# QUANTITATIVE APTITUDE

## Questions asked in MIB Examination

**1.** If a + b + c = 0, then $(a^3 + b^3 + c^3) \div abc$ is equal to:

(A) 1        (B) 2
(C) 3        (D) 9

**2.** If x + y + z = 0, then $\dfrac{x^2}{yz} + \dfrac{y^2}{xz} + \dfrac{z^2}{xy}$ is equal to:

(A) 3        (B) 27
(C) 1        (D) –3

**3.** If ab + bc + ca = 0, then the value of

$$\frac{1}{a^2 - bc} + \frac{1}{b^2 - ca} + \frac{1}{c^2 - ab}$$

is equal to:

(A) 3        (B) 3 abc
(C) abc        (D) 0

**4.** If a + b = 2c, then $\dfrac{a}{a-c} + \dfrac{c}{b-c}$ is equal to:

(A) 2        (B) 1
(C) 0        (D) –2

**5.** If $x = a^2 - bc$, $y = b^2 - ca$, $z = c^2 - ab$, then the value of $\dfrac{(a+b+c)(x+y+z)}{ax + by + cz}$ is:

(A) 3        (B) 2
(C) 1        (D) 0

**6.** The difference between compound interest and simple interest for 3 years at 5% per annum can be found out by multiplying the principal by:

(A) 1.7625        (B) 0.7625
(C) 0.07625        (D) 0.007625

**7.** The simple interest on a sum of money is $\dfrac{1}{9}$th of the sum and the number of years and the rate per cent per annum are equal. The rate per cent per annum is:

(A) $3\dfrac{1}{3}$        (B) 5

(C) $6\dfrac{2}{3}$        (D) 10

**8.** A man invested Rs 5,000 at some rate of simple interest and Rs 4,000 at 1% higher rate of interest. If the interest in both the cases after 4 years is same the rate of interest in the former case is:

(A) 4%        (B) 5%
(C) $6\dfrac{1}{4}$%        (D) $8\dfrac{1}{3}$%

**9.** A sum of money at simple interest rate amounts to Rs 4,025 in 3 years and to Rs 4,550 in 6 years at the same rate of interest. Find the sum and the rate of interest per annum.

(A) Rs 2,500, 6%        (B) Rs 3,000, 5%
(C) Rs 3,500, 5%        (D) Rs 4,500, 4%

**10.** In how many years, will a sum of Rs 800 at 10% per annum compound interest semi-annually become Rs 926.10?

(A) $2\dfrac{1}{2}$        (B) $1\dfrac{1}{2}$

(C) $2\dfrac{1}{3}$        (D) $1\dfrac{1}{3}$

**11.** On a certain map of India the actual distance of 1450 kms between two cities Delhi and Kolkata is shown as 5 cms. What scale is used to draw the map?

(A) $1 : 15 \times 10^6$        (B) $1 : 20 \times 10^6$
(C) $1 : 25 \times 10^6$        (D) $1 : 29 \times 10^6$

**12.** The ratio between the third proportional of 12 and 30 and mean proportional of 9 and 25 is:

(A) 2 : 1        (B) 5 : 1
(C) 7 : 15        (D) 9 : 14

**13.** 5 mangoes and 4 oranges cost as much as 3 mangoes and 7 oranges. What is the ratio of cost of one mango to the cost of one orange?

(A) 4 : 3        (B) 1 : 3
(C) 3 : 2        (D) 5 : 2

**14.** Rs 1,050 are divided among P, Q and R. The share of P is $\dfrac{2}{5}$ of the combined share of Q and R. P gets:

(A) Rs 320        (B) Rs 300
(C) Rs 200        (D) Rs 420

**15.** If a : b = c : d, then $\dfrac{ma + nc}{mb + nd}$ is equal to:

(A) an : mb        (B) m : n
(C) a : b        (D) dm : cn

**16.** How many even numbers of four-digits can be formed with digits 1, 2, 3, 4, 5, 6 (repetition of the digit is allowed)?

