CHAPTER – 6

VBODMAS

HIERARCHY OF ARITHMETIC OPERATIONS

To simplify arithmetic expressions, which involve various operations like brackets, multiplication, addition, etc. a particular sequence of the operations has to be followed. For example, 2 + 3 x 4 has to be calculated by multiplying 3 with 4 and the result 12 added to 2 to give the final result of 14 (you should not add 2 to 3 first to take the result 5 and multiply this 5 by 4 to give the final result as 20). This is because in arithmetic operations, multiplication should be done first before addition is taken up.

The hierarchy of arithmetic operations are given by a rule called BODMAS rule. The operations have to be carried out in the order in which they appear in the word BODMAS, where different letters of the word BODMAS stand for the following operations:

V Vinculum
B Brackets
O Of
D Division
M Multiplication
A Addition
S Subtraction

There are four types of brackets:

(i) Vinculum : This is represented by a bar on the top of the numbers. For example,

$2 + 3 - \overline{4+3}$; Here, the figures under the vinculum have to be calculated as 4 + 3 first and the "minus" sign before 4 is applicable to 7. Thus the given expression is equal to 2 + 3 – 7 which is equal to –2.

(ii) Simple Brackets: These are represented by ( )

(ii) Curly Brackets: These are represented by { }

(iv) Square Brackets: These are represented by [ ]

The brackets in an expression have to be opened in the order of vinculum, simple brackets, curly brackets and square brackets, i.e., [{ ($\bar{}$) }] to be opened from inside outwards.

After brackets is O in the BODMAS rule standing for "of" which means multiplication. For example, 1/2 of 4 will be equal to 1/2 x 4 which is equal to 2.

After O, the next operation is D standing for division. This is followed by M standing for multiplication. After Multiplication, A standing for addition will be performed. Then, S standing for subtraction is performed.

Exercise – 6(a) **Time: 30 min.**

Questions 1 to 30: **Simplifications**

1. $16 + \frac{3}{4}$ of $[32 - 16 \div 4 \times 6 + \overline{23-11} + 3 - 2 \times 6] = ?$
(A) 89/4 (B) 77/4
(C) 97/4 (D) 81/4

2. $3\frac{2}{9} + 5\frac{1}{4}\left(16\frac{2}{3} \div 13\frac{4}{6}\right) \div 6\frac{3}{4} = ?$
(A) 3140/369 (B) 1342/369
(C) 1456/369 (D) 1539/369

3. 40% of $\left[\left\{\left(\overline{16-8} + \overline{18-12}\right) \times 5 - 6\right\} \times 2 + 3\right] = ?$
(A) 253/5 (B) 271/5
(C) 267/5 (D) 262/5

4. $\frac{15}{2}$ % of $[108 + \frac{3}{8}$ of $[16 + \overline{37-5}\,(10 + 2)\} = ?$
(A) 21.25 (B) 19.35
(C) 16.35 (D) 15.85

5. $3025 + (232 \times \left(\frac{4}{3}\text{of}\,6\right) - 20\%\text{ of } 250) \div 301 = ?$
(A) 3031 (B) 3224
(C) 3160 (D) 3458

6. 16%of $2250 \div \overline{30\%\text{ of } 300 - 1\%\text{ of } 4500} = ?$
(A) 4 (B) 8 (C) 5 (D) 2

7. $\frac{3.4 \times 0.64 + 0.17 \times 1.6}{6.8 \times 0.0004} = ?$
(A) 940 (B) 800 (C) 900 (D) 860

8. $[6.03 \times 9 - \{207 - (303 + 129 - 198)\}] = ?$
(A) 75 (B) 81 (C) 84 (D) 72

9. $(\sqrt{14.44} - 2.5)^2 \div 1.68 = ?$
(A) 1 (B) 1.5 (C) 2.25 (D) 24

10. If $1441 \div 8 \div 5 = 90\%$ of x, find x.
(A) 36 (B) 40 (C) 45 (D) 50

11. $[12 \times 5 - \{200 - (501 + 247 - 386)\}] \div 2 = ?$
(A) 111 (B) 62 (C) 61 (D) 82

12. 0.5 of $98 \div 7 \times [4 + \{3 - (4 - 7)\} + 5] = ?$
(A) 105 (B) 100 (C) 49 (D) 98

13. $201 + 651 + (201 - 0.25\{378 + (256 - 137) + 263\}) = ?$
(A) 863 (B) 464 (C) 563 (D) 575

14. $[20 + 2\{(16 \times 4 + 6 \times 40) + (98 \times 12 \div 4 \times 10)\} - 10] = ?$
(A) 6498 (B) 6496
(C) 6497 (D) 6499

