

$= 56 \times 3 + 112 \times 4 = 168 + 448 = 616$ Choice (D)

3. $\frac{56 \times 34 \times (55 \times 55 - 9)}{58 \times 52} = ?$

$= \frac{56 \times 34 \times (55^2 - 3^2)}{58 \times 52} = \frac{56 \times 34 \times (55 - 3)(55 + 3)}{58 \times 52}$

$= \frac{56 \times 34 \times 58 \times 52}{58 \times 52} = 1904.$ Choice (B)

4. $\sqrt{0.0004 + 0.004 + 0.01} = ?$

$= \sqrt{0.0144} = 0.12$ Choice (B)

5. $0.2 \div 0.08 \text{ of } 0.25 = ?$

i.e., $0.2 \div 0.02 = 10$ Choice (D)

6. According to BODMAS rule, we should first consider 15% of 480 = 72

$\frac{24^2}{72} = 8$

$8 + 6^2 = 44$ Choice (D)

7. $343 \div 49 = 7$

$32 \times 7 = 224$

$56 + 224 - 140 = 140$ Choice (A)

8. $(14^2 - 8^2) = 132$

$132 \div 2^2 = 33$

$25 + 33 - 1 = 57$ Choice (B)

9. 18% of 650 = 117

$117 \div 3^2 = 13$

$13 - ? = 89$

$\Rightarrow ? = -76$ Choice (C)

10. $(16^2 - 14^2 - 40) = 256 - 196 - 40 = 20$

$20 \div 2 = 10$

$11^3 \times 10 = 13310$

$13310 - 10000 = 3310$ Choice (D)

11. $\sqrt[4]{16} \times 100\% \text{ of } 26 = 13 \times ?$

$2 \times 26 = 13 \times ? \Rightarrow ? = 4$ Choice (D)

12. $6^1/_2 - 4^1/_3 + 6^1/_3 - 3^1/_2$
$\Rightarrow (6 - 4 + 6 - 3) + (1/2 - 1/3 + 1/3 - 1/2)$
$\Rightarrow 5$ Choice (A)

13. $666.666 + 6.66666 - 33.3333 + 333.333 = 973.33236$ Choice (D)

14. $\sqrt{12100} + \frac{23}{161} \times 1064 \Rightarrow 110 + 152 = 262.$ Choice (C)

15. $\frac{(13.25 + 18.75)}{6 + 2} = \frac{32}{8} = 4$ Choice (A)

16 $11 \times 18 + 2438 - 2145 = ?$
$\Rightarrow ? = 2636 - 2145 = 491.$ Choice (C)

17. $48 + 1367 - 2439 + 1694 = ?$
$\Rightarrow ? = 3109 - 2439 = 670.$ Choice (B)

18. $\frac{8}{13}$ of $\frac{65}{24}$ of (27) + 32 – $\frac{1}{4}$ of (8) = ?
$\Rightarrow ? = \frac{8}{13} \times \frac{65}{24} \times 27 + 32 - 2$
$\Rightarrow ? = 45 + 30 = 75.$ Choice (D)

19. $\frac{2448}{6 \times 3 \times 4} + 27 \times 20 = ?$
$\Rightarrow ? = 34 + 540 = 574.$ Choice (D)

20. $5.40 \times \frac{1}{30} \times 0.5 + 4.32 = ? \times \frac{1}{1000}$
$\Rightarrow 0.18 \times 0.5 + 4.32 = ? \times \frac{1}{1000}$
$\Rightarrow ? \times \frac{1}{1000} = 4.41$
$\Rightarrow ? = 4410.$ Choice (A)

21. $484 \times 14 \div ? = 121 + 240 - 240$
$\Rightarrow 484 \times 14 \times \frac{1}{?} = 121$
$\Rightarrow ? = \frac{484 \times 14}{121} = 56.$ Choice (D)

22. $\frac{8580}{6} \times 7.8 + \frac{725}{29} \times 9 = ?$
$\Rightarrow ? = 143 \times 78 + 25 \times 9$
$\Rightarrow ? = 11379.$ Choice (D)

23. $\frac{60}{100} \times 1300 = \frac{?}{100} \times 1700 + \frac{900}{90} - \frac{20}{100} \times 400$
$\Rightarrow ? \times 17 + 10 - 80 = 780$
$\Rightarrow ? \times 17 = 780 + 70 = 850$
$\Rightarrow ? = \frac{850}{17} = 50$ Choice (B)

24. $? = \frac{451}{100} \times \frac{60}{100} \times \frac{80}{100} \times \left[\frac{714}{8} \times \frac{64}{17}\right] \times \frac{1}{378} \times 1125$
$\Rightarrow ? = \frac{9}{20} \times \frac{3}{5} \times \frac{4}{5} \times [42 \times 8] \times \frac{1}{378} \times 1125$
$\Rightarrow ? = 24 \times 9 = 216.$ Choice (D)

25. $? = \frac{2}{5}$ of $\left\{\left(36 \div 4 \times \frac{1}{9}\right) + \frac{1}{9}\right\}.$
$\Rightarrow ? = \frac{2}{5} \times \left\{1 + \frac{1}{9}\right\} \Rightarrow ? = \frac{2}{5} \times \frac{10}{9} = 4/9.$ Choice (D)

26. $? = \frac{3}{325}$ of $\frac{4}{25}$ of $\frac{65}{9}$ of $\frac{60}{96}$ of $\frac{25}{4}$ of $\frac{3}{5}$
$\Rightarrow ? = \frac{3}{325} \times \frac{4 \times 65 \times 60 \times 25}{25 \times 9 \times 96 \times 4} \times \frac{3}{5}$
$\Rightarrow ? = \frac{1}{40}.$ Choice (B)

27. $\frac{9}{15}$ of $\frac{5}{9}\left\{\frac{49}{6} \times \frac{2}{7}$ of $\frac{24}{5} \times \frac{15}{16}\right\} = ?$
$\Rightarrow ? = \frac{9}{15} \times \frac{5}{9}\left\{\frac{7}{3} \times \frac{9}{2}\right\}$
$\Rightarrow ? = 7/2.$ Choice (A)

28. $? = \frac{6}{164} \times \frac{8}{48} \times 7 \times \frac{3}{7}$
$\Rightarrow ? = \frac{3}{164}$ Choice (D)

29. $\frac{\sqrt{169} \times \sqrt{49}}{\sqrt[3]{343} \times \sqrt{121}} = \frac{13 \times 7}{7 \times 11} = \frac{13}{11}\left(\frac{13}{11} \times 11^2\right) + 64 - 81 = ?$
$\Rightarrow ? = (13 \times 11) + 64 - 81 = ?$
$\Rightarrow ? = 126.$ Choice (C)

30. $13 \times 45 + 17 \times 16 = ?$
$\Rightarrow ? = 585 + 272 = 857.$ Choice (D)

Speed Enhancement Test – 1

Solutions for questions 1 to 5:

1. Adding last two digits of the all the numbers, we have
$55 + 58 + 57 - 95 - 54 = 21$
Adding first three digits of all the numbers
$698 + 429 + 409 - 752 - 599 = 185$
The required sum is (18500+21) =18521

2. 130827

3. 19512

4. 289358

5. 84096

Solutions for questions 6 to 10:

6. By using the method of calculating the product of two 3-digit numbers, we can arrive at the answer quickly.
(or)
Alternately,
535 x 895 = 535 (900 – 5)
= 481500 – 2675 = 478825

7. 236672

8. 208962

9. 200376

10. 319140

Solutions for questions 11 to 15:

11. 10% of 484 = 48.4
1% of 484 = 4.84
0.1% of 484 = 0.484
$48 \approx 48.4 - 0.484$
$\therefore \frac{48}{484} \approx 9.9\%$

12. 343 is 36.33% of 944

13. 843 is 68.15% of 1237

14. 585 is 12.76% of 4586

15. 735 is 17.27% of the 4255

Solutions for questions 16 to 20

16. Comparing $\frac{11}{20}$ and $\frac{20}{39}$, as

11 x 39 > 20 x 20, $\frac{11}{20} > \frac{20}{39}$, .

Also $\frac{39}{71}$ is much greater than these two.

$\therefore \frac{11}{20}$ is the lowest.

17. 14/26 is closer to 1/2, all other fractions are greater than 2/3.
Answer is 14/26.

18. All fractions except 24/80 are greater than 0.3.

19. 102/88 is less than 6/5 and, all other fractions are greater than 6/5.

20. Whenever there is a constant difference between numerator and denominator, then if all fractions are less than 1, then the fraction with the lowest numerator is the lowest.
Answer is 18/32.

Solutions for questions 21 to 25:

21. 12 + 7(20 – 7) = 103 Choice (D)

22. 45% of [540/7(18 – 17 + 20)] = 729 Choice (A)

23. 1/24 (56 – 4 + 156 – 16) = 8 Choice (B)

24. 256.5 – 197 + 113.5 = 173 Choice (C)

25. 70.56 x 3 + 224.12 – 14.112 x 25
= 435.8 – 352.8 = 83 Choice (D)

Speed Enhancement Test – 2

Solutions for questions 1 to 5:

1. By adding two digits (in tens digit and units digit) at a time, and then adding two digits (thousands digit and hundred digit) and then adding ten thousands digit at a time, the sum of 74194, 48013 and 18934 is 141141. Now adding both the numbers, with negative sign, the sum of 38925 and 22256 is 61181.
141141 – 61181 = 79960

2. The sum is 377774.

3. The sum is 219575.

4. The sum of the four positive numbers is 154813
154813 – 94381 = 60432.

5. The sum of the four negative numbers is 94426
97485 – 94423 = 3059.

Solutions for questions 6 to 10:

6. $73 \times 18 \times 19 = 1314 \times (20 - 1) = 26280 - 1314 = 24966$

7. $248 \times (200 + 5) = 49600 + 248 \times 5 = 50840$

8. (1000 – 1) x (1000 – 5) = 1000^2 – (5 + 1)1000 + 5×1
= 994005

9. $(800 - 6)^2 = 640000 + 36 - 9600 = 630436$

10. $(500 - 7) \times (500 + 7) = 500^2 - 7^2 = 250000 - 49 = 249951$

Solutions for questions 11 to 15:

11. $129 = 43 \times 3$
$301 = 43 \times 7$
As 43 divides 129 and 301 exactly. It is the HCF of 129 and 301.
The LCM of 43, 129 and 301
LCM $(43, 43 \times 3, 43 \times 7) = 43 \times$ (LCM OF 1, 3, 7)
$= 43 \times 21 = 903$

12. $84 = 7 \times 3 \times 2^2$
$119 = 7 \times 17$
$147 = 7^2 \times 3$
HCF $(84, 119, 147)$ = HCF $(7 \times 12, 7 \times 17, 7 \times 21)$
$= 7 \times$ HCF (12, 17, 21) = 7 x 1 = 7.
LCM (84,119,147) = $7^2 \times 3 \times 2^2 \times 17 = 9996$

13. $112 = 16 \times 7$
$224 = 16 \times 14$
$336 = 16 \times 21$
HCF (112, 224, 336)
= HCF$(16 \times 7, 16 \times 14, 16 \times 21)$
$= 16 \times$ HCF (7, 14, 21) $= 16 \times 7 = 112$
$\therefore$ HCF = 112
LCM $(16 \times 7, 16 \times 14, 16 \times 21)$
$= 16 \times 7$ LCM (2, 3) $= 16 \times 7$ x 3 x 2 = $336 \times 2 = 672$
$\therefore$ LCM = 672

14. $36 = 6 \times 6$
$288 = 6 \times 48$
$576 = 6 \times 96$
HCF $(6 \times 6, 6 \times 48, 6 \times 96)$
$= 6 \times$ HCF (6, 48, 96) $= 6 \times 6 = 36 \Rightarrow$ HCF = 36
LCM $(6 \times 6, 6 \times 8, 6 \times 16)$
$= 36 \times$ LCM (1, 8, 16) $= 36 \times 16 = 576 \Rightarrow$ LCM = 576

15. $255 = 85 \times 3$
$425 = 85 \times 5$
$595 = 85 \times 7$
HCF $(85 \times 3, 85 \times 5, 85 \times 7)$
$= 85 \times$ HCF (3, 5, 7) $= 85 \Rightarrow$ HCF = 85
LCM $(85 \times 3, 85 \times 5, 85 \times 7)$
$= 85 \times$ LCM (3, 5, 7) = 85 x 105 = 8925
$\Rightarrow$ LCM = 8925

Solutions for questions 16 to 20:

16. 29% can be considered as 30% – 1%
30% of 584 = 175.2
1% of 584 = 5.84
29% of 584 = 175.2 – 5.84 = 169.36

17. 53% can be considered as 50% + 3 x 1%
50% 1152 = 576
1 % of 1152 = 11.52
53 % of 1152 = 576 + 3 x 11.52 = 610.56

18. Let X % of 1495 is 794
$x = 794/1495 \times 100$
Since 794 and 1495 do not have any common factors, 1% method has to be used.
1495 is a 4 digit number and 794 is a three digit number.
1% of 1495 is 14.95
14.95 goes 53 times in 794
$14.95 \times 53 = 792.35$
794 – 792.35 = 1.65
14.95 x 0.11 = 1.65
The answer is 53.11%

19. 12804/45687 is the given fraction.
1% of 45687 = 456.87
456.87 goes 28 times in 12804
456.87x 28 = 12792.36
12804 – 12792.36 = 11.64
12.804 not go in 11.64 even one time
The answer is 28%

20. 39.5% can be considered as 40% – 0.5%
40% of 1447 = 578.8
0.5% of 1447 = 7.235
39.5% of 1447 = 578.8 – 7.235 = 571.565

Solutions for questions 21 to 25:

21. $\frac{16}{17}+\frac{24}{34}+\frac{67}{51}$

$\frac{16}{17}+\frac{12}{17}+\frac{67}{51}=\frac{(16+12)\times 3+67}{51}=\frac{151}{51}$

22. $\frac{8}{21}+\frac{14}{28}+\frac{43}{56}$

$=\frac{(8\times 8)+(6\times 14)+(3\times 43)}{168}=\frac{277}{168}$

23. $\frac{18}{24}+\frac{32}{48}+\frac{48}{96}$

$=\frac{(18\times 4)+(2\times 32)+(48)}{96}=\frac{184}{96}=\frac{23}{12}$

24. $\frac{12}{16}+\frac{58}{64}+\frac{108}{128}+\frac{120}{256}$

$=\frac{(12\times 16)+(58\times 4)+(2\times 108)+120}{256}=\frac{760}{256}=\frac{190}{64}=\frac{95}{32}$

25. $\frac{11}{216}+\frac{10}{180}+\frac{4}{270}+\frac{8}{135}$

$=\frac{(11\times 5)+(10\times 6)+(4\times 4)+(8\times 8)}{1080}=\frac{195}{1080}=\frac{13}{72}$

Speed Enhancement Test – 3

Solutions for questions 1 to 5:

By using the rule for multiplying two 3 digit numbers we can say.

1. 684978

2. 409032

3. 762603

4. 285254

5. 625408

Solutions for questions 6 to 10:

6. 16.4% of 745 = 16% of 745 + 0.4% of 745

$=\frac{4}{25}\times 745+\frac{4\times 7.45}{10}=119.2+2.98=122.18$

7. 88.96% of 972 = 88.88% of 972 + 0.08% of 972

$=\frac{8}{9}\times 972+0.08\times 9.72=864+0.7776=864.7776.$

$=865$

8. 46.45% of 7777 = 45.45% of 7777 + 1% of 7777

$=\frac{5}{11}\times 7777+77.77=3535+77.77=3612.77$

$=3612.8$

9. 73.85% of 8496 = 75% of 8496 – 1.15% of 8496

$=\frac{3}{4}\times 8496$ – 1% of 8496 – 0.15% of 8496

= 6372 – 84.96 – 12.744 = 6274.296.

10. 360 is 4.5 times of 80.
∴ The required percentage is 450%.

Solutions for questions 11 to 15:

11. $\frac{37}{75}=\frac{1}{\frac{75}{37}}=\frac{1}{2+\frac{1}{37}}$

$\frac{38}{77}=\frac{1}{\frac{77}{38}}=\frac{1}{2+\frac{1}{38}}$

$\frac{39}{79}=\frac{1}{\frac{79}{39}}=\frac{1}{2+\frac{1}{39}}$

$\frac{40}{81}=\frac{1}{\frac{81}{40}}=\frac{1}{2+\frac{1}{40}}$

$\frac{41}{83}=\frac{1}{\frac{83}{41}}=\frac{1}{2+\frac{1}{41}}$

$\frac{1}{37}$ is the highest among $\frac{1}{37}, \frac{1}{38}, \frac{1}{39}, \frac{1}{40}, \frac{1}{41}$

∴ $\frac{37}{75}$ is the minimum.