(A) 648      (B) 180
(C) 1296      (D) 540

**17.** In how many ways 5 MBA students and 6 law students can be arranged together so that no two MBA students are side by side?

(A) $\dfrac{7!6!}{2!}$      (B) $6!.6!$

(C) $5!6!$      (D) $^{11}P_5$

**18.** There is a number lock with four rings. How many attempts at the maximum would have to be made before getting the right number?

(A) $10^4$      (B) 255
(C) $10^4 - 1$      (D) 256

**19.** There are four letters and four envelops addressed to different persons. In how many ways can wrong choices be made?

(A) 64      (B) 23
(C) 16      (D) 255

**20.** There are 10 points on a straight line AB and 8 points on another AC, none of them being A. How many triangles can be formed with these points as vertices?

(A) 720      (B) 640
(C) 816      (D) 680

**21.** In a village consisting of p persons, x% can read and write. Of the male alone y% and of the females alone 2% can read and write. Find the number of males in the village in terms of p, x, y and z, if z < y:

(A) $\dfrac{p(x-z)}{(y+x-z)}$      (B) $\dfrac{p(x-z)}{(y+x-2z)}$

(C) $\dfrac{p(y-x)}{x-z}$      (D) $\dfrac{p(x-z)}{y-z}$

**22.** The price of a commodity is first increased by x% and then decreased by x%. If the new price is $\dfrac{K}{100}$, find the original price from the given below:

(A) $\dfrac{(x-100)100}{K}$      (B) $\dfrac{(x^2-100^2)100}{K}$

(C) $\dfrac{(x-100)100}{K}$      (D) $\dfrac{100\,K}{(100^2-x^2)}$

**23.** A fraction is such that if the double of the numerator and the triple of the denominator is changed by + 10% and – 30% respectively, then we get 11% of $\dfrac{16}{21}$. Find fraction:

(A) $\dfrac{4}{25}$      (B) $\dfrac{2}{25}$

(C) $\dfrac{3}{25}$      (D) None of these

**24.** A credits 15% of his salary in his fixed account and spends 30% of the remaining on groceries. If the cash in hand is Rs 2,380, what is his salary?

(A) Rs 5,000      (B) Rs 4,500
(C) Rs 4,000      (D) Rs 3,500

**Directions (Q. Nos. 25 to 28):** *Read the following and answer the questions that follow:*

Two friends Shyam and Kailash own two versions of a car. Shyam owns the diesel version while Kailash owns petrol version. Kailash's car gives an average that is 20% higher than Shyam's (in terms of litres per kilometre). It is known that petrol costs 60% of its price higher than diesel.

**25.** The ratio of cost per kilometre of Kailash's car to Shyam's car is:

(A) 3 : 1      (B) 1 : 3
(C) 1.92 : 1      (D) cannot be determined

**26.** Shyam's car gives an average of 20 km per litre, then the difference in the cost of travel per kilometre between the two cars is:

(A) Rs 4.3      (B) Rs 3.5
(C) Rs 2.5      (D) cannot be determined

**27.** For the above question (26), the ratio of the costs per kilometre of the Shyam's travel to Kailash's travel is:

(A) 3 : 1      (B) 1 : 3
(C) 1 : 1.92      (D) cannot be determined

**28.** Diesel costs Rs 12.5 per litre, then the difference in the cost of travel per kilometre between Kailash's and Shyam's is (assume an average of 20 km per litre for Shyam's car and also assume that petrol is 50% of its own price higher than diesel):

(A) Rs 1.75      (B) Rs 0.875
(C) Rs 1.25      (D) None of these

**29.** A shopkeeper gives 3 consecutive discounts of 10%, 15% and 15% after which he sells his goods at a percentage profit of 30.05% on the cost price. Find the value of the percentage profit that the shopkeeper would have earned if he had given discounts of 10% and 15% only:

(A) 53%      (B) 62.5%
(C) 72.5%      (D) 68.6%

**30.** A journey of 192 kms takes 2 hours less by a fast train than by a slow train. If the average speed of the slow train is 16 kmph less than that of a fast train, what is the average speed of the fast train?