15. $\{6 + (6464 \div 101) - (7 \times 31 \div 186 \times 6)\} + 21 = ?$
(A) 82 (B) 84 (C) 74 (D) 64

16. $\frac{3}{4}$ % of $\{54 \times 8 + (16 \times 9 - 12)\} + 1125 \div 5 \times 4 - 3 = ?$

(A) 1167.23 (B) 1011.23
(C) 1101.23 (D) None of these

17. $168 \div 21 \times 16 + \left(\frac{5}{6} \text{ of } 42 - \overline{\frac{7}{3} + \frac{5}{4}}\right) = ?$

(A) 1643/12 (B) 1913/12
(C) 1418/12 (D) 2016/12

18. $230 - \frac{10}{7}$ % of $\left[\frac{16}{3} \text{of} 126 \div \overline{14 - 2} \times 6\right] = ?$

(A) 220.4 (B) 226.6
(C) 230.5 (D) 225.2

19. $1256 + \{326 + \frac{11}{13}[24 \times 15 - 126]\} = ?$

(A) 1786 (B) 1780
(C) 1632 (D) 1820

20. $\frac{3}{4}$ of $3600 \div 54 - \overline{130 + 25} \times 36\%$ of $200 = ?$

(A) –11110 (B) –12360
(C) –11315 (D) – 8465

21. $44 \times 60 \div 80 + 45 \div 15 = ?$

(A) 36 (B) 24 (C) 33 (D) 32

22. $(330 + 12.48\% \text{ of } 144) \div (33 - 37.51\% \text{ of } 24) = ?$

(A) 14.5 (B) 12.5
(C) 16.66 (D) 33.33

23. $\left(\frac{35}{2100} \times 175\right) \text{of} \frac{1}{5} \div 20 = ?$

(A) 35/3 (B) 3/35
(C) 7/240 (D) 6240/7

24. $\left(\frac{189}{31} \text{ of } 12.42\right) \div \frac{21}{61.1} \text{of} 427.75 = ?$

(A) 0.51 (B) 0.73 (C) 0.58 (D) 0.64

25. $\{(12 \times 15) - 9.72\} \div 9 = ?$

(A) 18.82 (B) 18.92
(C) 18.87 (D) 18.97

26. $9 - 9 + 9 \times 9 \div 9 = ?$

(A) 9 (B) 3 (C) 4 (D) 5

27. $108 \times 24 \div 96 + 288 \div 48 = ?$

(A) 31 (B) 32 (C) 33 (D) 34

28. $6417 - (50\% \text{ of } (7308 - 4689) + 25^2 \div 2) = ?$

(A) 2619 (B) 5580
(C) 4725 (D) None of these

29. 1700 % of $680 \div 34 \div 340 = ?$

(A) 1 (B) 1.1 (C) 0.55 (D) 550

30. $3\frac{2}{5} \times 2\frac{3}{5} + \frac{1}{5} = ?$

(A) $1^{7}/_{10}$ (B) $1^{3}/_{5}$
(C) $45^{121}/_{125}$ (D) None of these

Exercise – 6(b) **Time: 30 min.**

Questions 1 to 30: **Simplifications**

1. (7.692% of 1391 + 6029) ÷ 6.5 = ?

(A) 942 (B) 944
(C) 20.8 (D) 474

2. $\frac{24 + 6 \times 80}{16 + 4 \times 60}$ = ? × 7 of 9 ÷ 32

(A) $1^{31}/_{32}$ (B) $3^{15}/_{16}$
(C) 1 (D) 2

3. $11\frac{3}{5} \times \left(1\frac{4}{29} \div 1\frac{41}{58}\right) \div 3\frac{8}{9} = ?$

(A) $1^{171}/_{175}$ (B) $1^{173}/_{175}$
(C) $1^{169}/_{175}$ (D) $1^{167}/_{175}$

4. $\frac{3}{4}$ of $30\,[46 + 2 \times \{1503 \div 167 \times 20 + (40 - 8)\}] = ?$

(A) 2675 (B) 9680
(C) 10575 (D) 11625

5. $3 \times [3 + \{3 \times (3 + (3^3 \div 3))\}] = ?$

(A) 117 (B) 98 (C) 110 (D) 108

6. $60 + 5 \times 12 \div (180 \div 3) = ?$

(A) 60 (B) 120
(C) 13 (D) 61

7. $8118 \times 5 - ? \times 1850 = 7290$

(A) 8 (B) 14 (C) 18 (D) 28

8. $\frac{?^2 \times 20 \times 14}{13^2 - 4 \times 7 - 1} = 4$

(A) $2\sqrt{2}$ (B) 4 (C) $\sqrt{2}$ (D) 2

9. $7 + 5 - (3 \div 2 \times {}^{1}/_{4})$ of ${}^{2}/_{7} + {}^{7}/_{2} \times {}^{1}/_{16} = ?$