Alternately, as the percentage increase in numerators is greater than the corresponding denominators, here we observe that smaller the numerator, smaller is the fraction.

∴ $\frac{37}{75}$ is the minimum.

12. $\frac{24}{95}=\frac{1}{\frac{95}{24}}=\frac{1}{4-\frac{1}{24}}$

$\frac{17}{67}=\frac{1}{\frac{67}{17}}=\frac{1}{4-\frac{1}{17}}$

$\frac{22}{87}=\frac{1}{\frac{87}{22}}=\frac{1}{4-\frac{1}{22}}$

$\frac{18}{71}=\frac{1}{\frac{71}{18}}=\frac{1}{4-\frac{1}{18}}$

$\frac{19}{75}=\frac{1}{\frac{75}{19}}=\frac{1}{4-\frac{1}{19}}$

$\frac{1}{24}$ is the least among $\frac{1}{24}, \frac{1}{17}, \frac{1}{22}, \frac{1}{18}, \frac{1}{19}$

∴ $\frac{24}{95}$ is the minimum.

13. $\frac{99}{75}=1+\frac{24}{75}, \frac{67}{51}=1+\frac{16}{51}, \frac{91}{69}=1+\frac{22}{69},$

$\frac{83}{63}=1+\frac{20}{63}, \frac{71}{54}=1+\frac{17}{54}$

Clearly $\frac{16}{51}$ is the least

∴ $\frac{67}{51}$ is the minimum.

14. $\frac{56}{169}<\frac{1}{3}$

$\frac{47}{140}>\frac{1}{3}$

$\frac{68}{204}=\frac{1}{3}$

∴ $\frac{68}{204}$ is neither the least nor the highest.

15. $\frac{28}{141} = \frac{1}{5+\frac{1}{28}}$

$\frac{19}{96} = \frac{1}{5+\frac{1}{19}}$

$\frac{21}{106} = \frac{1}{5+\frac{1}{21}}$

$\frac{1}{28} < \frac{1}{21} < \frac{1}{19}$

$\therefore \frac{21}{106}$ is neither the least nor the highest.

Solutions for questions 16 to 20:

16. LCM = 384, HCF = 32

17. LCM = 5236, HCF = 17

18. LCM = 920, HCF = 23

19. LCM = 324, HCF = 27

20. LCM = 372, HCF = 62

Solutions for questions 21 to 25: By using the rule of adding two digits at a time and adding all the positive terms first and then the negative terms and subtracting one from the other, we get the answer.

21. 9836 + 7834 + 1784 = 19454
1452 + 2345 = 3797
19454 – 3797 = 15657

22. 435

23. 2250

24. 8894

25. 11853

Speed Enhancement Test – 4

Solutions for questions 1 to 5:

1. $25.001 \times 13.997 - 18.01 \times 5.99 = ?$
$\Rightarrow ? = 25 \times 14 - 18 \times 6 = 350 - 108 = 242.$ Choice (B)

2. $335.998 \div 6.002 - 9.01 \times 4.98 = ?$
$\Rightarrow ? = 336 \div 6 - 9 \times 5 = 56 - 45 = 11.$ Choice (A)

3. $\sqrt{64.03} \div \sqrt{15.97} + 81.003 \div 8.988 = ?$
$\Rightarrow ? = 8 \div 4 + 81 \div 9 = 2 + 9 = 11.$ Choice (C)

4. $345.99 \div 173.01 + 9.02 \times 7.99 = ?$
$\Rightarrow ? = 346 \div 173 + 9 \times 8 = 2 + 72 = 74.$ Choice (D)

5. $? = 986.93 + 234.02 - 884.92 = 987 + 234 - 885 = 336.$ Choice (C)

Solutions for questions 6 to 10:

6. LCM of denominators is 75.
$\frac{8}{25} + \frac{7}{15} + \frac{4}{75} = \frac{24+35+4}{75} = \frac{63}{75} = \frac{21}{25}$

7. $\frac{9}{72} + \frac{4}{36} + \frac{96}{144} = \frac{1}{8} + \frac{1}{9} + \frac{2}{3}$
LCM of denominators is 72
$= \frac{9+8+48}{72} = \frac{65}{72}$

8. LCM of denominators = $2 \times 11 \times 6 = 132$
$\therefore$ The answer is $\frac{(3\times6)+(9\times12)+(11\times11)}{132} = \frac{247}{132}$

9. Inversion and comparison of fractions, gives a clear picture.
$\frac{23}{6} = 3 + \frac{5}{6}$, $\frac{35}{9} = 3 + \frac{8}{9}$, $\frac{43}{11} = 3 + \frac{10}{11}$,
$\frac{45}{16} = 2 + \frac{13}{16}$
Clearly, $2 + \frac{13}{16}$ is the least.
$\therefore \frac{16}{45}$ is the highest.

10. $\frac{49}{101} = \frac{1}{2.06}$
$\frac{74}{223} = \frac{1}{3.01}$
$\frac{91}{227} = \frac{1}{2.49}$
$\frac{87}{260} = \frac{1}{2.99}$ s
$\frac{65}{229} = \frac{1}{3.52}$
The descending order is $\frac{49}{101}, \frac{91}{227}, \frac{87}{260}, \frac{74}{223}, \frac{65}{229}$

Solutions for questions 11 to 15:

11. Adding the last two digits, we have 76 + 58 + 27 + 18 + 69 = 248
Adding the remaining digits, we get 98 + 34 + 84 + 93 + 78 = 387
$\therefore$ The required sum is 38948.

12. 29101

13. 14448

14. 1188

15. 3732

Solutions for questions 16 to 20:

16. 24.92% of 4800 = 25% of 4800 – 0.08% 4800
$= \frac{1}{4} \times 4800 - 0.08 \times 48 = 1200 - 3.84 = 1196.16$

17. 49% of 1636 = 50% of 1636 – 1% of 1636
$= \frac{1}{2} \times 1636 - 16.36 = 818 - 16.36 = 801.64$

18. 6.66% of 4896 = $\frac{2}{30} \times 4896 = \frac{2\times1632}{10} = 326.4$

19. 85.5% of 5676 = 87.5% of 5676 – 2% of 5676
$= \frac{7}{8} \times 5676 - 2 \times 56.76 = 4966.5 - 113.52 = 4852.98$

20. $\frac{1}{3}$ of 864 = 288 i.e, 33.33% of 864 = 288
Now, 288 – 283 = 5, i.e. 5 is less than 1% of 864 which is 8.64. 5 is almost 0.6% of 864. Hence the required answer is (33.33 – 0.6)% = 32.73%

Solutions for questions 21 to 25:

By using the method of multiplying two 3 digit numbers, we get the following answers.

21. 467558

22. 774795

23. 578512

24. 288192

25. 559206

Speed Enhancement Test – 5

Solutions for questions 1 to 5:

1. (66 2/3 + 10)% of 1542 = 1028 + 154.2 = 1182.2

2. (33.33 + 30)% of 2883 = 961 + 864.9 = 1825.9

3. (100 – 5.5)% of 3480 = 3480 – 191.4 = 3288.6

4. (75 + 2.2)% of 4560 = 3420 +100.32 = 3520.32

5. (30 – 0.6)% of 5894 = 1768.2 – 35.364 = 1732.836

Solutions for questions 6 to 10:

6. 254 x 254 x 2 = 254^2 x 2 = 129032

7. (500 – 225) x (500 + 225) = $500^2 – 225^2$ = 199375

8. 496 x (1000 + 4) = 496000 + 1984 = 497984

9. 417690

10. 7 x 111 x 8 x 111 = 56 x 111^2 = 689976

Solutions for questions 11 to 15:

11. 34/56 = 1/1.64
48/74 = 1/1.5
55/92 = 1/1.7
60/96 = 1/1.6
55/92 < 34/56 < 60/96 < 48/74

12. 27/89 = 1/3.29
13/54 = 1/4.15
34/123 = 1/3.6
43/185 = 1/4.3
27/89 > 34/123 > 13/54 > 43/185

13. The value of x = $\frac{489 \times 36}{652}$ = 27

14. 83/99 = 1/1.19
54/87= 1/1.6
93/123 = 1/1.3
131/293 = 1/2.23
131/293 < 54/87 < 93/123 < 83/99

15. Whenever there is a constant difference between numerator and denominator in the case of proper fractions then the fraction with the highest numerator is the highest and as the numerator decreases, value of the fraction also decreases.
50/92 > 49/91 > 48/90 > 47/89

Solutions for questions 16 to 20:

16. Adding first two digits of the given numbers, we get
75 + 43 + 34 + 29 + 58 = 239
Adding the remaining two digits of the given numbers, we get
83 + 57 + 28 + 85 + 03 = 256 $\Rightarrow$ 23900 + 256 = 24156

17. 26398

18. 81250

19. 223508

20. 28322

Solutions for questions 21 to 25:

21. 36 = 3^2 x 2^2
54 = 3^3 x 2
135 = 3^3 x 5
LCM = 3^3 x 2^2 x 5 = 540
HCF = 3^2 = 9

22. 18 = 3^2 x 2
45 = 3^2 x 5
72 = 3^2 x 2^3
LCM = 9 x 5 x 8 = 360
HCF = 9

23. 56 = 7 x 2^3
63 = 7 x 3^2
84 = 7 x 3 x 2^2
LCM = 7x 2^3 x 3^2 = 504
HCF = 7

24. 48 = 2^4 x 3
80 = 2^4 x 5
384 = 2^7 x 3
LCM = 2^7 x 3 x 5 = 1920
HCF = 2^4 = 16

25. 32 = 2^5
128 = 2^7
256 = 2^8
LCM = 2^8 = 256
HCF = 2^5 = 32

Speed Enhancement Test – 6

Solutions for questions 1 to 5:

By applying method of multiplication of two 3-digit numbers we will get the answer.

1. 163782

2. 113216

3. 227682

4. 576 x 243 = 139968
376 x 246 = 92496
139968 – 92496 = 47472

5. 436 x 462 = 201432
764 x 133 = 101612
201432 – 101612 = 99820

Solutions for questions 6 to 10:

By using the principle of adding two digits at a time we get

6. 22577
7. 29081

8. 13178

9. 35330

10. 10929

Solutions for questions 11 to 15:

11. 30% of 8943 = 2682.9
4% of 8943 = 357.72
0.45% of 8943 = 40.2435
34.45% of 8943 = 3080.8635

12. 43.87 % = (50 – 6.13)%
50% of 5674 = 2837
6% of 5674 = 340.44
0.13 % of 5674 = 7.3762
43.87% of 5674 = 2837 – 340.44 – 7.3762
= 2489.1838

13. 78.53 % = (75+3.53) %
75% of 9848 = 7386
3% of 9848 = 295.44
0.53% of 9848 = 52.1944
78.53 % of 9848 = 7733.6344

14. (1345 /3948) x 100%
34 % of 3948 = 1342.32
0.06% of 3948 = 2.3688
34.06% of 3948 is 1345.

15. (934/4345) x 100%
21% of 4345 = 912.45
0.49% of 4345 = 21.2905
21.49% of 4345 is 934

Solutions for questions 16 to 20:

16. 95/189 = 1/1.989
45/89 = 1/1.977
113/225 = 1/1.9911
78/155 = 1/1.987
113/225 < 95/189 < 78/155 < 45/89

17. 58/32 =1.8125
94/45 = 2.08
125/54 = 2.314
189/92 = 2.05
125/54 > 94/45 > 189/92 > 58/32

18. x = (824 x 562)/1124 = 412

19. 22/24 + 34/32 – 40/48

$= \frac{22\times4+34\times3-2\times40}{96} = \frac{110}{96}$

$= \frac{55}{48}$

20. 32/41 – 76/82 + 108 / 123

$= \frac{32\times6-76\times3+2\times108}{246} = \frac{180}{246} = \frac{30}{41}$

Solutions for questions 21 to 25:

21. 54 =18 x 3
162 = 18 x 9
198 = 18 x 11
LCM = 18 x 9 x 11 = 1782
HCF = (18 x3, 18 x 9, 18 x 11) = 18

22. 136 = 17 x 8
374 = 17 x 22
476 = 17 x 28
LCM = 17 x 8 x 11 x 7 = 10472
HCF =(17 x 8, 17 x 22, 17 x 28) = 34

23. 138 = 23 x 6
161 = 23 x 7
207 = 23 x 9
LCM = 23 x 2 x 8 x 7 = 2898
HCF = (23 x 6, 23 x 7, 23 x 9) =23

24. 75 = 5 x 15
104 = 13 x 8
130 = 15 x 26
LCM = 5 x 15 x 4 x 26 = 7800
HCF = (5 x 15, 13 x 8, 15 x 26) = 1

25. 121/27, 51/8,153/29
As two numbers of opposite parity have a HCF of 1.
Hence HCF (121, 51, 153) = 1
HCF of the given fractions

$= \frac{1}{\text{LCM}(\text{the prime numbers given})}$

LCM of given fractions = $\frac{\text{LCM of }(121, 51, 153)}{\text{HCF of }(27, 8, 29)}$

$= \frac{\text{LCM}(11\times11, 51, 51\times3)}{\text{HCF of }(27, 8, 29)} = \frac{18513}{1} = 18513$

As LCM (prime numbers) would always be their product.

HCF of given fractions = $\frac{1}{(27\times8\times29)} = \frac{1}{6264}$

Speed Enhancement Test – 7

Solutions for questions 1 to 5:

By the concept of ten percent and one percent we can find the percentage values.

1. 740 is 82.96% of 892

2. 136 is 18.5% of 735

3. 634 is 63.53% of 998

4. 162 is 24.55% of 659

5. 548 is 69.72% of 786

Solutions for questions 6 to 10:

By using the method of multiplying two 3-digit numbers, we get.

6. 65394

7. 629038

8. 592752

9. 118809

10. 45387

Solutions for questions 11 to 15:

Additions and Subtractions can be done faster by operating with two digits at a time.

11. 26319

12. 32819

13. 11771

14. 40717

15. 30599

Solutions for questions 16 to 20:

16. $\frac{77}{48}+\frac{83}{96}-\frac{29}{32}=\frac{154+83-87}{96}=\frac{150}{96}=\frac{25}{16}$

17. $\frac{18}{95}-\frac{27}{76}+\frac{23}{57}=\frac{216-405+460}{1140}=\frac{271}{1140}$

18. $\frac{43}{13}$ = 3.31, $\frac{55}{17}$ = 3.24, $\frac{61}{19}$ = 3.21, $\frac{79}{25}$ = 3.16, $\frac{94}{30}$ = 3.13

$\therefore \frac{94}{30}<\frac{79}{25}<\frac{61}{19}<\frac{55}{17}<\frac{43}{13}$

19. $\frac{123}{196}=\frac{1}{1.59}, \frac{81}{152}=\frac{1}{1.88}, \frac{23}{35}=\frac{1}{1.52}, \frac{46}{93}=\frac{1}{2.02}, \frac{72}{95}$

$= \frac{1}{1.32}$

$\Rightarrow$ The descending order is $\frac{72}{95}, \frac{23}{35}, \frac{123}{196}, \frac{81}{152}, \frac{46}{93}$

20. (a) $\frac{63}{197} \simeq \frac{1}{3.1}$

$\frac{44}{127}=\frac{1}{<3} \therefore \frac{44}{127}>\frac{63}{197}$

(b) $\frac{235}{704}>\frac{1}{3}$ and $\frac{326}{983}<\frac{1}{3} \Rightarrow \frac{235}{704}>\frac{326}{983}$

Solutions for questions 21 to 25:

21. $\frac{9}{27}+\frac{8}{32}-\frac{6}{30}+\frac{5}{15}=\frac{1}{3}+\frac{1}{4}-\frac{1}{5}+\frac{1}{3}=\frac{20+15-12+20}{60}$

$=\frac{43}{60}=0.717$ Choice (C)

22. $\frac{3^2\times7\times2^2+5\times7^2\times6}{42}=\frac{7\text{ x }6\text{ x }(6+35)}{42}=41.$

Choice (B)

23. 932.64 + ? – 823.16 = 735.86 + 243.35
$\Rightarrow$? = 869.73 Choice (B)

24. 91686 – 5672 + 8423 – 3827 = ?
$\Rightarrow$? = 8110 Choice (A)

25. 8493 + 3846 + 7312 + 9457 – 1836 = ?
$\Rightarrow$? = 27272 Choice (D)

Speed Enhancement Test – 8

Solutions for questions 1 to 5:

1. 345 × 355 = (350 – 5) (350 + 5) = $(350)^2 - 5^2$
= 122500 – 25 = 122475

2. 839 × 639 = (800 + 39) (600 + 39)
= 800 × 600 + 1400 × 39 + 39 × 39
= 480000 + 54600 + 1521 = 536121

3. By using the method of multiplying two three digit numbers the product is 594072

4. 369 × 246 = 3 × 123 × 2 × 123 = 6 × 15129 = 90774

5. 1953 × 197 = (1750 + 203) 197 = 1750 × 197 + 203 × 197
$=\frac{7000}{4}\times197+(200+3)(200-3)$
$=(7000\times49.25)+(200^2-3^2)$
= (70 × 4925) + (40000 – 9)
= 344750 + 39991 = 384741

Solutions for questions 6 to 10:

6. 10% of 3269 = 326.9
80% of 3269 = 2615.2
4% of 3269 = $\frac{261.52}{2}$ = 130.76
$\therefore$ 84% of 3269 = 2745.96

7. $68\frac{2}{3}\%$ of 639 = $66\frac{2}{3}\%$ of 639 + 2% of 639
$=\frac{2}{3}\times639+2\times6.39=426+12.78=438.78$

8. 56% of 758 = 50% of 758 + 6% of 758
$=\frac{1}{2}\times758+6\times7.58=379+45.48=424.48$

9. 35% of 932 = $\frac{7}{20}\times932=\frac{7}{10}\times466=7\times46.6=326.2$

10. 40% of $\frac{45}{91}=\frac{2}{5}\times\frac{45}{91}=\frac{18}{91}=0.198$

Solutions for questions 11 to 15:

11. $\frac{15}{62}\approx\frac{1}{4.13},\frac{11}{50}\approx\frac{1}{4.54},\frac{44}{123}\approx\frac{1}{2.79},\frac{65}{184}\approx\frac{1}{2.83}$
$\therefore\ \frac{11}{50}<\frac{15}{62}<\frac{65}{184}<\frac{44}{123}$

12. $\frac{9}{23}\approx\frac{1}{2.55},\frac{11}{56}\approx\frac{1}{5.09},\frac{18}{73}\approx\frac{1}{4.05},\frac{22}{145}\approx\frac{1}{6.59}$
$\therefore\ \frac{9}{23}>\frac{18}{73}>\frac{11}{56}>\frac{22}{145}$

13. $\frac{15}{22}+\frac{17}{110}-\frac{35}{66}=\frac{225+51-175}{330}=\frac{101}{330}$

14. $\frac{15}{16}+\frac{17}{32}+\frac{19}{64}+\frac{5}{8}+\frac{1}{4}=\frac{60+34+19+40+16}{64}=\frac{169}{64}$

15. $\frac{13}{170}=\frac{1}{13+\frac{1}{13}},\frac{12}{151}=\frac{1}{12+\frac{7}{12}},\ \frac{18}{199}=\frac{1}{11+\frac{1}{18}},$
$\frac{15}{161}=\frac{1}{10+\frac{11}{15}},\ \frac{14}{157}=\frac{1}{11+\frac{3}{14}}$
Clearly, the descending order is
$\frac{15}{161},\frac{18}{199},\frac{14}{157},\frac{12}{151},\frac{13}{170}$

Solutions for questions 16 to 20:

16. HCF (57, 171, 228) = HCF (57, 57 × 3, 57 × 4)
= 57 × HCF (1, 3, 4) = 57(1) = 57
LCM (57, 171, 228) = LCM (57, 57 × 3, 57 × 4)
= 57 × LCM (1, 3, 4) = 57 × 12 = 684

17. HCF (32, 80, 192) = HCF (16 × 2, 16 × 5, 16 × 12)
= 16 × HCF (2, 5, 12) = 16 × 1 = 16
LCM (32, 80, 192) = LCM (16 × 2, 16 × 5, 16 × 12)
= 16 × LCM (2, 5, 12) = 16 × 60 = 960

18. HCF $\left(\frac{17}{22},\frac{51}{44},\frac{102}{121}\right)=\frac{\text{HCF (17, 51, 102)}}{\text{LCM (22, 44, 121)}}$
$=\frac{\text{HCF (17, 17 x 3, 17 x 6)}}{\text{LCM (11 x 2, 11 x 4, 11 x 11)}}$
$=\frac{\text{17 x HCF (1, 3, 6)}}{\text{11 x LCM (2, 4, 11)}}$
$=\frac{17\times1}{11\times4}=\frac{17}{484}$
LCM $\left(\frac{17}{22},\frac{51}{44},\frac{102}{121}\right)=\frac{\text{HCF (17, 51, 102)}}{\text{LCM (22, 44, 121)}}$
$\frac{\text{LCM (17, 17 x 3, 17 x 6)}}{\text{HCF (11 x 2, 11 x 4, 11 x 11)}}$
$=\frac{\text{17 x LCM (1, 3, 6)}}{\text{11 x HCF (2, 4, 11)}}$
$=\frac{\text{17 x 6}}{\text{11 x 1}}=\frac{102}{11}$

19. HCF (62, 155, 248) = HCF (31 × 2, 31 × 5, 31 × 8)
= 31 × HCF (2, 5, 8) = 31 × 1 = 31
LCM (62, 155, 248) = LCM (31 × 2, 31 × 5, 31 × 8)
= 31 × LCM (2, 5, 8) = 31 × 40 = 1240

20. HCF (128, 288, 64) = HCF (32 × 4, 32 × 9, 32 x 2)
= 32 × HCF (4, 9, 2) = 32
LCM (128, 288, 64)
= LCM (32 × 4, 32 × 9, 32 × 2)
= 32 × LCM (4, 9, 2) = 32 × 36 = 1152

Solutions for questions 21 to 25:

21. 29164

22. 47100

23. 14184

24. 16441

25. 15220

Speed Enhancement Test – 9

Solutions for questions 1 to 5:

1. 30% of 1238 = 284.74
0.06% of 1238 = 0.74
22.94% of 1238 = 284

2. 88% = (100 –12)%
3948 –12% of 3948
= 3474.24

3. 78.43% = (75 + 3 + 0.43)%
(75)% 7823 + (3)% 7823 + (0.43)% 7823
5867.25 + 234.69 + 33.6389 = 6135.5789
≈ 6136

4. 54% = (50 + 4)% of 89.35
= 44.675 + 3.574 = 48.249

5. 38% of 2344 = 890.72
894 – 890.72 = 3.28
0.13% of 2344 = 3.04
38.13% of 2344 is 894

Solutions for questions 6 to 10:

6. $24 = 24 \times 1 = 2^3 \times 3$
$72 = 24 \times 3 = 2^3 \times 3^2$
$96 = 24 \times 4 = 2^5 \times 3$
LCM (24, 72, 96) = 24 x 12 = 288,
$HCF = 2^3 \times 3 = 24$

7. LCM = 1008 and HCF = 28

8. LCM =1332 and HCF = 37

9. LCM = 432 and HCF = 12

10. LCM = 1116 and HCF = 31

Solutions for questions 11 to 15:

11. LCM of denominators = 156

$$\frac{13\times 4+3\times 34-114}{156}=\frac{40}{156}=\frac{10}{39}$$

12. LCM of denominators = 231

$$\text{Total} = \frac{11\times 18+3\times 54+133}{231}=\frac{493}{231}$$

13. $\frac{25\times 35+20\times 43-16\times 94}{1200}=\frac{231}{1200}=\frac{77}{400}$

14. 78/43 = 1.81
58/45 = 1.28
45/34 = 1.32
179/94 = 1.9
58/45 < 45/34 < 78/43 < 179/94

15. 89/58 = 1.53
98/78 = 1.25
124/84 = 1.47
133/89 = 1.49
98/78 is the smallest fraction among the given fractions.

Solutions for questions 16 to 20:

16. $256\times\frac{2500}{4}=160000$

17. (300 + 5) x 953 = 285900 + 4765 = 290665

18. (1000 – 15) x 412 = 412000 – 6180 = 405820

19. (700 + 24) x (700 – 24) = 4900000 – 576 = 489424

20. (1000 – 101) x 478 = 478000 – 48278 = 429722

Solutions for questions 21 to 25:

21. Adding the last two digits of all the numbers, we have
84 + 66 – 59 – 54 = 37
Adding the remaining digits (hundreds digit),
we have, 9 + 5 – 6 – 2 = 6
The required sum = 600 + 37 = 637

22. 2161

23. 117836

24. 3484

25. 12528

Speed Enhancement Test – 10

Solutions for questions 1 to 5:

1. $\frac{4}{32}+\frac{104}{128}-\frac{348}{512}=\frac{64+416-348}{512}=\frac{132}{512}=\frac{33}{128}$

2. $\frac{17}{27}-\frac{204}{32}+\frac{14}{24}$
$=\frac{272-204+252}{432}=\frac{320}{432}=\frac{20}{27}$

3. $x=\frac{714\times 512}{768} \Rightarrow x = 476$

4. 46/68 = 1/1.47
74/98 = 1/1.32
78/102 = 1/1.3
86/133 = 1/1.54
89/142 = 1/1.59
89/142 < 86/133 < 46/68 < 74/98 < 78/102

5. 53/34 = 1.55
78/45 = 1.73
89/56 = 1.58
94/64 = 1.468
98/67 = 1.462
78/45 > 89/56 > 53/34 > 94/64 > 98/67

Solutions for questions 6 to 10:

By using the principle of adding two digits at a time, additions can be calculated faster.

6. 10713

7. 690

8. 30667

9. 122771

10. 12495

Solutions for questions 11 to 15:

By the method of multiplication of two 3-digit numbers, we get the answers.

11. 199326

12. 489426

13. 182376

14. 301070

15. 186017

Solutions for questions 16 to 20:

16. 68.65 % of 8458
= (70 – 1 – 0.35)% of 8458 = 5806.42

17. 43.7 % of 4985
= (50 – 6 – 0.3) % of 4985
= 2178.45

18. 88.46 % of 9452
= (100 – 11 – 0.54)% of 9452
= 8361.24

19. 34.57 % of 8450
$= (30 + 4 + 0.57) \times \frac{8450}{100} = 2921.17$

20. 98.48 % of 4393
$(100 - 1 - 0.52) \times \frac{4393}{100} = 4326.23$

Solutions for questions 21 to 25:

21. [57 ÷ [72 – 5 + 60 + 29]]
= 57/156 = 19 /52 Choice (B)

22. [49 + 32 – 415 + 400] x [36 + 25 – 81 + 27]
= 66 x 7
= 462 Choice (A)

23. [5184 – 3243] + [81 + 533]
= 2555 Choice (C)

24. {4900+576} 2/37÷148
= {5476} 2 /37÷148
= 2 Choice (B)

25. $\frac{(21.2+22.2+23.2)\left(21.2^2+22.2^2+23.2^2-21.2\times22.2-22.2\times23.2-23.2\times21.2\right)}{21.2^2+22.2^2+23.2^2-21.2\times22.2-22.2\times23.2-23.2\times21.2}$

= 21.2 + 22.2 + 23.2 = 66.6

Choice (D)

Speed Enhancement Test – 11

Solutions for questions 1 to 5:

1. Adding the last two digits of all the numbers, we have
78 + 32 – 56 + 46 + 73 = 173
Adding the remaining digits, we have
63 + 98 – 14 + 23 + 69 = 239
Carrying 1 from the above sum,
the required sum = 24073

2. 65.4

3. 9171

4. 15540.28

5. 9316

Solutions for questions 6 to 10:

6. LCM = 270, HCF = 45

7. LCM = 1008, HCF = 12

8. LCM = 9360, HCF = 1

9. LCM = 1190, HCF = 17

10. LCM = 285, HCF = 19

Solutions for questions 11 to 15:

11. $\frac{46}{89} = \frac{1}{1+\frac{43}{46}}, \frac{53}{121} = \frac{1}{2+\frac{15}{53}}, \frac{35}{71} = \frac{1}{2+\frac{1}{35}},$
$\frac{26}{83} = \frac{1}{2+\frac{25}{26}}, \frac{19}{75} = \frac{1}{3+\frac{18}{19}}$

$\Rightarrow$ The largest fraction is $\frac{46}{89}$

Alternately, only $\frac{46}{89}$ > 0.5 while all others are less than 0.5.

Hence $\frac{46}{89}$ is the largest.

12. $\frac{242}{501} = \frac{1}{2+\frac{17}{242}}, \frac{86}{195} = \frac{1}{2+\frac{23}{86}}, \frac{63}{159} = \frac{1}{2+\frac{33}{63}},$
$\frac{42}{127} = \frac{1}{3+\frac{1}{42}}, \frac{39}{92} = \frac{1}{2+\frac{14}{39}}$
$\frac{42}{127} < \frac{63}{159} < \frac{39}{92} < \frac{86}{195} < \frac{242}{501}$

13. $\frac{96}{384} = \frac{215}{43x}$
$\Rightarrow \frac{1}{4} = \frac{5}{x} \Rightarrow x = 4 \times 5 = 20$

14. $\frac{35}{122} - \frac{17}{244} + \frac{11}{488} = \frac{140-34+11}{488} = \frac{117}{488}$

15. $\frac{35}{122} = \frac{1}{3+\frac{17}{35}}, \frac{89}{306} = \frac{1}{3+\frac{37}{89}}, \frac{97}{183} = \frac{1}{1+\frac{86}{97}},$
$\frac{68}{225} = \frac{1}{3+\frac{21}{68}}, \frac{57}{134} = \frac{1}{2+\frac{20}{57}}$
$\frac{97}{183} > \frac{57}{134} > \frac{68}{225} > \frac{89}{306} > \frac{35}{122}$

Solutions for questions 16 to 20:

16. 77% of 896 = 70% of 896 + 7% of 896
= 7 × 89.6 + 7 × 8.96
= 627.2 + 62.72 = 689.92

17. 64.28% of 980 = $\frac{9}{14}$ × 980 = 630

18. 18.125% of 1760 = 15.625% of 1760 + 2.5% of 1760
= $\frac{5}{32}$ × 1760 + $\frac{1}{40}$ × 1760 = 5 × 55 + 44 = 319

19. 95% of 18 = $\frac{19}{20}$ × 18 = 19 × 0.9 = 17.1

20. $\frac{71}{450} = \left(\frac{72}{450} - \frac{1}{450}\right) \times 100$
$= \left(\frac{4}{25}\right) \times 100 - \frac{100}{450}$
= 16 – 0.22 i.e., 15.78
∴ 71 is 15.78% of 450.