(A) 30 kmph      (B) 48 kmph
(C) 20 kmph      (D) 25 kmph

**31.** Two planes move along a circle of circumference 1.2 kms with constant speeds. When they move in different directions, they meet every 15 seconds and when they move in the same direction one plane overtakes the other every 60 seconds. Find the speed of the slower plane:

(A) 0.04 km/s      (B) 0.03 km/s
(C) 0.05 km/s      (D) 0.02 km/s

**32.** The distance between two towns is x km. A car travelling between the towns covers the first 'k' km at an average speed of y kmph and the remaining distance at z kmph. The time taken for the journey is:

(A) $\dfrac{k}{y} + \dfrac{(x-k)}{z}$

(B) $ky + \dfrac{(k-x)}{z}$

(C) $\dfrac{k}{y} + \dfrac{k-x}{z}$

(D) $ky + z(x-k)$

**33.** The metro service has a train going from Mumbai to Pune and Pune to Mumbai every hour. The first one at 6 a.m. The trip from one city to another takes $4\dfrac{1}{2}$ hours, and all trains travel at the same speed. How many trains will pass while going from Mumbai to Pune, if you start at 12 noon?

(A) 8            (B) 10
(C) 9            (D) 13

**Directions (Q. Nos. 34 to 38):** *Read the following and answer the questions that follow:*

A train journey from P to D by an X-express has 4 classes of fares:

| | | | |
|---|---|---|---|
| (i) | 3 tier Rs 300 | 72 berths per bogie | Train has 8 bogies |
| (ii) | AC-3 tier Rs 898 | 64 berths per bogie | Train has 2 bogies |
| (iii) | AC-2 tier Rs 1,388 | 45 berths per bogie | Train has 2 bogies |
| (iv) | AC-first class Rs 2,691 | 26 berths per bogie | Train has one bogie |

The distance between P to D is 1100 km. Assume the train does not stop at any station unless otherwise indicated. The running cost per kilometre : AC-bogie—Rs 25, non-AC-bogie—Rs 10.

**34.** Assuming full occupancy, a bogie of which class exhibits the highest profit margin?

(A) AC-3 tier        (B) AC-2 tier
(C) AC-first class       (D) 3 tier

**35.** Assuming full occupancy in all the classes, for a journey between P and D to Delhi, the profit margin (as a percentage of running costs) of the class showing the lowest profit is approximately:

(A) 116%         (B) 127%
(C) 109%         (D) None of these

**36.** For the above question, the percentage of the total profit that comes out of AC bogie is (approximately):

(A) 50%          (B) 60%
(C) 70%          (D) 80%

**37.** The highest revenue for a journey from P to D will always be generated by:

(A) 3 tier
(B) AC-3 tier
(C) AC-2 tier
(D) cannot be determined

**38.** 2/3 of a consignment was sold at a profit of 6% and the rest at a loss of 3%. If, however, there was an overall profit of Rs 540.00, the value of consignment was:

(A) Rs 1,620       (B) Rs 4,860
(C) Rs 5,400       (D) Rs 18,000

**39.** A cistern is filled by a tap in $3\dfrac{1}{2}$ hours. Due to a leak in its bottom, it takes $\dfrac{1}{2}$ hour longer to fill. If cistern is full, how long will it take to leak to empty it?

(A) 7 hours        (B) 8 hours
(C) 14 hours       (D) 28 hours

**40.** A can do a piece of work in 7 days of 9 hours each whereas B can do the same work in 6 days of 7 hours each. How long will it take to complete the work together working $8\dfrac{2}{5}$ hours a day?

