50+ Important Arithmetic Questions For SSC CGL Tier-II 2019-20 Exam (Eng/Hindi PDF)

1. The average of five consecutive odd numbers is "m". If the next three odd numbers are also included, then what is the increase in the average?
A. 0
B. 8
C. 17
D. 3

2. The average of five consecutive even numbers is m. If the next five even number are also included, the average of ten number will be:
A. m+5
B. m+10
C. 10
D. 11

3. A batman scores 92 runs in the 15th inning and thus increases his average by 4. What is his average after the 15th inning?
A. 40
B. 32
C. 35
D. 36

4. The average of eleven numbers is 68. The average of the first four numbers is 78 and that of the next four numbers is 63. The 9th number is two times the 11th number and the 10th number is 4 less than the 11th number. What is the average of the 9th and 11th number?
A. 70.1
B. 72.2
C. 70.5
D. 72.6

5. A person can row a distance of 4 km upstream in one hour 20 minutes and can row back to the starting point in just 24 minutes. How much time (in hours) will he take to row 13 km in still water?
A. $2\frac{1}{2}$
B. $3\frac{1}{2}$
C. 2
D. 3

6. A boat can cover a distance of 7.2km downstream and 3.2 km upstream in 2 hours. It can also cover 1.5 km downstream and 0.6 km upstream in 24 minutes. What is the speed of the boat when going downstream in km/h)?
A. $4\frac{1}{2}$
B. 5
C. $7\frac{1}{2}$
D. 6

7. Ritika can row upstream 20 kmph and downstream 40 kmph. Find the speed of ritika in still water and speed of stream?
A. 18, 20
B. 30, 10
C. 22, 15
D. 20, 40

8. If a boat goes upstream at a speed of 24 km/hr and comes back the same distance at 40 km/hr. What is the average speed (in km/hr) for the total journey.
A. 32
B. 30
C. 31
D. 33

9. A steamer in still water travel at a speed of 35 km/h. It takes 2 hrs to go 60 km upstream. The time taken by it to cover the same distance down the stream will be.
A. 1 hr
B. 1 hr 30 min
C. 2 hrs
D. 2 hrs 30 min

10. A certain sum amounts to Rs. 280900 in 2 years at 6% per annum, interest compounded annually. The sum is:
A. Rs. 350000
B. Rs. 550000
C. Rs. 250000
D. Rs. 200000

11. The simple interest on a sum of money for 3 years at an interest rate of 6% p.a. is

Rs 6,750. What will be the compound interest rounded off on the same rate for the same period, compounded annually is closest to:
A. ` 7,133
B. ` 7,663
C. ` 7,103
D. ` 7,163

12. What will be the difference in compound interest on a sum of Rs. 7800 at 8% p.a for 1 year, when the interest is paid yearly and half yearly?
A. Rs 24.72
B. Rs 12.48
C. Rs 19.46
D. Rs 29.18

13. A sum lent out at compound interest amounts to Rs. 1,250 in one year and to Rs. 1,458 in 3 years at a rate percentage p.a. What is the simple interest on the same sum for $5\frac{2}{5}$ years at the same rate of interest?
A. Rs. 600
B. Rs. 520
C. Rs. 500
D. Rs. 480

14. If in 13 years a fixed sum doubles at simple interest, what will be the interest rate per year?(Correct to two decimal places)
A. 8.69%
B. 7.69%
C. 7.29%
D. 7.92%

15. When 732 is divided by a positive integer x, the remainder is 12. How many values of x are there?
A. 19
B. 16
C. 18
D. 20

16. If the number 1005x4 is completely divisible by 8, then the smallest integer in place of x will be:
A. 0

B. 1
C. 4
D. 2

17. How many natural numbers up to 2001 are divisible by 3 or 4 but NOT by 5?
A. 768
B. 934
C. 1067
D. 801

18. When 3738, 5659 and 9501 are divided by the greatest possible number X, the remainder in each case is y. What is the sum of x and y?
A. 3783
B. 3637
C. 3673
D. 3738

19. The HCF and LCM of two numbers are 8 and 48 respectively. If the ratio of the two numbers is 2 : 3, then the largest of the two numbers is :
A. 24
B. 18
C. 48
D. 16

20. What is the sum of the greatest three digit number and smallest four digit number such that their HCF is 23?
A. 2001
B. 2002
C. 1984
D. 1998

21. Two bottles of the same capacity are 35% and $33\frac{1}{3}\%$ full of orange juice, respectively. They are filled up completely with apple juice and then the contents of both bottles are emptied into another vessel. The percentage of apple juice in the mixture is:
A. $65\frac{5}{6}$

B. $64\frac{1}{3}$

C. $60\frac{2}{3}$

D. $34\frac{1}{6}$

22. How many kg of salt costing Rs. 28 per kg must be mixed with 39.6 kg of salt costing Rs. 16 per kg, so that selling the mixture at Rs. 29.90, there is a gain of 15%?
Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.
A. 198
B. 200
C. 160
D. 188