Solutions for questions 21 to 25:

21. $435 \times 565 = (500 - 65)(500 + 65) = (500)^2 - (65)^2$
$= 250000 - 4225 = 245775$

22. $251 \times 252 = (250 + 1)(250 + 2) = (250)^2 + 3 \times 250 + 1 \times 2$
$= 62500 + 750 + 2 = 63252$

23. $994 \times 998 = (1000 - 6)(1000 - 2)$
$= (1000)^2 - 8 \times 1000 + 12$
$= 1000000 - 8000 + 12 = 992012$

24. $789 \times 811 = (800 - 11)(800 + 11) = (800)^2 - (11)^2$
$= 640000 - 121 = 639879$

25. $625 \times 725 = 625(625 + 100) = 625 \times 625 + 62500$
$= 390625 + 62500 = 453125$

Speed Enhancement Test – 12

Solutions for questions 1 to 5:

1. $560 \times 740 = (650 - 90)(650 + 90)$
$= (650)^2 - (90)^2$
$= 422500 - 8100 = 414400$

2. $157 \times 1926 = (100 + 50 + 7)(1926)$
$= 192600 + 96300 + 13482 = 302382$

3. $76 \times 98 = 76 \times (100 - 2) = 7600 - 152 = 7448$

4. $146 \times 510 = 146 \times (500 + 10) = 73000 + 1460 = 74460$

5. $569 \times 748 = 425612$

Solutions for questions 6 to 10:

6. 53.33% of 1890 = $\frac{8}{15} \times 1890 = 1008$

7. 60.07% of 4600 = 60% of 4600 + 0.07% of 4600
$= \frac{3}{5} \times 4600 + 7 \times 0.46 = 2760 + 3.22 = 2763.22$

8. $5\frac{1}{3}\%$ of 945 = $3\frac{1}{3}\%$ of 945 + 2% of 945
$= \frac{1}{30} \times 945 + 2 \times 9.45 = 31.5 + 18.9 = 50.4$

9. 54 is 50% of 108
63 – 54 = 9, 9 is 8.33% of 108
∴ 63 is 50% + 8.33% = 58.33% of 108

10. 136 is $\frac{1}{12}$th of 1632
i.e. 136 is 8.33% of 1632

Solutions for questions 11 to 15:

11. $\frac{25}{78} = \frac{1}{3 + \frac{3}{25}}, \frac{16}{52} = \frac{1}{3 + \frac{4}{16}}, \frac{23}{71} = \frac{1}{3 + \frac{2}{23}},$
$\frac{29}{78} = \frac{1}{2 + \frac{20}{29}}, \frac{63}{142} = \frac{1}{2 + \frac{16}{63}}$

Clearly, $\frac{16}{52}$ is the smallest fraction, $\frac{63}{142}$ is the largest fraction.
∴ The required difference
$= \frac{63}{142} - \frac{16}{52} = \frac{1638 - 1136}{3692} = \frac{502}{3692} = \frac{251}{1846}$

12. $\frac{17}{357} - \frac{18}{216} + \frac{3}{84} = \frac{1}{21} - \frac{1}{12} + \frac{1}{28} = \frac{4 - 7 + 3}{84} = 0$

13. $\frac{15}{92} + \frac{19}{138} - \frac{5}{207} = \frac{135 + 114 - 20}{828} = \frac{229}{828}$

14. $\frac{78}{564} = \frac{65}{x}$
$\Rightarrow \frac{6}{564} = \frac{5}{x} \Rightarrow x = 94 \times 5 = 470$

15. $\frac{32}{35} + \frac{19}{25} - \frac{11}{20} = \frac{640 + 532 - 385}{700} = \frac{787}{700}$

Solutions for questions 16 to 20:

16. Adding the last two digits of the given numbers, we have
48 + 19 + 46 + 89 – 68 = 134
Adding the remaining digits, we have
63 + 82 + 78 + 63 – 54 = 232
∴ The required sum = 23334

17. 18254

18. 11711

19. 22124

20. 4587

Solutions for questions 21 to 25:

21. $35 = 5 \times 7, 70 = 2 \times 5 \times 7, 45 = 3^2 \times 5$
∴ LCM of 35, 70, 45 = $2 \times 3^2 \times 5 \times 7 = 630$
HCF of 35, 70, 45 = 5

22. LCM = 216, HCF = 9

23. LCM = 420, HCF = 7

24. LCM = 1160, HCF = 29

25. LCM = 1125, HCF = 25

Speed Enhancement Test – 13

Solutions for questions 1 to 5:

1. 56 – 150 = –94

2. 464 + 249 – 704 + 24 = 33

3. (620 + 47 – 15) ÷ 5 = 130

4. 656 ÷ 4 – 32 = 132

5. 58 – 98 + 849 ÷ 11 x 3 = –40 + 77 x 3 = 191

Solutions for questions 6 to 10:

6. 50% of 1234 is 617
783 – 617 = 166
13.4% of 1234 is 165
783 is 63.4% of 1234.

7. 30% of 1487 = 446
435 – 446 = – 11
0.75% of 1487 = 11
435 is 29.25% of 1487

8. (50 – 3 – 0.7)% of 745
372.5 – 22.35 – 5.215 = 344.935

9. 89.54% of 384
$(100 - 10 - 0.46) \times \frac{384}{100}$ = 343.68 ≃ 344

10. 54% of 645
= (50 + 4) % of 645
= 322.5 + 25.8 = 348.3

Solutions for questions 11 to 15:

11. Adding the last two digits of all the numbers, we have
85 + 90 + 24 – 23 – 43 = 133
Adding the other two digits of all the numbers, we have
49 + 58 + 93 – 87 – 87 = 26
The required sum is (2600 + 133) = 2733.

12. 9342 + 8943 + 7436 + 5456 – 7634
= 31177 – 7634 = 23543

13. 9842 – 3443 – 3254 – 133 – 1343
= 9842 – 8173 = 1669

14. 8934 + 4383 + 7354 + 7833 + 1545 = 30049

15. 7782 + 7845 – 3549 – 4632 – 5322
= 15627 – 13503 = 2124

Solutions for questions 16 to 20:

By using the method of calculating the product of two 3- digit numbers, we can arrive at the answer quickly.

16. 762622

17. 182035

18. 645975

19. 634639

20. 731322

Solutions for questions 21 to 25:

21. $\frac{13}{3}\times\frac{17}{3}\div\frac{22}{3}\div\frac{29}{11}$
$= \frac{13}{3}\times\frac{17}{22}\div\frac{29}{11}$
$= \frac{221}{174}$

22. 23/54 = 1/2.34
134/234 = 1/1.74
543/785 = 1/1.44
744/898 = 1/1.20
23/54 < 134/234 < 543/785 < 744/898

23. $x = \frac{361\times132}{1083} = 44$

24. 34/23 = 1.47
345/245 = 1.408
674/453 = 1.48
889/546 = 1.62
The greatest = $\frac{889}{546}$,
The least = $\frac{345}{245}$

25. $x = \frac{266\times273}{156} = 483$

Speed Enhancement Test – 14

Solutions for questions 1 to 5:

1. $\frac{38\times5+56\times2-32\times4}{220} = \frac{87}{110}$

2. $\frac{13+21\times4+17\times2+5\times5}{160} = \frac{39}{40}$

3. $\frac{43+8\times3+14\times2}{210} = \frac{95}{210} = \frac{19}{42}$

4. $\frac{11\times2+9\times14}{196} = \frac{37}{49}$

5. $\frac{4}{3}+\frac{17}{8}+\frac{9}{4}+\frac{29}{6}-\frac{231}{32}$
$\frac{32\times4+12\times17+24\times9+16\times29-3\times231}{96} = \frac{319}{96}$

Solution for question 6 to 10:

6. $\text{HCF}\left(\frac{1}{60},\frac{11}{48},\frac{1}{32}\right) = \frac{\text{HCF}(1,11,1)}{\text{LCM}(60,48,32)} = \frac{1}{480}$
$\text{LCM}\left(\frac{1}{60},\frac{11}{48},\frac{1}{32}\right) = \frac{\text{LCM}(1,11,1)}{\text{HCF}(60,48,32)} = \frac{11}{4}$

7. $102 = 2^1 \times 3^1 \times 17^1$
$187 = 11^1 \times 17^1$
$272 = 2^4 \times 17^1$
$\text{HCF} = 17^1$
LCM (108, 192, 228) = 17 x LCM (2 x 3, 11, 2^4)
$\text{LCM} = 2^4 \times 3^1 \times 11^1 \times 17^1$

8. $144 = 2^4 \times 3^2$
$180 = 2^2 \times 3^2 \times 5^1$
$204 = 2^2 \times 3^1 \times 17^1$
$\text{HCF} = 2^2 \times 3^1$
$\text{LCM} = 2^4 \times 3^2 \times 5^1 \times 17^1$

9. 114 = 19 x 6
247 = 19 x 13
342 = 19 x 18
HCF (114, 247, 342) = 19 x HCF (6, 13, 18) = 19
LCM (114, 247, 342) = 19 x LCM (2 x 3, 13, 3^2 x 2)
$\text{LCM} = 19 \times 3^2 \times 2 \times 13 = 4446$

10. 108 = 12 x 9
192 = 12 x 16
228 = 12 x 19
HCF (108, 192, 228) = 12 x HCF (9, 16, 19) = 12
LCM (108, 192, 228) = 12 x LCM (9, 16, 19)
$\text{LCM} = 12 \times 3^2 \times 2^4 \times 19 = 32832$

Solution for questions 11 to 15:

11. 7 6 5
0 5 7

	1000's	100's	10's	1's
0	(35)	(30 + 49)	(42 + 25)	35

The required product is 43605.

12. (850 – 147) x (850 + 147) = 700891

13. (1000 + 15) x 414 = 420210

14. (1000 – 97) x (1000 + 97) = 990591

15. The required product
= 14 x 10000 + 27000 + 3100 + 180 + 8 = 170288

Solutions for questions 16 to 20:

16. (50 – 7)% of 9834 = 4917 – 688.38 = 4228.62

17. (30 + 4 + 0.2) % of 6732
= 2019.6 + 269.28 + 13.464 = 2302.34

18. (75 – 0.27) % of 1376 = 1032 – 3.71 = 1028.28

19. 763/4566 = 16.71%

20. 825/4324 = 19.07%
Alternative method:
20% of 4324 = 864.8
825 = 864.8 – 39.8
0.93% of 4324 = 39.8
(20 – 0.93)% = 19.07% of 4324 = 825

Solutions for questions 21 to 25:

21. 8343 + 3487 + 6735 + 7843 + 3242 = 29650

22. 8954 + 7353 + 3246 + 4667 + 7899 = 32119

23. 87437 + 34833 – 63423 + 67233 – 63543
= 189503 – 126960 = 62537

24. 643 + 733 + 298 – 6763 + 56324 – 9889
= 57998 – 16652 = 41346

25. 82 – 38 + 633 – 732 + 7634 – 7232
= 8349 – 8002 = 347

Speed Enhancement Test – 15

Solutions for questions 1 to 2: LCM and HCF

		LCM	**HCF**
1..	$72 = 2^3 \times 3^2$, $12 = 2^2 \times 3$, $32 = 2^5$	$'= 2^5 \times 3^2$ $= 32 \times 9$ $= 288$	$'= 2^2$ $= 4$
2.	$16 = 2^4$, $24 = 2^3 \times 3$, $18 = 2 \times 3^2$	$'= 2^4 \times 3^2$ $= 144$	$'=2$
3.	$18 = 2 \times 3^2$, $36 = 2^2 \times 3^2$, $80 = 2^4 \times 5$	$'= 2^4 \times 3^2 \times 5$ $= 720$	$'= 2$
4.	$15 = 3 \times 5$, $27 = 3^3$, $64 = 2^6$	$'= 2^6 \times 3^3 \times 5$ $= 8640$	$'= 1$
5.	$49 = 7^2$, $140 = 2^2 \times 5 \times 7$, $35 = 5 \times 7$	$'= 2^2 \times 5 \times 7^2$ $= 4 \times 5 \times 49$ $= 980$	$'= 7$

Solutions for questions 6 to 10: Percentages

6. 50% of 1245 = 622.5
1% of 1245 = 12.45
0.1% of 1245 = 1.245
Required answer = (50% – 3 × 1% + 6 × 0.1%) of 1245
= 622.5 – 3 × 12.45 + 6 × 1.245
= 622.5 – 37.35 + 7.47 = 592.62

7. 10% of 724 = 72.4
1% of 724 = 7.24
0.5% of 724 = 3.62
0.25% of 724 = 1.81
Required answer = (10% + 2% + 0.5% + 0.25%) of 724
= 72.4 + 7.24 + 7.24 + 3.62 + 1.81
= 92.31

8. 10% of 2610 = 261
30% of 2610 = 3 × 10% of 2610
= 3 × 261 = 783
$0.3\% = \frac{1}{100} \times 783 = 7.83$
Required answer = 783 + 7.83 = 790.83

9. $\frac{140}{2450} \times 100 = \frac{4 \times 35}{70 \times 35} \times 100 = \frac{40}{7}$ = 5.71428% = 5.71%
Since 1/7 = 0.1428571... and 4/7 = 0.5714285...

10. $\frac{415}{913} \times 100\% = \frac{5 \times 83}{11 \times 83} \times 100\% = \frac{5}{11} \times 100\%$
$= \frac{45}{99} \times 100\% = 45.4545\% = 45.455\%$
Since XY/99 = 0.XYXYXYXY...

Solutions for questions 11 to 15:

By using the rule of adding two digits at a time and adding all the positive terms first and then the negative terms and subtracting one from the other, we get the answer.

11. 4325 + 1286 – 3245 + 4826
4325 + 1286 + 4826 = 10437
10437 – 3245 = 7192

12. 1303

13. 11539

14. 2288

15. 1729

Solutions for questions 16 to 20: Fractions

16. $X = 629 \times \frac{15}{721}$ is less than $630 \times \frac{15}{720}$
X < 13.12
X is more than $627 \times \frac{15}{720}$
X > 13.06
Hence, 13.06 < X < 13.12
From the given options, the only value 13.08 satisfies the condition. Choice (C)

17. $X = 61 \times \frac{120}{11}$
X = (60 + 1) × 120 /11 = (60 × 120 + 120)/11
= (7200 + 120)/11 = (6600 + 600 + 110 + 10)/11
= 600 + 10 + (610/11) = 610 + (550 + 60) /11
= 610 + 50 + (55 + 5)/11 = 660 + 5 + 0.4545
= 665.45

18. Comparing 8/15 and 9/20
The numerator is increased from 8 to 9 by 1 and 1 is 12.5% of the numerator 8. Similarly, The denominator is increased from 15 to 20 by 5 and 5 is $33^1/_3$ % of the denominator 15
Clearly, the increase in numerator is less than the increase in the denominator. Hence 8/15 > 9/20
Comparing 8/15 and 19/30
8/15 = 16/30 and since 16 < 19
8/15 < 19/30
Comparing 19/30 and 5/7 (= 25/35)
The numerator is increased from 19 to 25 by 6 and 6 is $33^1/_3$ % of the numerator 19, Similarly, The denominator is increased from 30 to 35 by 5 and 5 is approximately 16 % of the denominator 30
Clearly, the increase in numerator is more than the increase in the denominator. Hence 5/7 > 19/30 and
$\frac{9}{20} < \frac{8}{15} < \frac{19}{30} < \frac{5}{7}$

19. 0.448 = 0.283 + 0.165 and 0.118 = 0.283 – 0.165
The given expression is in form
$$\frac{\left(a^2 + b^2 - 2 \times a \times b\right)\left(a^2 + b^2 + 2 \times a \times b\right)}{(a+b)(a-b)}$$
$$= \frac{(a-b)^2(a+b)^2}{(a+b)(a-b)} = (a+b)(a-b)$$
The required answer is 0.448 × 0.118 = 0.052864

20. $\frac{4}{63} + \frac{15}{17} + \frac{4}{5} = \frac{9349}{5355}$

Solutions for questions 21 to 25: Multiplications

21. (1000 – 8) × (100 – 2)
= 1,00,000 – 2000 – 800 + 16
= 97,200 + 16 = 97216

22. (60 + 2)(3 × 60 + 9)
= 3 × 60 × 60 + 6 × 60 + 9 × 60 + 18
= 3 × 3600 + 10 × 60 + 5 × 60 + 18
= 10800 + 600 + 300 + 18
= 11718

23. (500 + 12) × (500 – 12)
= 500 × 500 – 12 × 12 = 250000 – 144
= 250000 – 200 + 56 = 249800 + 56 = 249856

24. 213 × 355 = (71 × 3) × (71 × 5)
= $(70 + 1)^2$ × 15 = (4900 + 140 + 1) (10 + 5)
= 5041 × 10 + 5041 × 5 = 50410 + 25205
= 75615

25. 999 × 1234 = (1000 – 1) × 1234
= 1234000 – 1234
= 1234000 – 2000 + 766 = 1232766

Speed Enhancement Test – 16

Solutions for questions 1 to 5: Percentages

1. (16.666% + 62.5%) of 5088
= (1/6 + 5/8) of 5088 = 848 + 3180 = 4028

2. 69.9% of 3700 ≃ 2587

3. (45.4545% – 2% = (45/99 – 2%)
= (5/11 – 2%) of 13255
= (5 x 13255/11) – (2 x 13255/100)
= 6025 – 265.1 = 5759.9

4. 111 is 20% of 555
123.21 = 111 + 11.1 + 1.11
123.21 is 20% + 2% + 0.2% of 555
Required answer = 22.2%

5. 1% of 1826 = 18.26
0.1% of 1826 = 1.826
0.01% of 1826 = 0.1826
0.001% of 1826 = 0.01826
20 = 18.26 +1.826 – 0.086
20 is (1% + 0.1% - 0.04%) of 1826
20 is 1.096% of 1826
Required answer is 1.09

Solutions for questions 6 to 10: By using the rule of adding two digits at a time and adding all the positive terms first and then the negative terms and subtracting one from the other, we get the answer.