(A) 2 days        (B) 3 days
(C) $3\dfrac{1}{7}$ days       (D) $4\dfrac{2}{5}$ days

**41.** If 12 men and 16 boys can do a piece of work in 5 days and 13 men and 24 boys can do it in 4 days, the ratio of daily work done by a man to that done by a boy is:

(A) 1 : 3        (B) 1 : 2
(C) 2 : 1        (D) 3 : 1

**42.** A bus left Delhi for Ambala at 50 km/hr and turned over the same route at 40 km/hr. Thus it took 1 hour more on the return trip. The distance between Delhi and Ambala is:

(A) 200 kms
(B) 180 kms
(C) 400 kms
(D) None of these

**43.** A train running at 72 kms per hour crosses a coconut tree standing by the side of the track in 7 seconds. The length of the train is:

(A) 104 metres
(B) 140 metres
(C) 504 metres
(D) 540 metres

**44.** A man purchased a bag of rice containing 70 kgs for Rs 175. He sold it at the rate of Rs 2.75 per kg. Find the profit and loss per cent.

(A) 10% profit      (B) 10% loss
(C) 12.5% profit     (D) 12.5% loss

**45.** If 16% of 140% of a number is 28, the number is:

(A) 200         (B) 225
(C) 125         (D) 320

**46.** A person marks his goods 20% higher than the cost price and allows a discount of 5%. The percentage of profit is:

(A) 15%         (B) 20%
(C) 5%          (D) 14%

## ANSWERS AND EXPLANATIONS

1. (C) $\because a + b + c = 0$  $\therefore a^3 + b^3 + c^3 = 3\,abc$
    or $(a^3 + b^3 + c^3) \div abc = 3$

2. (A) $\dfrac{x^2}{yz} + \dfrac{y^2}{xz} + \dfrac{z^2}{xy} = \dfrac{x^3 + y^3 + z^3}{xyz} = \dfrac{3xyz}{xyz} = 3$

$$(\because x + y + z = 0)$$

3. (D) $ab + bc + ca = 0 \Rightarrow bc = -(ab + ca)$
$$ca = -(ab + bc)$$
$$ab = -(bc + ca)$$

    Given exp
    $$= \frac{1}{a^2 - bc} + \frac{1}{b^2 - ca} + \frac{1}{c^2 - ab}$$
    $$= \frac{1}{a^2 + ca + ab} + \frac{1}{b^2 + ab + bc} + \frac{1}{c^2 + bc + ca}$$
    $$= \frac{1}{a(a + c + b)} + \frac{1}{b(b + a + c)} + \frac{1}{c(c + b + a)}$$
    $$= \frac{bc + ca + ab}{abc(a + b + c)} = \frac{0}{abc(a + b + c)} = 0$$

4. (B) $a + b = 2c$ or $a - c = c - b = -(b - c)$
    $$\frac{a}{a - c} + \frac{c}{b - c} = \frac{a}{-(b - c)} + \frac{c}{b - c}$$
    $$= \frac{-a + c}{b - c} = \frac{-(a - c)}{b - c} = \frac{b - c}{b - c} = 1$$

5. (C) $\dfrac{(a + b + c)(x + y + z)}{a(a^2 - bc) + b(b^2 - ca) + c(c^2 - ab)}$
    $$= \frac{(a + b + c)(x + y + z)}{a^3 - abc + b^3 - abc + c^3 - abc}$$
    $$= \frac{(a + b + c)(x + y + z)}{a^3 + b^3 + c^3 - 3abc}$$
    $$= \frac{(a + b + c)(a^2 - bc + b^2 - ca + c^2 - ab)}{a^3 + b^3 + c^3 - 3abc}$$
    $$= \frac{a^3 + b^3 + c^3 - 3abc}{a^3 + b^3 + c^3 - 3abc} = 1$$

6. (D) $P\left[\left(1 + \dfrac{R}{100}\right)^n - 1\right] - \dfrac{P \times R \times T}{100}$

    $$= P\left[\left\{\left(1 + \frac{5}{100}\right)^3 - 1\right\} - \frac{5 \times 3}{100}\right] = P \times .007625$$