23. A vessel contains a 32 litre solution of acid and water in which the ratio of acid and water is 5 : 3. If 12 litres of the solution are taken out and $7\frac{1}{2}$ litres of water are added to it, then what is the ratio of acid and water in the resulting solution?
A. 8 : 11
B. 5 : 6
C. 4 : 7
D. 4 : 9

24. 40 litres of 60% concentration of acid solution is added to 35 litres of 80% concentration of acid solutions. What is the concentration of acid in the new solutions?
A. $66\frac{2}{3}\%$
B. 69%
C. $69\frac{1}{3}\%$
D. 66%

25. In what ratio, sugar costing Rs 60 per kg he mixed with sugar costing Rs 42 kg such that by selling the mixture at Rs 56 per kg there is a gain of 12%?
A. 5 : 7
B. 8 : 9
C. 5 : 6
D. 4 : 5

26. A, B and C start a business. A invests $33\frac{1}{3}\%$ of the total capital, B invests 25% of the remaining and C invests the rest. If the total profit at the end of a year is ` 1,62,000, then A's share in profit is :
A. ` 54,000
B. ` 60,000
C. ` 81,000
D. ` 90,000

27. 'A' started a business with a capital of Rs 54,000 and admitted 'B' and 'C' after 4 months and 6 months respectively. At the end of the year, the profit was divided in the ratio 1 : 4 : 5. What is the difference between the capitals invested by 'B' and 'C'?
A. Rs 2,16,000
B. Rs 3,24,000
C. Rs 1,08,000
D. Rs 1,62,000

28. A sum of ` x is divided among A, B and C such that the ratio of the shares of A and B is 6 : 7 and that of B and C is 3 : 2. If the difference between the shares of A and C is ` 540. Then the value of x is :
A. 7020
B. 7290
C. 7425
D. 7155

29. A, B and C invested their capitals in the ratio of 2 : 3 : 5. The ratio of months for which A, B and C invested is 4 : 2 : 3. If C gets a share of profit which is ` 1,47,000 more than that of A, then B's share of profit is :
Note : For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.
A. ` 1,89,000
B. ` 1,05,000
C. ` 1,68,000
D. ` 1,26,000

30. By what number must the given number be multiplied to increase the number by 25%?
A. 5/4

4

B. 3/4
C. 2/5
D. 3

31. Anu spends 68% of her monthly income. If her monthly income increases by 20% and her monthly savings increase by $9\frac{3}{8}\%$, then the percentage increase in her monthly expenditure is:
A. 20%
B. 25%
C. 22%
D. 32%

32. In an examination, Anita scored 31% marks and failed by 16 marks. Sunita scored 40% marks and obtained 56 marks more than those required to pass. Find the minimum marks required to pass.
A. 264
B. 3944
C. 3116
D. 7100

33. If radius of a circle is decreased by 11%, then the total decrease in the area of the circle is given as:
A. 19.50%
B. 20.79%
C. 20.50%
D. 21%

34. Pipes A and B together can fill a tank in 16 hours, whereas pipe C alone can empty the full tank in 24 hours, A and B were opened together for 10 hours and then closed. Pipe C was then opened. The tank will now be emptied by C in:
A. 18 hours
B. 12 hours
C. 10 hours
D. 15 hours

35. Pipes, A and B, are emptying pipes and can empty a tank in 6 hours and 16 hours, respectively. C is a filling pipe. All the three pipes were opened together. They took 80 minutes to empty $\frac{5}{18}$ of the tank. Pipe C alone can fill the tank in:

A. 36 hours
B. 42 hours
C. 48 hours
D. 40 hours

36. Pipes A and B are filling pipes while pipe C is an emptying pipe. A and B can fill a tank in 72 and 90 minutes respectively. When all the three pipes are opened together, the tank gets filled in 2 hours. A and B are opened together for 12 minutes, then closed and C is opened. The tank will be empty after:
A. 12 minutes
B. 18 minutes
C. 16 minutes
D. 15 minutes

37. Pipes A and B can fill a tank in 16 hours and 24 hours, respectively and pipe C alone can empty the full tank in x hours. All the pipes were opened together at 10:30 A. m. but C was closed at 2:30 p.m. If the tank was full at 8:30 p.m. on the same day, then what is the value of x?
A. 96
B. 48
C. 64
D. 45

38. Pipes A. B and C can fill a tank in 30 h, 40 h and 60 h respectively. Pipes A, B and C are opened at 7 a. m. 8 a. m. and 10 a. m. respectively on the same day. When will the tank be full?
A. 9. 40 p. m.
B. 10. 20 p. m.
C. 9. 20 p. m.
D. 10. 00 p. m.