6. 7288 − 3126 − 2220 − 1595
3126 + 2220 + 1595 = 6941
7288 – 6941 = 347

7. 4424

8. 8950

9. 18241

10. 1153

Solutions for questions 11 to 15: Multiplications

11. (400 + 6) × (450 – 6)
= 400 × 450 + 450 × 6 – 400 × 6 – 36
= 400 × 400 + 400 × 50 + 50 × 6 – 100 + 64
= 1,60,000 + 20,000 + 300 – 100 + 64
= 1,80,000 + 200 + 64
= 180264

12. (43)(43 × 10 + 3)
= 43 × 43 × 10 + 43 × 3
= (1600 + 2 × 40 × 3 + 9) × 10 + 129
= (1600 + 240 + 9) × 10 + 129 = 18490 + 129
= 18619

13. (80 + 5) × (80 – 3)
= 80 × 80 + 5 × 80 – 3 × 80 – 5 × 3
= 6400 + 2 × 80 – 15 = 1600 + 160 – 15
= 6400 + 140 + 20 – 15 = 6540 + 5 = 6545

14. 216 × 437 = 437(200 + 16) = 87400 + 6992 = 94392

15. 628 × 123
= (625 + 3) × (125 – 2)
= 5 × 125 × 125 + 3 × 125 – 2 × 5 × 125 – 6
= 5 × 15625 – 7 × 125 – 6 = 78125 – 875 – 6
= 77244

Solutions for questions 16 to 20:

		LCM	**HCF**
16.	$88 = 2^3 \times 11$, $143 = 11 \times 13$, $77 = 7 \times 11$	$= 2^3 \times 7 \times 11 \times 13$ $= 8008$	$= 11$
17.	$10 = 2 \times 5$, $25 = 5^2$, $75 = 3 \times 5^2$	$= 2 \times 3 \times 5^2$ $= 150$	$= 5$
18.	$45 = 3^2 \times 5$, $55 = 5 \times 11$, $6 = 2 \times 3$	$= 2 \times 3^2 \times 5 \times 11$ $= 990$	$= 1$
19.	$32 = 2^5$, $64 = 2^6$, $12 = 2^2 \times 3$	$= 2^6 \times 3$ $= 192$	$= 2^2$ $= 4$
20.	$36 = 2^2 \times 3^2$, $27 = 3^3$, $81 = 3^4$	$= 2^2 \times 3^4$ $= 4 \times 81$ $= 324$	$= 3^2$ $= 9$

Solutions for questions 21 to 25: Fractions

21. The given fractions are equal to
$2+\frac{17}{38}, 2-\frac{18}{39}, 2+\frac{40}{47}, 2+\frac{19}{23}$
Clearly 60/39 is the least
Comparing 40/47 and 19/23 (= 38/46)
The numerator is decreased by 2 and the denominator is decreased by 1.
Since 2 in 40 is greater than 1 in 47, The decrease in numerator is greater than decrease in denominator.
Hence 40/47 is greater than 19/23
half of 38 = 19 => 17/38 < 1/2, while 40/47 and 19/23 are each greater then 1/2
Hence $\frac{60}{39} < \frac{93}{38} < \frac{65}{23} < \frac{134}{47}$

22. $\frac{72}{276} = \frac{12\times 6}{23\times 12} = \frac{6}{23}$
$X = 115 \times \frac{6}{23} = 30$

23. $X = 63 \times \frac{505}{6969} = \frac{21\times 3\times 5\times 101}{23\times 3\times 101} = \frac{105}{23} = 4.6$

24. $\frac{8}{3\times 7} + \frac{9}{5\times 7} + \frac{7}{3\times 5} = \frac{8\times 5 + 9\times 3 + 7\times 7}{3\times 5\times 7} = \frac{40+27+49}{105}$
$= \frac{116}{105}$

25. $\frac{1024}{26244}=\frac{256\times4}{6561\times4}=\frac{256}{6561}=\left(\frac{4}{9}\right)^4$

$\frac{768}{8748}=\frac{64\times4\times3}{729\times4\times3}=\frac{64}{729}=\left(\frac{4}{9}\right)^3$

$\frac{320}{1620}=\frac{16\times5\times4}{81\times5\times4}=\frac{16}{81}=\left(\frac{4}{9}\right)^2$

For $x < 1$; $x > x^2 > x^3 > x^4$
Since $(4/9) < 1$

$\frac{320}{1620} > \frac{768}{8748} > \frac{1024}{26244}$

Speed Enhancement Test – 17

Solutions for questions 1 to 5:

1. 38.57% of 686 = 28.57% of 686 + 10% of 686
$= \frac{2}{7}\times 686 + \frac{1}{10}\times 686 = 196 + 68.6 = 264.6$

2. 49.44% of 891 = 44.44% of 891 + 5% of 891
$= \frac{4}{9}\times 891 + \frac{1}{20}\times 891 = 396 + \frac{89.1}{2}$
$= 396 + 44.55 = 440.55$

3. 61.66% of 1296 = 66.66% of 1296 – 5% of 1296
$= \frac{2}{3}\times 1296 - \frac{1}{20}\times 1296 = 864 - 64.98 = 799.02$

4. 674 is 50% of 1348
269.6 is 20% of 1348
26.96 is 2% of 1348
2.44 is 0.18% of 1348
∴ 973 is (50 + 20 + 2 + 0.18)% of 1348
i.e. 973 is 72.18% of 1348

5. 1975 is 2.6333 times of 750
i.e., 1975 is 263.33% of 750
∴ 1975 is 163.33% more than 750.

Solutions for questions 6 to 10:

6. Adding the last two digits of the given numbers, we have
42 + 39 + 42 + 64 = 187
Adding the next two digits, we have
65 + 94 + 65 + 89 = 313
Adding first digits, we have
3 + 8 + 7 + 3 = 21
∴ The required sum = 241487

7. 10108

8. 745

9. 8816

10. 2473

Solutions for questions 11 to 15: By using the principle of multiplication of two 3-digit numbers we can calculate the values.

11. 54234

12. 257172

13. 340413

14. 472916

15. 724272

Solutions for questions 16 to 20:

16. $\frac{56}{23}=2\frac{10}{23};\frac{84}{37}=2\frac{10}{37};\frac{168}{77}=2\frac{14}{77};\frac{96}{41}=2\frac{14}{41}$

Clearly $\frac{10}{23}>\frac{10}{37}$; $\frac{14}{41}>\frac{14}{77};\frac{14}{41}>\frac{10}{37}$ > $\frac{14}{77}$

$\Rightarrow \frac{10}{23}>\frac{14}{41}>\frac{10}{37}>\frac{14}{77}$

∴ The required descending order is

$\frac{56}{23}>\frac{96}{41}>\frac{84}{37}>\frac{168}{77}$

17. $\frac{26}{15}=1\frac{11}{15};\frac{45}{21}=2\frac{3}{21};\frac{365}{189}=1\frac{176}{189};\frac{556}{313}=1\frac{243}{313}$

Clearly, $\frac{176}{189}>\frac{243}{313}>\frac{11}{15}$

∴ $\frac{26}{15}<\frac{556}{313}<\frac{365}{189}<\frac{45}{21}$

18. Given, $\frac{x}{19}=\frac{21}{346}$

$\Rightarrow x = \frac{19\times21}{346}=\frac{399}{346}=1\frac{53}{346}\approx 1.15$ Choice (B)

19. $x = \frac{204}{169}\times\frac{728}{2176}=\frac{3}{13}\times\frac{7}{4}=\frac{21}{52}$

20. $\frac{75}{83}=\frac{1}{1.1},\frac{64}{77}=\frac{1}{1.2},\frac{98}{37}$
$= \frac{1}{1.4},\frac{61}{109}=\frac{1}{1.8}$
∴ The descending order is $\frac{75}{83},\frac{64}{77},\frac{98}{137},\frac{61}{109}$

Solutions for questions 21 to 25:

21. $121 = 11^2$, $66 = 11^1 \times 3^1 \times 2^1$, $132 = 11^1 \times 3^1 \times 2^2$
LCM = $11^2 \times 3^1 \times 2^2 = 1452$

22. $663 = 3^1 \times 13^1 \times 17^1$, $793 = 13^1 \times 61^1$,
$923 = 13^1 \times 71^1$
∴ GDC= $13^1 = 13$

23. $72 = 2^3 \times 3^2$, $48 = 2^4 \times 3^1$, $180 = 2^2 \times 3^2 \times 5^1$
∴ LCM = $2^4 \times 3^2 \times 5^1 = 720$

24. $428 = 2^2 \times 107$, $648 = 2^3 \times 3^4$, $968 = 2^3 \times 11^2$
∴ GCD = $2^2 = 4$

25. $324 = 2^2 \times 3^4$, $468 = 2^2 \times 3^2 \times 13^1$, $792 = 2^3 \times 3^2 \times 11^1$
∴ LCM = $2^3 \times 3^4 \times 11^1 \times 13^1 = 92664$
HCF = $2^2 \times 3^2 = 36$

Speed Enhancement Test – 18

Solutions for questions 1 to 5: By using the method of multiplying two 3 digit numbers we can calculates the answer quickly.

1. 545484

2. 474980

3. 237699

4. 554688

5. 143664

Solutions for questions 6 to 10:

6. 50% of 760 = 380
6% of 760 = 45.6
0.3% of 760 = 2.28
56.3% of 760 = 427.88
Less 0.01% of 760 = 0.076
56.29% of 760 = 427.804

7. 40% of 1860 = 744
Less 2% of 1860 = 37.2
38% of 1860 = 706.8
Less 0.1% of 1860 = 1.86
37.9% of 1860 = 704.94

8. 80% of 980 = 784
Less 0.2% of 980 = 1.96
79.8% of 980 = 782.04

9. 100% of 646 = 646
50% of 646 = 323
3% of 646 = 19.38
0.1% of 646 = 0.646
153.1% of 646 = 989.026
The answer is 153.1%

10. 472 – 158 = 314

The required percentage is $\frac{314}{472}$ x 100%

66.5% of 472 = 313.88
The answer is 66.5%

Solutions for questions 11 to 15:

11. Adding the last two digits of all the numbers, we have
89 + 68 – 78 + 39 + 48 = 166
Adding the remaining digits, we have 6 + 9 + 5 + 6 = 26
∴ The required sum is (26 + 1) 66 i.e., 2766

12. 21593

13. 4466

14. 30293

15. 26488

Solutions for questions 16 to 20:

16. Arrange the following fractions in ascending order

$\frac{52}{57}=1-\frac{5}{57},\frac{63}{67}=1-\frac{4}{67},\frac{71}{77}=1-\frac{6}{77},\frac{83}{87}=1-\frac{4}{87}$

Clearly $\frac{5}{57}>\frac{6}{77}>\frac{4}{67}>\frac{4}{87}$

$\Rightarrow \frac{52}{57}<\frac{71}{77}<\frac{63}{67}<\frac{83}{87}$

17. Multiplying each of the fractions $\frac{53}{75},\frac{48}{65},\frac{39}{55},\frac{76}{85}$ by 5, they become $\frac{53}{15},\frac{48}{13},\frac{39}{11},\frac{76}{17}$ respectively

$\frac{53}{15}=3\frac{8}{15},\frac{48}{13}=3\frac{9}{13},\frac{39}{11}=3\frac{6}{11},\frac{76}{17}=4\frac{8}{17}$

Clearly $\frac{9}{13}>\frac{6}{11}>\frac{8}{15} \Rightarrow \frac{48}{13}>\frac{39}{11}>\frac{53}{15}$

∴ The required order is $\frac{76}{85},\frac{48}{65},\frac{39}{55},\frac{53}{75}$

18. $x=\frac{856}{225}\times 175=\frac{856}{9}\times 7$ = 95.11 × 7 = 665.77

19. $x=\frac{87}{348}\times 54$. Dividing numerator and denominator by 87,

$x=\frac{1}{4}\times 54 = 13.5$ Choice (A)

20. $x=\frac{232^2-8^2}{224^2}\times 112=\frac{(232-8)(232+8)}{224^2}\times 112$

$=\frac{224\times 240}{224^2}\times 112 = 120$

Solutions for questions 21 to 25:

21. $\frac{18(49)-9(97)}{35(2)-17(4)}=\frac{882-873}{70-68}=\frac{9}{2}$ = 4.5 Choice (A)

22. $\left[16\times\frac{145}{80}-23\times\frac{75}{69}+48\times\frac{1}{8}\right]\times[\{16-36\div 6+1\}-10]$

= [29 – 25 + 6] × [16 – 6 + 1 – 10] = 10 × 1 = 10
Choice (C)

23. $\left[\frac{3}{100}\times\frac{4}{100}\times\frac{5}{100}\times\frac{800000}{16}\right]-\left[45\div 9\times 3-\left(\frac{84+72}{12}\right)\right]$

= 3 – 2 = 1 Choice (A)

24. $\left[\frac{12}{100}\times\frac{16}{100}\times\frac{20}{100}\times\frac{40}{100}\times\frac{(100)^4}{96}\right]\div[\{196-84\div 12+11\}\times 10]$

= 1600 ÷ [{196 – 7 + 11} × 10] = 1600 ÷ 2000 = sss
Choice (D)

25. $\left[9+\{23-\overline{52-56}\}\text{of}\frac{11}{27}\right]\times\left[\frac{212\left(10^4-2\times 300+6^2\right)}{(106)^3-1800\times 106}\right]$

$=\left[9+\{23+4\}\text{of}\frac{11}{27}\right]\times\left[\frac{2(100+6)\left(100^2-100\times 6+6^2\right)}{(100+6)^3-3.100.6(100+6)}\right]$

= 20 × 2 = 40 Choice (B)

Speed Enhancement Test – 19

Solutions for questions 1 to 3:

1. LCM of 12, 16, 48 and 64 is 192.

$\frac{1}{12}+\frac{5}{16}+\frac{7}{48}+\frac{9}{64}$

$=\frac{1\times 16+5\times 12+7\times 4+9\times 3}{192}=\frac{131}{192}$

2. LCM of 72 and 54 is 216.

$\frac{41}{72}+\frac{23}{54}$

$=\frac{41\times 3+23\times 4}{216}=\frac{215}{216}$

3. 10/31 = 1 /3.1
17/52 = 1/3.05
29/88 = 1/3.03
22/67 = 1/3.04
10/31 < 17/52 < 22/67 < 29/88

Solutions for questions 4 and 5:

4. $x=\frac{38\times 306}{51}=228$

5. $x=\frac{39\times 441}{27}=637$

Solutions for questions 6 to 10:

6. 54 = 9 x 6
48 = 6 x 8
108 = 6 x18
LCM = 6 × LCM (9, 8, 18) = 6 × 72 = 432

7. 48 = 12 x 4
72 = 12 x 6
288 = 12 x 24
LCM = 12 x 24 = 288

8. 224 = 14 x 16
280 = 14 x 20
336 = 14 x 24
HCF = (14 x 16, 14 x 20, 14 x 24)
= 14 x (16, 20, 24) = 56
LCM= 56 x 4 x 5 x 3 = 3360

9. 245 = 5 x 49
330 = 5 x 66
375 = 5 x 75
HCF = 5
LCM = 5 x 49 x 3 x 25 x 22 = 404250

10. 1032 = 43 x 24
1260 = 36 x 35
1568 = 28 x 56
LCM = 43 x 7^2 x 5 x 3^2 x 2^5

Solutions for questions 11 to 15:

By the method of multiplication of two 3-digit numbers, we get the answers.

11. 612156

12. 325032

13. 171315

14. 556200

15. 163185

Solutions for questions 16 to 20:

By using the principle of adding two digits at a time, additions can be calculated faster.

16. 21073

17. 13823

18. 8896

19. 122971

20. 3796

Solutions for questions 21 to 25:

21. 10% of 782 = 78.2
80% of 782 = 78.2 x 8 = 625.6
7% of 782 = 7 x 7.82 = 54.74
0.84% of 782 = 6.5688
87.84 % of 782 = 686.9088

22. 10% of 3476 = 347.6
40% of 3476 = 4 x 347.6 = 1390.4
4% of 3476 = 139.04
0.64 % of 3476 = 22.2464
44.64 % of 3476 = 1551.6864

23. 85.67 % of 8437
10% of 8437 = 843.7
80% of 8437 = 8 x 843.7 = 6749.6
5% of 8437 = 421.85
0.67% of 8437 = 56.5279
$\Rightarrow$ 85.67% of 8437 = 7227.9779

24. The required percentage
= 845 /7342 x 100 = 11.509%

25. The required percentage
$= \frac{9234-8923}{8923} \times 100 \approx 3.49\%$

Speed Enhancement Test – 20

Solutions for questions 1 to 5:

By the method of multiplication of two 3-digit numbers, we get the answers.