7. (A) $\dfrac{P}{9} = \dfrac{P \times R \times R}{100} \Rightarrow R = \dfrac{10}{3} = 3\dfrac{1}{3}$

8. (A) $5000 \times x \times \dfrac{4}{100} = 4000\,(x + 1) \times \dfrac{4}{100} \Rightarrow x = 4$

9. (C) I for 3 years = Rs 4550 – 4025 = Rs 525

A = P + I
∴ P = 4025 – 525 = Rs 3500
$$R = \frac{525 \times 100}{3 \times 3500} = 5$$

10. (B) $926.10 = 800\left(1 + \dfrac{\frac{2}{100}}{ }\right)^n \Rightarrow n = 3$ half years $= 1\dfrac{1}{2}$ years

11. (D)

12. (B) Third proportional of 12 and 30 $= \dfrac{30^2}{12} = 75$

    Mean proportional of 9 and 25 $= \sqrt{9 \times 25} = 15$

    Reqd ratio $= \dfrac{75}{15} = \dfrac{5}{1} = 5 : 1$

13. (C) Let the cost of 1 mango be Rs x and that of 1 orange be Rs y

    ATS $5x + 4y = 3x + 7y \Rightarrow \dfrac{x}{y} = \dfrac{3}{2}$

14. (B) Let the combined share of Q and R be Rs x
    $$\therefore \frac{2x}{5} + x = \text{Rs } 1050 \Rightarrow x = 750$$
    $$\therefore \text{Share of P} = \frac{2}{5} \times 750 = \text{Rs } 300$$

15. (C) $\dfrac{a}{b} = \dfrac{c}{d} = k \Rightarrow a = bk,\ c = dk$
    $$\frac{ma + nc}{mb + nd} = \frac{mbk + ndk}{nb + nd} = k = a : b$$

16. (A) Unit's place be filled in 3 ways (*i.e.* by 2 or 4 or 6)
    Each of three remaining places (*i.e.* ten's hundred's and thousand's) can be filled in 6 ways
    (∵ repetition is allowed)
    ∴ Reqd. no. of nos. = 6 × 6 × 6 × 3 = 648

17. (A) 6 law students can be arranged in 6! ways
    Now in 7 places, 5 MBA students can be arranged in $^7P_5$ ways .×. ×. ×. ×. ×. ×.
    ∴ Total no. of ways = 6! × $^7P_5$ = $\dfrac{6! \times 7!}{2!}$

18. (C)

19. (D) $4^4 - 1 = 255$

20. (B) $^8C_2 \times 10 + {}^{10}C_2 \times 8 = 640$
    [No. of bases on AC = $^8C_2$
    No. of vertices on AB = 10
    ∴ No. of $\Delta^s$ with bases on AC and vertices on AB = $^8C_2 \times 10$
    No. of $\Delta^s$ with bases on AB and vertices on AC = $^{10}C_2 \times 8$]

21. (D) Total persons who can read and write $= \dfrac{px}{100}$

Let the no. of males be M

A.T.S. $M \times \dfrac{y}{100} + (p - M) \dfrac{z}{100} = \dfrac{px}{100}$

$\Rightarrow M = \dfrac{p(x - z)}{y - z}$

22. (D) Let the original price be Rs y

$y \left( \dfrac{100 + x}{100} \right) \left( \dfrac{100 - x}{100} \right) = \dfrac{k}{100} \Rightarrow y = \dfrac{100k}{100^2 - x^2}$

23. (B) Let the fraction be $\dfrac{x}{y}$

A.T.S. $\dfrac{2x \times \dfrac{110}{100}}{3y \times \dfrac{70}{100}} = \dfrac{11}{100} \times \dfrac{16}{21} \Rightarrow \dfrac{x}{y} = \dfrac{2}{25}$