(A) $12^{3}/_{88}$ (B) $24^{21}/_{24}$
(C) $12^{25}/_{224}$ (D) $12^{1}/_{224}$

10. $30.9 \times 3000 - 10.1 \times 1100 + 8298 - 4302 = ? \times 1000$

(A) 80 (B) 90 (C) 105 (D) 85

11. $13 + \frac{1}{25.9}$ of $182.02 - 15.01 \times 1.9 = ?$

(A) –10 (B) –12
(C) –15 (D) –11

12. $421 \times 0.9 + 130 \times 101 + 10000 = ? \times 100$

(A) 335 (B) 235
(C) 225 (D) 245

13. $32.92 \times 3.5 + 6.41 \div 0.4 = ?$

(A) 103 (B) 111.8
(C) 131.5 (D) 167.28

14. ? % of 1200 = 32.01 × 250 + 499.9 × 38
(A) 2650 (B) 2250
(C) 2450 (D) 2360

15. $\frac{3.04}{8}$ of $\frac{2.01}{7}$ of 90 = ?
(A) 5 (B) 3 (C) 7 (D) 10

16. 6% of ? + $\frac{2}{7}$ × 715 = 288
(A) 1420 (B) 1400
(C) 1440 (D) 1350

17. 12½% of 752 = 2 × (?)
(A) 94 (B) 188 (C) 47 (D) 48

18. 5 – [3/4 + {2½ – (0.5 + $^1/_6$ – $^1/_7$)}] =?
(A) $1^{19}/_{84}$ (B) $2^{61}/_{84}$
(C) $2^{23}/_{84}$ (D) $2^{47}/_{84}$

19. $\frac{192 \times 9 \times (56 \times 56 - 4)}{54 \times 58}$ = $?^3$
(A) 8 (B) 12 (C) 24 (D) 3

20. $^3/_4 \times 2^3/_5 \div {}^3/_5$ of $^2/_5 - (1^{28}/_{72} \div {}^7/_{72})$ = ?
(A) 345/56 (B) 56/345
(C) – 345/56 (D) – 56/345

21. (55% of 260 + $\frac{3}{4}$ of 268) + 44 = ?
(A) 300 (B) 344
(C) 254 (D) 388

22. 24.4 + 5.6 ÷ 0.05 = ?
(A) 146.4 (B) 136.4
(C) 60 (D) 600

23. (78% of 500) – (24% of 200) =
(A) 352 (B) 342
(C) 362 (D) 372

24. 38.02 × 49.99 + 10% of 1503 = ?
(A) 2250 (B) 2140
(C) 2040 (D) 2050

25. 12.48% of 1140 – 19.83 × 2.99 = ?
(A) 82.5 (B) 75
(C) 77.5 (D) 87.5

26. ($16^2/_3$% of 602 + $33^1/_3$% of 480) ÷ $\left(\overline{12+12} \times 5\right)$ = ?
(A) 3 (B) 2.5 (C) 2 (D) 3.5

27. ($3^4 + 3^3$ of $3^{-1} + 2^3$ of 2^{-1}) × 14.87 = ?
(A) 1290 (B) 1410
(C) 1380 (D) 1450

28. 840 ÷ 30 % of 50 + (–3 $^1/_3$) = ?
(A) 72 (B) 140
(C) 1400 (D) 27

29. 0.003 × ? × 0.0003 = 0.00000027
(A) 9 (B) 3 (C) 0.3 (D) 0.03

30. ? % = 17% of 400 – (40% of 160)
(A) 4 (B) 0.1
(C) 400 (D) 0.4

Key

Exercise – 6(a)

1. C	6. B	11. A	16. D	21. A	26. A
2. D	7. C	12. A	17. B	22. A	27. C
3. D	8. B	13. A	18. D	23. C	28. D
4. B	9. A	14. A	19. B	24. A	29. A
5. A	10. B	15. B	20. A	25. B	30. D

Exercise – 6(b)

1. B	6. D	11. A	16. B	21. D	26. C
2. C	7. C	12. B	17. C	22. B	27. B
3. B	8. C	13. C	18. C	23. B	28. A
4. C	9. C	14. B	19. B	24. D	29. C
5. A	10. D	15. D	20. C	25. A	30. C