1. 293364
2. 252721

3. 693630

4. 467016

5. 324159

Solutions for questions 6 to 10:

6. 45, 35 and 315 LCM is 315.
$\frac{12}{45}+\frac{15}{35}-\frac{98}{315} = \frac{12\times 7+15\times 9-98}{315} = \frac{121}{315}$

7. 56, 32 and 224 LCM is 224.
$\frac{13}{56}+\frac{17}{32}-\frac{123}{224}$
$= \frac{13\times 4+17\times 7-123}{224} = \frac{48}{224} = \frac{3}{14}$

8. $x = \frac{286\times 14}{308} = 13$

9. $y = \frac{46\times 32}{23} = 64$

10. $y = \frac{72\times 32}{192} = 12$

Solutions for questions 11 to 15:

11. 8 = 2^2 x 2
36 = 2^2 x 3^2
44 = 2^2 x 11
HCF (8, 36, 44) = 2^2 x HCF (2, 3^2, 11) = 4
LCM = 2^3 x 3^2 x 11 =792

12. LCM = 141933 and HCF = 1.

13. LCM = 1096500 and HCF = 1

14. LCM = 31416 and HCF = 2

15. LCM = 24624 and HCF =2

Solutions for questions 16 to 20:

16. 10% of 8453 = 845.3
40% of 8453 = 845.3 x 4 = 3381.2
3% of 8453 = 3 x 84.53 = 253.59
0.2% of 8453 = 16.906
100% of 8453 = 8453
143.2 % of 8453 = 12104.696

17. 10% of 7343 = 734.3
50% of 7343= 5 x 734.3 = 3671.5
6 % of 7343 = 6 x 73.43 = 440.58
0.31 % of 7343 = 22.7633
56.31 % of 7343 = 4134.8433

18. 10% of 8723 = 872.3
70% of 8723 = 7 x 872.3 = 6106.1
3% of 8723 = 3 x 87.23 = 261.69
0.6% of 8723 = 6 x 8.723 = 52.338
73.6 % of 8723 = 6420.128

19. The required percentage
= 223 /632 x 100 = 35.28%

20. 10% of 532 = 53.2
60% of 532 = 6 x 53.2 = 319.2
2% of 532 = 2 x 5.32 = 10.64
0.1% of 532 = 0.532 = 0.532
330.72+532 = 862.372
532 when increased by 62.1 % becomes 862.372

Solutions for questions 21 to 25: By using the principle of adding two digits at a time, additions can be calculated faster.

21. 3850

22. 30248

23. 19464

24. –1115

25. 6773

Speed Enhancement Test – 21

Solutions for questions 1 to 5:

1. 10% of 762 = 76.2
40% of 762 = 4 x 76.2 = 304. 8
3% of 762 = 3 x 7.62 = 22.86
0.76% of 762 = 5.7912
304.8 + 22.86 + 5.7912 = 333.4512

2. 78.2% = 80% – 1.8%
10% of 824 = 82.4
80% of 824 = 8 x 82.4 = 659.2
1% of 824 = 8.24
0.8% of 824 = 6.592
659.2 − 8.24 – 6.592 = 644.368

3. 10% of 462 = 46.2
50% of 462 = 5 x 46.2 = 231
6% of 462 = 6 x 4.62 = 27.72
0.32 % of 462 = 1.4784
231 + 27.72 +1.4784 = 260.1984

4. Required to find 487/ 723 x 100
10% of 723 = 72.3
60% of 723 = 6 x 72.3 = 433.8
7% of 723 = 7 x 7.23 = 50.61
0.358% of 723 = 2.5305
433.8 + 50.61 + 2.5305 = 486.9405
67.36% of 723 is 487.

5. What percentage of 873 is 576
Required to find 576/ 873 x 100
10% of 873 = 87.3
60% of 873 = 6 x 87.3 = 523.8
5% of 873 = 5 x 8.73 = 43.65
0.97% of 873 = 8.4681
523.8 + 43.65 + 8.4681 = 575.9181
65.97% of 873 is 576

Solutions for questions 6 to 10:

6. 57 = 19 x 3
95 = 19 x 5
133 = 19 x 7
LCM of 57, 95, 133 = 3 x 5 x 7 x 19 =1995
GCD = 19

7. 36 = 9 x 4
54 = 9 x 6
108 = 9 x 12
LCM of 36, 54,108 = 9 x 12 = 108
GCD = 9 × 2 = 18

8. $56 = 7x\ 2^3$
$98 = 7^2 \times 2$
$126 = 7 \times 2 \times 3^2$
LCM of 56, 98, 126 = $7^2 \times 2^3 \times 3^2 = 3528$
GCD = 7 × 2 = 14

9. 72 = 12 x 6
132 = 12 x 11
168 = 12 x 14
LCM of 72, 132, 168 = 12 x 3 x 14 x 11 =5544
GCD = 12

10. 80 = 16x 5
144 = 16 x 9
160 = 16 x 10
LCM of 80, 144, 160 = 16 x 5 x 2 x 9 = 1440
GCD = 16

Solutions for questions 11 to 15:

11. Adding the last two digits of all the numbers, we have
76 + 63 – 86 + 04 – 34 = 23
Adding the remaining digits of all the numbers, we have
3 + 7 – 7 + 9 – 7 = 5
The required sum is (500 + 23) = 523

12. 38929

13. 9892

14. 17796

15. 14001

Solutions for questions 16 to 20:

16. The numbers multiplied are two three digit numbers with the same hundreds digit. The last two digits of each number add up to 100. The logic for multiplying two such three digit numbers is given below. Let x be the hundreds digit in each number. Let s be the last two digits in any one of the numbers. The last two digits in the other number would be (100 – s). The product of the numbers would be
(100x + s) (100x + 100 – s)
= (100 x + s) (100x – s + 100)
= (100 x + s) ((100x – s) + 100 (100x + s))
$= (100\ x)^2 – s^2 + 100\ (100x + s)$
Let x = 1 and s = 43
$(100)^2 – 43^2 + 100\ (143) = 22451$

17. The numbers, multiplied are two three digit numbers with the same hundreds digit. The ten's digit and unit's digit in 164 are ten's compliment of the ten's and unit's digit in 146. The logic for multiplying two such three digit numbers is given below .Let x be the hundreds digit in each number. The last two digits of both numbers are add up to 110. Let s be the last two digits in one number, then in the other number would be (110 – s), the product of the numbers would be
(100x + s) (100x +110 – s)
$= (100\ x)^2 – s^2 + 110\ (100x + s)$
Let x = 1 and s = 64
$(100)^2 – 64^2 + 110\ (164) = 23944$

18. The numbers multiplied have the same ten's digit. The hundred's digit in each number is equal to the unit's digit in the other number. The logic for multiplying two such three digit number is given below.

Let one of the three digit number be
100x + 10 y + 10 – x = 99x + 10y +10
The other three digit number would be
100 (10-x) + 10y + x = 1000 – (99x – 10y)
The product of the both the numbers = (99x + 10y + 10) (1000 – 99x + 10y)
$= 1000(99x + 10y) – 10(99x – 10y) +10000 – (99x)^2 + (10y)^2$
Taking x = 1 and y = 3, the product of the 139 and 931
$= 1000((99 + 10 \times 3) – 10(99 – 10 \times 3)) +10000 – (99)^2 + (10 \times 3)^2 = 129409$

19. The numbers multiplied have the ten's digits as ten's compliment of each other. The hundred's digit in each number equal to the unit's digit in the other. Using a similar logic as explained in the previous solution

872 x 238 = 207536

20. (100 + 22) x (400 + 44)
= 100 x 400 + 100 x 44 +22 x 400 + 22 x 44
= 40000 + 4400 + 8800 + 968 = 54168

Solutions for questions 21 to 25:

21. 6382 ÷ 16 x 3.92 – 59.68 = 399 x 4 – 60 = 1536

22. $(4.28 + 6.17)^3 = 1141$

23. $0.00000347 \times 40 \times 10^6 = \sqrt{?}$
? = 19600

24. $\frac{27\times12}{28}=12$

25. 932.83 ÷ 34 x 56 + 137.73 – 231 .32
=27 x 56 +138 – 231 = 1419

Speed Enhancement Test – 22

Solutions for questions 1 to 5:

1. By using the method of calculating the product of two 3-digit numbers, we can arrive at the answer quickly.
(or)
Alternately,
832 x 923 = 832 (930 – 7)
= 773760 – 5824
= 767936

2. 339135

3. 596666

4. 216513

5. 116736

Solutions for questions 6 to 10:

By using the principle of adding two digits at a time we get

6. 284844

7. 7554

8. 22

9. 25611

10. 13429

Solutions for questions 11 to 15:

11. 23/74 = 1/3.21
34/93 = 1/2.73
84/122 = 1/1.45
89/134 = 1/1.5
Hence, $\frac{84}{122}>\frac{89}{134}>\frac{34}{93}>\frac{23}{74}$

12. 12/67 = 1/5.58
23/74 = 1/3.21
34/86 = 1/2.52
54/89 = 1/1.64
Hence, $\frac{12}{67}<\frac{23}{74}<\frac{34}{86}<\frac{54}{89}$

13. x = $\frac{252\times132}{387}$ = 88

14. 45/121 = 1/2.68
54/234 = 1/4.33
56/ 324 = 1/5.78
66/353 = 1/5.34
Hence, $\frac{45}{121}>\frac{54}{234}>\frac{66}{353}>\frac{56}{324}$

15. LCM of 84 and 92 is 1932.
? = $\frac{76\times23+21\times56}{1932}=\frac{2924}{1932}=\frac{731}{483}$

Solutions for questions 16 to 20:

16. Let x and y be the first two digit and last two digits of the four digit number.
Give that,
x + y = 55 ----(1)
x – y = –17---(2)
Solving (1) and (2) will get x = 19 and y = 36
The four digit number = 1936
Required number = $\sqrt{1936}$ = 44

17. Let the number squared and the number cubed be x and y respectively.
$x^2 + y^3 = 737$ as y is a natural number, y > 0
As $x^2 > 0$, $y^3 < 737$ in order to satisfy the above equation.
Hence $y < \sqrt[3]{737}$ i.e. y ≤ 9
Substituting different possible values of y in the above equation, The difference of x and y is 7 is a prime number.
x = 15 when y = 8
∴ Required answer: x + y = 15 + 8 = 23

18. Let the number squared and the number cubed be x and y respectively.
$x^2 - y^3 = 71$
$x = \sqrt{71 + y^3}$ ------- (1)
Substituting different natural numbers for y in the equation (1), we get x = 14 when y = 5.
Required answer: x + y = 19

19. Factorisation of 58081 is = 241 x 241
$\sqrt{58081}$ = 241

20. Let the number N = 1225043 be divided into three groups A, B and C, each having a pair of three digits taken from right to left. (i.e,)
A = 1, B = 225 and C = 043.
Since the number of groups thus formed is three, we get the cube root of N is a three digit number.
Let the three digit number XYZ = $\sqrt[3]{1225043}$
$X = \sqrt[3]{A}$ => X = 1 ---(1)
Units digit of Z^3 is same as units digit of N (or units digit of C) = 3 => Z = 7 ---(2)
Units digit of $3YZ^2$ is same as tens digit of $(N - Z^3)$
Units digit [3Y(49)] = Tens digit [1225043 – 343]
=> Y = 0 ---(3)
From (1), (2) and (3) we get,
Required answer: $\sqrt[3]{1225043}$ = 107

Solutions for questions 21 to 25:

21. 73% of 7823 is (70% + 3%) of 7823 = 5710.79

22. 91% of 8232 is (90% + 15%) of 8232 = 7491.12

23. 24% of 4565 is (20% + 4%) of 4565 = 1095.6

24. 82% of 9322 is (80% + 25%) of 9322 = 7644.04

25. 45% of 4243 is (40% + 5%) of 4243 = 1909.35

Speed Enhancement Test – 23

Solutions for questions 1 to 5:

1. 594 × 135 – 1357 = ?
? = 80190 – 1357 = 78833

2. 648 × 14 = 9072
? = 9072 – 246 = 8826

3. (9 + 487 + 1356)4 = 1852 × 4 = 7408
$\left(\frac{5346}{3}\right)$ = 1782
? = 7408 – 1782 = 5626

4. 292 × 361 = 105412
? = 105412 + 3456 = 108868

5. The given express is in the form of $\frac{a^3 - b^3}{a^2 + ab + b^2}$

$= \frac{(a-b)(a^2+ab+b^2)}{(a^2+ab+b^2)} = a - b$

? = 14.31 – 11.26 = 3.05

Solutions for questions 6 to 10:
Using "ten percent – one percent" concept we can find the values of the required percentages.

6. 73% of 987 = (70 + 3) × $\frac{987}{100}$ = 720.51

7. 68% of 846 = (70 – 2) × $\frac{846}{100}$ = 575.28

8. 48% of 569 = (50 – 2) × $\frac{569}{100}$ = 273.12

9. 39% of 764 = (40 − 1) × $\frac{764}{100}$ = 297.96

10. 92% of 236 = (90 + 2) × $\frac{236}{100}$ = 217.12

Solutions for questions 11 to 15:

11. $32 = 2^5$; $96 = 3 \times 2^5$; $128 = 2^7$
LCM = $2^7 \times 3 = 384$
HCF = $2^5 = 32$

12. 21 = 3 × 7 ; $28 = 2^2 \times 7$; 70 = 2 × 5 × 7
LCM = $2^2 \times 3 \times 5 \times 7 = 420$
HCF = 7

13. 33 = 3 × 11 ; 55 = 5 × 11 ; 110 = 2 × 5 × 11
LCM = 2 × 3 × 5 × 11 = 330
HCF = 11

14. $54 = 2 \times 3^3$; $18 = 2 \times 3^2$; $81 = 3^4$
LCM = $2 \times 3^4 = 162$
HCF = $3^2 = 9$

15. $48 = 2^4 \times 3$; $12 = 2^2 \times 3$; 78 = 2 × 3 × 13
LCM = $2^4 \times 3 \times 13 = 624$
HCF = 2 × 3 = 6

Solutions for questions 16 to 20:

16. Adding the numbers in the 10,000's place:
8 − 9 + 6 – 7 + 5 = 3
Adding the numbers formed from next two places:
64 − 86 + 38 − 89 + 47 = −26
Adding the numbers formed from the last two places:
32 − 45 + 76 − 16 + 39 = 86
? = 3 (10000) − 26(100) + 86 = 27486

17. 6752

18. 18899

19. 35411

20. 15687

Solutions for questions 21 to 25:

21. 716 × 45 = 716 × (50 – 5) = 35800 – 3580 = 32220

22. 598 × 6450 = (600 – 2) × 6450 = 3870000 – 12900 = 3857100

23. 94 × 76 = (100 – 6) × 76 = 7600 – 456 = 7144

24. 96 × 998 = 96 × (1000 – 2) = 96000 – 192 = 95808

25. 346 × 374 = (360 – 14) × (360 + 14)
$= (360)^2 - (14)^2$
= 129600 – 196 = 129404

Speed Enhancement Test – 24

Solutions for questions 1 to 5:

By using the principle of adding two digits at a time we get

1. 33307

2. 8477

3. 42

4. 2013

5. 74340

Solutions for questions 6 to 10:

6. (A) (26 ÷ 13 + 48 ÷ 48) ÷ 3 + 30 × 50 ÷ 300 × 6 – 25
= (2 + 1) ÷ 3 + 30 × $\frac{50}{300}$ × 6 – 25 = 1 + 30 – 25 = 6

(B) 340 ÷ 17 + 18 – 36 + 54 ÷ 27 – 56 ÷ 7 + 10
= 20 + 18 – 36 + 2 – 8 + 10 = 50 – 44 = 6

(C) 48 × 6 ÷ 36 + 12 × 96 ÷ 24 – 36 ÷ 6 – 48 + 4
$48 \times \frac{6}{36} + 12 \times \frac{96}{24} - \frac{36}{6} - 48 + 4$
= 8 + 48 – 6 – 48 + 4 = 6

(D) 576 ÷ 24 × 2 – 192 ÷ 96 – 72 ÷ 18 × 8
$= \frac{576}{24} \times 2 - \frac{192}{96} - \frac{72}{18} \times 8 = 48 - 2 - 32 = 14$

Choice (D)

7. (A) 17 × 68 ÷ 34 + 54 × 12 ÷ 36 – 18 × 108 ÷ 27
$= 17 \times \frac{68}{34} + 54 \times \frac{12}{36} - 18 \times \frac{108}{27} = 34 + 18 - 72$
= – 20

(B) 156 ÷ 39 + 84 × 21 ÷ 42 – 86 ÷ 43 – 64
$= 4 + 84 \times \frac{21}{42} - 2 - 64 = 4 + 42 - 2 - 64$
= 46 – 66 = – 20

(C) 800 ÷ 200 × 500 – 999 ÷ 111 + 156 × 12 ÷ 36 + 14 =
$\frac{800}{200} \times 500 - 9 + 156 \times \frac{12}{36} + 14 = 2000 - 9 + 52 + 14$
= 2057

(D) 925 ÷ 25 + 45 ÷ 15 × 12 – 52 ÷ 13 × 25 + 9 – 2
$= 37 + \frac{45}{15} \times 12 - \frac{52}{13} \times 25 + 9 - 2$
= 37 + 36 – 100 + 9 – 2
= 82 – 102 = –20

Choice (C)

8. (A) 545 – 389 + 96 = 252
(B) 348 + 836 – 1052 = 132
(C) 888 – 666 – 90 = 132
(D) 856 – 436 – 288 = 132

Choice (A)