24. (C) Let his salary be Rs x

A.T.S. $\dfrac{85x}{100} \times \dfrac{70}{100} = 2380 \Rightarrow x = \text{Rs } 4000$

25. (C)

26. (D)

27. (C)

28. (D)

29. (A) Let CP = Rs 100, P = 30.05%

∴ S.P. = Rs 130.05

Discounts = 10%, 15%, 15%

∴ M.P. = $130.05 \times \dfrac{100}{90} \times \dfrac{100}{85} \times \dfrac{100}{85} = \text{Rs } 200$

If discounts are 10% and 15% only

∴ S.P. = M.P. × $\left( \dfrac{100 - d_1}{100} \right) \times \left( \dfrac{100 - d_2}{100} \right)$

$= 200 \times \dfrac{90}{100} \times \dfrac{85}{100} = \text{Rs } 153$

∴ Profit = 53%

30. (B) $\dfrac{192}{x - 16} - \dfrac{192}{x} = 2 \Rightarrow$ x = Speed of fast train = 48

31. (C) Let the speeds of fast plane and slow planes be x and y m/sec respectively        D = s × t

If they move in opposite direction

15 (x + y) = 1200 $\Rightarrow$ x + y = 80  m/sec        ... (i)

If they move in same direction, relative speed

= x – y m/sec

Time = 60 i.e. 4 times

∴ Speed is $\dfrac{1}{4}$ th x – y = 20 m/sec        ... (ii)

Solving (i) and (ii),

y = 50 m/sec = 0.05 km/sec

32. (A) Reqd time = $\dfrac{k}{y} + \dfrac{x - k}{z}$

33. (D) 13 trains

34. (D) 3 tier

35. (D)

36. (B) 60%

37. (A) 3 tier

38. (D) Let total value of consignment be Rs x

A.T.S. $\dfrac{2}{3}x \times \dfrac{106}{100} + \dfrac{x}{3} \times \dfrac{97}{100} - x = 540$

$\Rightarrow x = \text{Rs } 18000$

39. (D) Tap's 1 hour's work = $\dfrac{2}{7}$

Let the reqd time be x hrs

ATS $\dfrac{2}{7} - \dfrac{1}{x} = \dfrac{1}{4} \Rightarrow x = 28$

40. (B) A's one day's work = $\dfrac{1}{63}$ (by working 1 hour a day)

(A + B)'s one day's work = $\dfrac{1}{63} + \dfrac{1}{42} = \dfrac{5}{126}$

(A + B)'s work by working $\dfrac{42}{5}$ hours a day

$= \dfrac{5}{126} \times \dfrac{42}{5} = \dfrac{1}{3}$

Reqd time = 3 days

41. (C) Work done by 12 M + 16B in 5 days

= work done by 13 M + 24 B in 4 days

$\Rightarrow$ 60M + 80B = 52 M + 96 B $\Rightarrow$ 1M = 2B

$\dfrac{M}{B} = \dfrac{2}{1}$        2 : 1 = Reqd ratio

42. (A) $\dfrac{D}{40} - \dfrac{D}{50} = 1 \Rightarrow D = 200$ km

43. (B) Let the length of train be x

∴ $\dfrac{x}{72 \times \dfrac{5}{18}} = 7 \Rightarrow x = 140$ m

44. (A) C.P. of 70 kg rice = Rs 175

S.P. = $2.75 \times 70 = \dfrac{385}{2}$

P = $\dfrac{385}{2} - 175 = \dfrac{35}{2}$

∴ P% = $\dfrac{35}{2} \times \dfrac{1}{175} \times 100 = 10$

45. (C) $\dfrac{16}{100} \times \dfrac{140}{100} \times x = 28 \Rightarrow x = 125$

46. (D) Let CP = Rs 100

∴ MP = Rs 120

S.P. = $120 \times \dfrac{95}{100} = \text{Rs } 114$

∴ P% = 14