9. (A) $\frac{5}{6} - \frac{4}{5} = \frac{1}{30}$

(B) $\frac{5}{6} - \frac{4}{5} = \frac{1}{30}$

(C) $\frac{5}{7} + \frac{4}{5} = \frac{53}{35}$

(D) $\frac{11}{10} - \frac{6}{5} + \frac{2}{15} = \frac{33 - 36 + 4}{30} = \frac{1}{30}$

Choice (C)

10. (A) 20% of 60 + 50% of 600 + 500% of 600
= 12 + 300 + 3000 = 3312

(B) 110.4% of 3000 = 3312

(C) 200% of 600 + 50% of 4224
= 1200 + 2112 = 3312

(D) 180% of 180 + 360% of 1000
= 324 + 3600 = 3924

Choice (D)

Solutions for questions 11 to 15:

11. $9963 \times 37 = (10000 - 37) \times 37 = 370000 - 37^2$
$= 370000 - (40 - 3)^2 = 368631$

12. $256^2 + 345^2 + 512 \times 345$
$= 256^2 + 345^2 + 2 \times 256 \times 345 = (256 + 345)^2$
$= (601)^2 = (600 + 1)^2 = 361201$

13. $834 \times 166 = (1000 - 166) \times 166 = 16600 - (166)^2$
$= 166000 - (160 + 6)^2 = 138444$

14. $194 \times 206 = (200 - 6)(200 + 6) = (200)^2 - (6)^2$
$= 40000 - 36 = 39964$

15. $189 \times 183 = (190 - 1) \times (190 - 7)$
$= (190)^2 - 8 \times 190 + 7 = 34587$

Solutions for questions 16 to 20:

16. 87% of 563 = (90 – 3)% of 563 = 489.81

17. 93% of 963 = (90 + 3)% of 963 = 895.59

18. 78% of 864 = (80 – 2)% of 864 = 673.92

19. 62% of 626 = (60 + 2)% of 626 = 388.12

20. 73% of 767 = (70 + 3)% of 767 = 559.91

Solutions for questions 21 to 25:

21. $\frac{27}{127} = \frac{1}{4.7}; \frac{47}{147} = \frac{1}{3.13}; \frac{37}{137} = \frac{1}{3.7}; \frac{57}{157}$
$= \frac{1}{2.75}; \frac{67}{167} = \frac{1}{2.49}$

The descending order is $\frac{67}{167}, \frac{57}{157}, \frac{47}{147}, \frac{37}{137}, \frac{27}{127}$

22. The fractions $\frac{45}{52}$ and $\frac{52}{59}$ can be compared by cross multiplication
(45) (59) < (52) (52)

Hence $\frac{45}{52} < \frac{52}{59}$

Similarly $\frac{59}{68} < \frac{52}{59}$; $\frac{45}{52} < \frac{59}{68}$

Hence $\frac{45}{52} < \frac{59}{68} < \frac{52}{59}$

23. $\frac{15}{26} = \frac{1}{1.73}, \frac{18}{31} = \frac{1}{1.72}, \frac{19}{39} = \frac{1}{2.05}$

Hence $\frac{18}{31} > \frac{15}{26} > \frac{19}{39}$

24. $\frac{35}{88} + \frac{59}{242} = \frac{35}{4 \times 22} + \frac{59}{11 \times 22} = \frac{35(11) + 59(4)}{4(11)(22)} = \frac{621}{4(242)}$
$= \frac{621}{968}$

25. $\left(\frac{10^2 + 4.7^2}{2.65^2 + 7.35^2}\right) + \frac{8}{9} - \frac{3}{4}$

The first part is in the form of $\frac{(b+a)^2 + (b-a)^2}{b^2 + a^2}$

Where a and b are real numbers, which is equal to 2

$\therefore 2 + \frac{8}{9} - \frac{3}{4} = \frac{77}{36}$

Speed Enhancement Test – 25

Solutions for questions 1 to 5:

1. $6276 \times 5926 = 6276 \times (6000 - 74)$
$6276 \times 6000 = 6276 \times 6 \times 1000 = 37656000$
$6276 \times 74 = 6276 \times (70 + 4) = 464424$
$6276 \times 5926 = 37656000 - 464424 = 37191576$

2. $9999 \times 666666 = 9 \times 1111 \times 6 \times 11111 = 9 \times 6 \times 1111 \times 11111$
$= 54 \times 12344321 = 666593334$

3. $743 \times 239 = (700 + 40 + 3) \times 239 = 167300 + 9560 + 717$
$= 177577$

4. $936 \times 712 = 936 \times (700 + 10 + 2) = 655200 + 9360 + 1872$
$= 666432$

5. $139 \times 96 = (140 - 1)(100 - 4)$
$= 140 \times 100 - 140 \times 4 - 1 \times 100 + 1 \times 4$
$= 14000 - 560 - 100 + 4 = 13344$

Solutions for questions 6 to 10:

6. 223 and 127 are prime numbers, 323 is not a multiple of either 223 or 127. $\Rightarrow$ Their HCF = 1
Their LCM = their product = $223 \times 323 \times 127 = 9147683$

7. $341 = 11 \times 31$
It is observed that 527 and 713 both are not divisible by 11. On dividing them by 31, the quotients obtained are 17 and 23 respectively.
Hence, HCF (341, 527, 713) = HCF (11×31, 17×31, 23×31) = $31 \times$ HCF (11, 17, 23) = $31 \times 1 = 31$
LCM (341, 527, 713) = $31 \times$ LCM (11, 17, 23) = $31 \times 11 \times 17 \times 23 = 133331$

8. $1824 = 19 \times 96$
1957 and 2109 are not divisible by 96. On dividing them by 19, the quotient obtained are 103 and 111 respectively. Hence HCF (1824, 1957, 2109) = HCF (19×96, 19×103, 19×111)
$= 19 \times$ HCF (96, 103, 111) = $19 \times 1 = 19$
LCM (1824, 1957, 2109) = $19 \times$ LCM (96, 103, 111)
$= 19 \times 103 \times 3 \times 32 \times 37 = 6951264$

9. $1016 = 8 \times 127$
2024 and 3032 are not divisible by 127. On dividing them by 8, the quotients obtained are 253 and 379 respectively. Also, hence 127, 253 and 379 are prime numbers, HCF (1016, 2024, 3032) = 8
$\therefore$ LCM (1016, 2024, 3032) = $8 \times 127 \times 253 \times 379$
= 97421192

10. $421 = 1 \times 421$
$1684 = 4 \times 421$
HCF = (211, 421, 1684) = HCF (211, 421) = 1
LCM (211, 421, 1684) = $211 \times 421 \times 1 \times 4 = 355324$

Solutions for questions 11 to 15:

11. 97% of 687 = (100 – 3)% of 687 = 666.39

12. 48% of 936 = (50 – 2)% of 936 = 449.28

13. 52% of 624 = (50 + 2)% of 624 = 324.48

14. 40% of 198 is 79.2
1% of 198 is 1.98
77.22 = 79.2 – 1.98
i.e. 77.22 is (40 – 1)% = 39% of 198

15. 30% of 364 = 109.2
2% of 364 = 7.28
0.5% of 364 = 1.82
118.3 = 109.2 + 7.28 + 1.82
i.e. 118.3 is (30 + 2 + 0.5)% = 32.5% of 364.

Solutions for questions 16 to 20:
By using the principle of adding two digits at a time we get

16. 35386

17. 13544

18. 27371

19. On dividing 21212121, 212121, 2121, 21 by 21, the quotients obtained are 1010101, 10101, 101 respectively and we get a remainder of 0 in each case.
Hence 21212121 + 212121 + 2121 + 21
= 21 (1010101 + 10101 + 101 + 1)
= 21(1020304) = 21426384
Alternately, the last two-digits of 21 appeared for four times, previous 21 for three times, the other 21s appeared for two times and one time respectively. Hence the sum is 21426384.

20. 3436

Solutions for questions 21 to 25:

21. $\frac{30\times30\times30\times30-30\times30}{832+45+22} = \frac{810000-900}{899}$
$= \frac{900(900-1)}{899} = 900.$ Choice (B)

22. $\sqrt{5.4756} = \sqrt{2.34\times2.34} = 2.34.$ Choice (A)

23. $\frac{\sqrt{12100}\times\sqrt{8100}}{\sqrt{108900}\times\sqrt[3]{27}}$ of $5^3 + 4^2 - 3^3 = 10\times125 + 16 - 27$
= 1250 + 16 – 27 = 1239. Choice (D)

24. $972 \div 9 \times 6 \times 2 + 3^4 \times 20$
$= \frac{972}{9\times6\times2} + 81\times20 = 9 + 1620 = 1629.$ Choice (C)

25. $16 + 1008 \div (7 \times 36 \div 2) \div \frac{1}{6} \times 3 - 5$
$= 16 + \frac{1008}{7\times18} \times 6 \times 3 - 5$
= 16 + 144 – 5 = 155. Choice (A)

Speed Enhancement Test – 26

Solutions for questions 1 to 5:

1. LCM (39, 26, 79, 52) = 12324
$? = \frac{10744+7110+9828-4977}{12324} = \frac{22705}{12324}$

2. LCM (23, 69, 34, 51) = 2346
$? = \frac{918-272+483-230}{2346} = \frac{899}{2346}$

3. $? = \frac{29}{3} - \frac{53}{6} + \frac{137}{18} - \frac{221}{36}$
$\Rightarrow ? = \frac{348-318+274-221}{36} = \frac{83}{36}$

4. $\left(\frac{11}{39}+\frac{121}{156}\right) - \left(\frac{16}{57}+\frac{3}{19}\right)$
$= \frac{165}{156} - \frac{25}{57}$ i.e, $\frac{55}{52} - \frac{25}{57}$
$= \frac{1835}{2964}$.`

5. LCM (36, 90, 54) = 540
$? = \frac{345+42+130}{540} = \frac{517}{540}$

Solutions for questions 6 to 10:

By using the principle of adding two digits at a time we get

6. –27

7. 687

8. 17325

9. 10867

10. 2629

Solutions for questions 11 to 15:

11. 28.125% of 6400 = $\frac{9}{32} \times 6400 = 1800$

12. 27.78% of 1836 = $\frac{5}{18} \times 1836 = 510$

13. 25% of 2506 = 626.5
2% of 2506 = 50.12
1% of 2506 = 25.06
$\Rightarrow$ 24% of 2506 = 601.44, 23% of 2506 = 576.38
$\Rightarrow$ 587.25 is approximately 23% of 2506

14. 728 is 13 times of 56 $\Rightarrow$ 56 is 7.69% of 728

15. 2% of 4560 = 91.2
$\Rightarrow$ 89 is approximately 2% of 4560

Solutions for questions 16 to 20:

16. $52 = 4 \times 13 = 2^2 \times 13$
$69 = 3 \times 23$
$299 = 13 \times 23$
$\therefore$ LCM = $2^2 \times 3 \times 13 \times 23 = 3588$, HCF = 1

17. $63 = 3^2 \times 7$
$105 = 3 \times 5 \times 7$
$168 = 2^3 \times 3 \times 7$
$\therefore$ LCM = $2^3 \times 3^2 \times 5 \times 7 = 2520$; HCF = $3 \times 7 = 21$

18. $54 = 2 \times 3^3$
$62 = 2 \times 31$
$78 = 2 \times 3 \times 13$
$\therefore$ LCM = $2 \times 3^3 \times 13 \times 31 = 21762$; HCF = 2

19. $18 = 2 \times 3^2$
$324 = 2^2 \times 3^4$
$90 = 2 \times 3^2 \times 5$
$\therefore$ LCM = $2^2 \times 3^4 \times 5 = 1620$; HCF = $2 \times 3^2 = 18$

20. $28 = 2^2 \times 7$
$63 = 3^2 \times 7$
$98 = 2 \times 7^2$
$\therefore$ LCM = $2^2 \times 3^2 \times 7^2 = 1764$; HCF = 7

Solutions for questions 21 to 25:

21. $9898 \times 998 = 9898\ (1000 - 2) = 9898000 - 19796$
= 9878204

22. $536 \times 789 = 536 \times (800 - 10 - 1) = 428800 - 5360 - 536$
$= 422904$

23. $763 \times 747 = (755 + 8) \times (755 - 8)$
$= (755)^2 - (8)^2 = 570025 - 64 = 569961$

24. $489 \times 649 = 489 \times (600 + 50 - 1) = 293400 + 24450 - 489$
$= 317361$

25. $912 \times 713 = (900 + 12)(700 + 13)$
$= 900 \times 700 + 900 \times 13 + 12 \times 700 + 12 \times 13$
$= 630000 + 11700 + 8400 + 156$
$= 650256$

Speed Enhancement Test – 27

Solutions for questions 1 to 5:

1. $\frac{1}{13}$ of $\left[\left(126 \div (42 \div 3) \times \frac{1}{2}\right) + \frac{1}{63}\right]$

$= \frac{1}{13}$ of $\left[\left(126 \div 14 \times \frac{1}{2}\right) + \frac{1}{63}\right]$

$= \frac{1}{13}$ of $\left[\left(9 \times \frac{1}{2}\right) + \frac{1}{63}\right]$

$= \frac{1}{13}$ of $\frac{569}{126} = \frac{569}{1638}$

2. $\frac{49}{19} \div \frac{2401}{231}\left[\frac{6}{11} \times \frac{132}{108} + \left(\frac{1}{12} + \frac{4}{9}\right)\right]$

$= \frac{49}{19} \div \frac{2401}{231}\left[\frac{2}{3} + \left(\frac{1}{12} + \frac{4}{9}\right)\right]$

$= \frac{49}{19} \div \frac{2401}{231}\left[\frac{2 \times 12 + 19}{36}\right]$

$= \frac{49}{19} \div \frac{2401}{231} \times \frac{43}{36}$

$= \frac{1188}{5719}$

3. $\frac{14}{21}$ of $\frac{84}{126}$ $\left[\frac{84}{7} \div \left(\frac{2}{13} - \frac{1}{26}\right)\right] \div \frac{16}{15}$

$= \frac{14}{21}$ of $\frac{84}{126}$ $\left[12 \div \frac{3}{26} \div \frac{16}{15}\right]$

$= \frac{130}{3}$

4. $\frac{9}{94}$ of $\frac{47}{81}$ of $\frac{361}{7}$ of $\frac{444}{9}\left[\left(\frac{49}{6} - \frac{34}{6}\right) + \frac{1}{6}\right]$

$= \frac{9}{94}$ of $\frac{47}{81}$ of $\frac{361}{7}$ of $\frac{444}{9}\left[\frac{16}{6}\right]$

$= \frac{213712}{567}$

5. $\frac{49}{155}$ of $\frac{31}{7}$ of $\left[(8 \times 9 - 7 \times 3) + \left(7 \times 14 - \frac{1}{7} \text{ of } 91 \div 13\right)\right]$

$= \frac{49}{155}$ of $\frac{31}{7}$ of $[(8 \times 9 - 7 \times 3) + 97]$

$= \frac{49}{155}$ of $\frac{31}{7}$ of $148 = \frac{1036}{5}$

Solutions for questions 6 to 10:

6. 83.73% of 84323
10% of 84323 = 8432.3
80% of 84323 = 8 x 8432.3 = 67458.4
3% of 84323 = 3 x 843.23 = 2529.69
0.73% of 84323 = 615.5579
83.73% of 84323 = 70603.6479

7. 43.91% of 23875
10% of 23875 = 2387.5
40% of 23875 = 4 x 2387.5 = 9550
3% of 23875 = 3 x 238.75 = 716.25
0.91% of 23875 = 217.2625
43.91% of 23875 = 10483.5125

8. 23 8/9% of 98345
10% of 98345 = 9834.5
20% of 98345 = 2 x 9834.5 = 19669
3% of 98345 = 2940.35
8/9% of 98345 = 874.177
23 8/9% of 98345 = 23493.52

9. Required to find 3222 /8734 × 100
10% of 8734 = 873.4
30% of 8734 = 3 x 873.4
= 2620.2
6% of 8734 = 6 x 87.34 = 524.04
0.89% of 8734 = 77.7326
36.89% of 8734 is 3221.97
i.e, 3222 is 36.89% of 8734

10. 98.62% of 23290
100% of 23290 = 23290
1% of 23290 = 232.90
0.38% of 23290 = 88.502
98.62% of 23290 = 22968.598

Solutions for questions 11 to 15:

By method of multiplication of two 3-digit numbers, we get the answers.

11. 9420356

12. 777032

13. 691740

14. 185796

15. 8907536

Solutions for questions 16 to 20:

16. $1\frac{2}{18} - 2\frac{4}{9} + 3\frac{5}{18} - 3\frac{4}{30}$

$\frac{20}{18} - \frac{22}{9} + \frac{59}{18} - \frac{94}{30}$

LCM of 18, 30 is 90.

$\frac{100 - 220 + 295 - 282}{90} = -\frac{107}{90}$

17. $\frac{1}{4} - \frac{146}{156} + \frac{14}{13}$

LCM of 4, 156 and 13 is 156.

$\frac{39 - 146 + 14 \times 12}{156} = \frac{61}{156}$

18. $\frac{2}{9} + 3\frac{4}{6} - \frac{25}{27}$

LCM of 9.6 and 27 is 54.

$\frac{6 \times 2 + 22 \times 9 - 2 \times 25}{54} = \frac{160}{54} = \frac{80}{27}$

19. $\frac{1}{70} + \frac{3}{28} + \frac{9}{56}$

LCM of 70, 28 and 56 is 280.

$\frac{4 + 10 \times 3 + 5 \times 9}{280} = \frac{79}{280}$

20. $\frac{32}{90}+\frac{13}{72}-\frac{198}{120}$

LCM of 90, 72 and 120 is 360.

$\frac{4\times32+5\times13-3\times198}{360}=\frac{-401}{360}$

Solutions for questions 21 to 25:

By using the principle of adding two digits at a time, additions can be calculated faster.

21. Adding the last two digits of the given numbers.
34 + 83 + 43 + 68 + 36 + 93 = 357
Adding the remaining digits (hundreds digit)
= 8 + 7 + 8 + 7 + 2 + 8 = 40
The required sum
= 4000 + 357 = 4357 = 4357

22. 14531

23. 881

24 75482

25. –1957

Speed Enhancement Test – 28

Solutions for questions 1 to 5:

1. $84 = 2^2 \times 3 \times 7$
$105 = 3 \times 5 \times 7$
$168 = 2^3 \times 3 \times 7$
HCF = $3 \times 7 = 21$
LCM = $2^3 \times 3 \times 5 \times 7 = 840$

2. $81 = 3^4$
$72 = 2^3 \times 3^2$
$54 = 2 \times 3^3$
HCF = $3^2 = 9$
LCM = $3^4 \times 2^3 = 648$

3. $105 = 3 \times 5 \times 7$
$135 = 3^3 \times 5$
$180 = 2^2 \times 3^2 \times 5$
HCF = $3 \times 5 = 15$
LCM = $2^2 \times 3^3 \times 5 \times 7 = 3780$

4. $114 = 2 \times 3 \times 19$
$380 = 2^2 \times 5 \times 19$
$532 = 2^2 \times 7 \times 19$
HCF = $2 \times 19 = 38$
LCM = $2^2 \times 3 \times 5 \times 7 \times 19 = 7980$

5. $322 = 2 \times 7 \times 23$
$966 = 2 \times 3 \times 7 \times 23$
$1173 = 3 \times 17 \times 23$
HCF = 23
LCM = $2 \times 3 \times 7 \times 17 \times 23 = 16422$

Solutions for questions 6 to 10:

6. $984 \times 489 = 984 \times (500 - 10 - 1) = 493000 - 9840 - 984$
$= 481176$

7. $4035 \times 6035 = (400 + 35)(6000 + 35)$
$= 4000 \times 6000 + 4000 \times 35 + 6000 \times 35 + 35 \times 35$
$= 24000000 + 350000 + 1225 = 24351225$

8. $1336 \times 8875 = 1336 \times (10000 - 1125)$
$= 1336\left(10000-\frac{9000}{8}\right)$
$= 13360000 - 167 \times 9000 = 13360000 - 1503000$
$= 11857000$

9. $495 \times 505 = (500 - 5)(500 + 5) = (500)^2 - 5^2$
$= 250000 - 25 = 249975$

10. $678 \times 659 = 678 \times (600 + 50 + 9)$
$= 406800 + 33900 + 6102 = 446802$

Solutions for questions 11 to 15:

By using the principle of adding two digits at a time we get

11. 6942

12. –18376

13. 2532

14. 23094

15. 46442

Solutions for questions 16 to 20:

16. Given, EB is eight times of CD, as CD is a two digit number and EB is a two digit number CD can be either 11 or 12 [$D \neq 0$]. But $C \neq D$, CD is equal to 12
$\Rightarrow$ EB is equal to 96
$\therefore$ CDEB = $1296 = (36)^2 = (AB)^2$, the only possible value of B is 6. Choice (C)

17. Given, $(AB)^2 = CAB$ is AB is a two digit number and CAB is a three digit number.
$\Rightarrow 12 \le AB \le 31$ [A, B and C are distinct non zero single digit numbers]
Only $(25)^2$ ends with 25, remaining numbers from 12 to 31 does not have that pattern.
$\therefore$ AB = 25, the only possible value of B is 5.
Choice (B)

18. 1234567×1111

$$\begin{array}{r} 1\,2\,3\,4\,5\,6\,7 \\ 1\,2\,3\,4\,5\,6\,7\times \\ 1\,2\,3\,4\,5\,6\,7\times\times \\ \underline{1\,2\,3\,4\,5\,6\,7\times\times\times} \\ 137-----\end{array}$$

Clearly the left most digit is 1. Choice (A)

19. TTT = 111(T) = 37 × 3(T)
If 37 is one of PQ and RS, (3) (T) is the other. In that case 3(T) must be at least 12 being a two digit number and P, Q, R, S and T being distinct. Hence $T \ge \frac{12}{3}$. T must be a minimum of 4 and a maximum of 9.
As PQ < 50, if PQ = 37 then RS can be 12 or 15 or 18 or 21 or 24 or 27, according T can be 4 or 5 or 6 or 7 or 8 or 9.
But as P, Q, R, S and T are distinct, T can take either 4 or 6 or 8.
$\therefore$ The possible values of T are '3'.
Choice (C)

20. 999×9270
$= (1000 - 1) \times 9270 = 9270000 - 9270 = 9260730$
$\therefore$ Approximate number of hundreds in the product of 999 and 9270 is 92607. Choice (D)

Solutions for questions 21 to 25:

21. $133.33 = 133\frac{1}{3}$ is $\frac{1}{12}$ of 1600

$\Rightarrow$ 133.33 is approximately $\frac{100}{12}$ = 8.33% of 1600.

22. 56.77% of 19836
= 11260.89

23. 62.62% of 6200 = 62% of 6200 + 0.62% of 6200 = 3882.44.

24. 36% of 1386 = 30% of 1386 + 6% of 1386 = 498.96.

25. 185% of 6374
= (200 − 10 − 5) % of 6374
= 2 × 6374 − 10% of 6374 − 5% of 6375
= 12748 − 637.4 − 318.7 = 11791.9

Speed Enhancement Test – 29

Solutions for questions 1 to 5:

By using the principle of adding two digits at a time we get

1. 9187

2. 58572

3. 189

4. 12846

5. 74566

Solutions for questions 6 to 10:

6. (A) = 1020 ÷ 17 × 40 + 15 × 15 – 65
= 60 × 40 + 225 – 65 = 2560
(B) = 33 × 63 + (8 × 8 + 6) × 16 ÷ 2 – 79
= 2079 + 560 – 79 = 2560
(C) = 1150 ÷ 23 × 46 + 1150 ÷ 23 × 4 + 60
= 50 × 46 + 50 × 4 + 60 = 2560
(D) = 1350 ÷ 27 × 50 + 2 × 78 – 6
= 50 × 50 + 156 – 6
= 2650 Choice (D)

7. (A) = 7 ÷ 4 × (25 + 7) + (8 + 4)/3
= 7 × 8 + 12 ÷ 3
= 60
(B) = 8 × 9 – (25 + 11) ÷ 3
= 72 – 36/3
= 60
(C) = 7 × 7 + (10 + 5) × 2 ÷ 3 – 1
= 49 + 15 × 2 ÷ 3 – 1
= 58
(D) = 8 × (12 × 3) ÷ 4 – 3 × 7 + 3 × 3
= 8 × 9 – 21 + 9
= 60 Choice (C)

8. (A) = 2 × 3 × (4 × 12 – 22 × 2) + 1
= 6 × 4 + 1
= 25
(B) = (4 × 2 – 2) × 3 × 2 – 1
= 6 × 3 × 2 – 1
= 35
(C) = 3 × 4 + 5 × 6 – 2 × 9 + 1
= 12 + 30 – 18 + 1
= 25
(D) = 7 ÷ 4 × 8 – 4 + (3 × 4 + 3)
= 14 – 4 + 15
= 25 Choice (B)

9. (A) = 6 × 4 × 150 ÷ 3 + 5 × 6 + 4 × 3 + 8
= 24 × 50 + 30 + 12 + 8
= 1250
(B) = 30 × (4 × 11 – 4) + 50
= 30 × 40 + 50
= 1250
(C) = (4 × 40 – 100 – 10) × 50
= (160 – 100 – 10) × 50
= 2500
(D) = 11 × 13 × 7 + 3 × 27 × 3 + 6
= 1001 + 243 + 6
= 1250 Choice (C)

10. (A) = 4 × 9 ÷ 3 × (5 + 6) + 13
= 12 × 11 + 13 = 145
(B) = 3 × (11 × 4 + 12 × 4 ÷ 3 – 10)
= 3 × (44 + 16 – 10) = 150
(C) = (3 × 7 – 6) × (6 × 7 + 3) ÷ 3 – (2 × 7 + 1) × 5
= 15 × 15 – 75 = 150
(D) = 4 × (10 + 6) × (10 – 6) – 106
= 4 × 16 × 4 – 106 = 150
Choice (A)

Solutions for questions 11 to 15:

11. $(1000 – 8) \times (1000 + 8) = 1000^2 – 8^2$
= 1000000 – 64 = 999936

12. (500 – 12) × (500 + 2 × 12)
$= 500^2 + 12 \times 500 – 2 \times 12^2$
= 250000 + 6000 – 288
= 255712

13. (600 + 12) × (600 – 44)
$= 600^2 + (12 – 44) \times 600 – 12 \times 44$
= 360000 – 32 × 600 – 528
= 340272

14. $6 \times 96 \times 4 \times 104 = 24 \times (100 – 4) \times (100 + 4)$
$= 24 \times (100^2 – 4^2)$
= 24 × (10000 – 16)
= 240000 – 24 × 16
= 240000 – 384 = 239616

15. (300+ 34) × (300 + 66)
$= 300^2 + (34 + 66) \times 300 + 34 \times 66$
= 300 × (300 +100) + 34 × 66 = 120000 + 2244
= 122244

Solutions for questions 16 to 20:

16. (66.666% + 2%) of 2457 = (2/3) of 2457 + 2% of 2457
= 1638 + 2 × 24.57
= 1687.14

17. (20% + 12.5% – 1%) of 4596
= (4596/5) + (4596/8) – 45.96
= 919.2 + 574.5 – 45.96
= 1447.74

18. (90 – 0.5)% of 4050 = 9 × 405 – (40.5)/2
= 3645 – 20.25 = 3624.75

19. (10 + 5 + 1)% of 540
= 54 + 27 + 5.4 = 86.4

20. 25.5 % of 25.5
$= \frac{25.5 * 25.5}{100} = \frac{650.25}{100} = 6.5025$

Solutions for questions 21 to 25:

21. LCM of 216 and 144 is 432
$\frac{125}{216} + \frac{120}{144} = \frac{125 \times 2 + 120 \times 3}{432} = \frac{610}{432} = \frac{305}{216}$
Choice (D)

22. $? = \frac{96 \times 108}{216} = 48$
Choice (B)

23. a = 2/3 = 8/12; b = 9/13 and c = 15/19
The difference between numerator and denominator of a, b and c is constant (i.e. 4). In such cases, the fraction having the greatest numerator is the greatest. Hence the required order is abc. Choice (A)

24. $\frac{5}{48}\times\frac{28}{35}\times\frac{\sqrt{36}}{\sqrt{81}}\div\frac{6}{14}=$

$\frac{5\times28\times6\times14}{48\times35\times9\times6}=\frac{5\times4\times7\times6\times2\times7}{6\times4\times2\times5\times7\times9\times6}$

= 7/54 Choice (C)

25. a = 7/30; a > 6/30 ⇒ a is slightly greater than 20%.
b = 5/16; b > 4/16 ⇒ b is slightly greater than 25%.
c = 12/71; c > 12/72 ⇒ c is slightly greater than 16.66%.
Clearly b > a > c Choice (C)

Speed Enhancement Test – 30

Solutions for questions 1 to 5:

1. $\frac{100}{24}\%$ of $828=\frac{828}{24}=34.5$

2. (75 + 12.5)% of 3460
= 2595 + 432.5
= 3027.5

3. 788.9 = 805 – 8.05 – 8.05
= (100 – 1 – 1)% of 805
= 98% of 805

4.

Percentage	Value
50% of 746 =	373
10% of 746 =	74.6
10% of 746 =	74.6
1% of 746 =	7.46
1% of 746 =	7.46
72% of 746 =	537.12

Required answer is 72%

5. (100 + 25 + 12.5)% of 450 = 450 + (450/4) + (450/4)/2
= 450 + 112.5 + 56.25 = 618.75

Solutions for questions 6 to 10:

By the method of multiplication of two 3-digit numbers, we get the answers.

6. 139390

7. 257821

8. 76405

9. 483718

10. 115320

Solutions for questions 11 to 15:

11. $\frac{36}{15}$ of 25% of 60% of 165 x $\left(8+\frac{1}{3}\right)-\frac{1}{3}$

$=\frac{36}{15}\text{ x }\frac{1}{4}\text{ x }\frac{3}{5}\text{ x }165\text{ x }\frac{25}{3}-\frac{1}{3}$

$=495-\frac{1}{3}=494\frac{2}{3}$ Choice (D)

12. $\frac{1}{2}\times\left(117\times\frac{11}{13}+23\times\frac{128}{16}-163\right)-\frac{45}{3}$

$=\frac{1}{2}\times(9\times11+23\times8-163)-\frac{45}{3}=\frac{1}{2}\times(120)-15=45$

Choice (A)

13. $\frac{130}{230}\times391+2524-1273\times8+\frac{504}{12}$

= 221 + 2524 – 10184 + 42
= –7397 Choice (B)

14. $\frac{49}{48}\text{of}\left(\frac{12}{5}\times\frac{4}{3}+\frac{1}{5}\right)=\frac{49}{48}\times\left(\frac{12}{5}\times\frac{3}{4}+\frac{1}{5}\right)$

$=\frac{49\times2}{48}=\frac{49}{24}$ Choice (C)

15. $\frac{12}{315}\div\frac{24}{63}\left(\frac{1000}{18}\text{ of }\frac{21}{175}\times\frac{96}{32}+80\right)$

$=\frac{12}{315}\div\frac{24}{63}\left(\frac{1000}{18}\times\frac{21}{175}\times\frac{96}{32}+80\right)$

$=\frac{12}{315}\times\frac{63}{24}\times\frac{1}{100}=\frac{1}{1000}$ Choice (A)

Solutions for questions 16 to 20:

		LCM	HCF
16.	$96=2^5\times3$ $54=2\times3^3$ $24=2^3\times3$	$=2^5\times3^3$ = 864	$=2\times3$ = 6
17.	85 = 5 × 17 51 = 3 × 17 34 = 2 × 17	= 2 × 3 × 5 × 17 = 510	= 17
18.	$126=2\times3^2\times7$ $414=2\times3^2\times23$ $324=2^2\times3^4$	$=2^2\times3^4\times7\times23$ = 52164	$=2\times3^2$ = 18
19.	$108=2^2\times3^3$ $54=2\times3^3$ $126=2\times3^2\times7$	$=2^2\times3^3\times7$ = 756	$=2\times3^2$ = 18
20.	$96=2^5\times3$ $72=2^3\times3^2$ $288=2^5\times3^2$	$=2^5\times3^2$ = 288	$=2^3\times3$ = 24

Solutions for questions 21 to 25:

21. Consider the 4 – digit number has two parts, first part is the number formed by the first two digits and the other part is the number formed by the remaining two digits
Adding the first two digits of all the numbers, we get
47 + 54 + 23 + 12 = 136
Adding the remaining digits
81 + 12 + 95 + 63 = 251
The required sum of all the numbers is
13600 + 251 = 13851

22. 8712 – 3643 + 1258 – 4654 = ?
= (8712 + 1258) – (3643 + 4654)
= 9970 – 8297 = 1673

23. 7859 – 785 + 2369 – 963 – 791 = 7689

24. 512 + 463 – 375 + 216 =
500+12 + 400 + 63 – 300 – 75 + 216 = 816
Choice (A)

25. 9125 + 1245 – 1368 – ? = –2064
? = (9125 + 1245 + 2064 – 1368)
= 11066 Choice (C)