39. Four years ago, the ratio of the ages of A and B was 4: 5. Eight years from now, the ratio of the ages of A and B will be 11: 13. What is the sum of the present age of both of them?
A. 76 years
B. 72 years
C. 80 years
D. 96 years

40. Present ages of A and B are in ratio 8:15 respectively. 8 years ago their ages were in ratio 6:13. What is the ratio of their ages 8 years from now?
A. 9:16
B. 9:17
C. 10:17
D. 13:17

41. A man wanted to sell his bat at a discount of 8%. His brother who was a cricketer wanted to buy the bat, so the man sells it at a discount of 10%. In this deal, the man reduces his profit to Rs. 70 . What was the market value of the bat?
A. Rs. 3,000
B. Rs. 3,500
C. Rs. 2,500
D. Rs. 3,200

42. A shopkeeper buys two books for Rs. 300. He sells the first book at a profit of 20% and the second book at a loss of 10%. What is the selling price of the first book, if, the whole transaction there is no profit no loss?
A. Rs. 110
B. Rs. 115
C. Rs. 120
D. Rs. 125

43. The following table shows the number of students enrolled in different streams in a particular college.

Science		Arts		Commerce		Vocational	
Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
32	18	28	45	42	42	13	30

The ratio of the number of girls studying Arts to the number of girls studying
in all other streams is:
A. 1 : 2
B. 3 : 1
C. 1 : 3
D. 2 : 1

44. If 3A = 4B = 5C, then A : B : C is equal to:
A. 10 : 5 : 4
B. 10 : 7 : 6
C. 20 : 15 : 12
D. 20 : 15 : 16

45. The total number of students in a class is 65. If the total number of girls in the class is 35, then the ratio of the total number of boys to the total number of girls is:
A. 7 : 6
B. 7 : 13
C. 13 : 7
D. 6 : 7

46. If A : B = 3 : 5, and B : C = 2 : 3, then A : B : C is equal to:
A. 6 : 10 : 15
B. 3 : 8 : 6
C. 6 : 15 : 10
D. 3 : 7 : 3

47. When two equal amounts are deposited for 5 years and 3 years at the rate of 7% and 9% per annum respectively and the difference of their simple interest is Rs. 475. Then find the deposited amount?
A. Rs. 5,837.5
B. Rs. 6,037.5
C. Rs. 5,992.5
D. Rs. 5,937.5

48. Rs. 4,300 becomes Rs. 4,644 in 2 years at simple interest. Find the principle amount that will become Rs. 10,104 in 5 years at the same rate of interest?
A. Rs 7,200
B. Rs 9,260
C. Rs 8,420
D. Rs 5,710

49. X and Y are two stations which are 280 km apart. A train starts at a certain time from X and travels towards Y at 60 km/h. After 2 hours, another train starts from Y and travels towards X at 20 km/h. After how many hours does the train leaving from X meets the train which left from Y?
A. 4 hours
B. 3 hours
C. 6 hours
D. 2 hours

50. In the stream running at 3 km/h, a motorboat hoes 12 km upstream and back to the starting point in 60 min. Find the speed of the motorboat in still water. (in km/h)?

A. $2(2+\sqrt{17})$
B. $2(4+\sqrt{15})$
C. $3(2+\sqrt{17})$
D. $3(4+\sqrt{17})$

###ANSWERS###

1. Ans. D.
The eight consecutive odd numbers:
2x + 1, 2x + 3, 2x + 5, 2x + 7, 2x + 9, 2x + 11, 2x + 13, 2x + 15
According to the question,
(2x + 1 + 2x + 3 + 2x + 5 + 2x + 7 + 2x + 9)/5 = (10x + 25)/5 = m
⇒ x = (m-5)/2 ………………(i)
Average (8 odd nos.) = [(10x + 25) + (2x + 11) + (2x + 13) + (2x + 15)]/8
= (16x + 64)/8 = 2x + 8
Putting value from equation (i):
Average (8 odd nos.) = 2 × (m-5)/2 + 8 = m + 3
∴ Required answer i.e. the increase in the average = **3**

Alternate Method:
Let the five consecutive odd numbers are 1, 3, 5, 7, 9.
Then Average = (1+3+5+7+9)/5 = 25/5 = 5
Now next three odd numbers are added i.e. 11, 13, 15.
Then New Average = (25+11+13+15)/8 = 64/8 = 8
Thus, increase in the average = 8 – 5 = **3**.

2. Ans. A.
Let five consecutive even numbers are = x , x+2 ,x+4 , x+6 and x+8
We know that , Average = $\frac{Sum\ of\ observations}{Total\ number\ of\ observations}$
Hence, average of five consecutive even numbers =
(x+x+2+x+4+x+6+x+8)/5 = (5x+20)/5 = x+4
Given that average of five consecutive even numbers is m
⇒ m = x+4
⇒ x =m-4
Now, next five consecutive even numbers are = x+10 , x+12 ,x+14 , x+16 and x+18
Sum of next five consecutive even numbers =
x+10+x+12+x+14+x+16+x+18 = 5x+70
Sum of ten numbers = 5x+20+5x+70 = 10x + 90

We know that , Average = $\frac{Sum\ of\ observations}{Total\ number\ of\ observations} = \frac{10x+90}{10} = x + 9$
⇒ x + 9 = m - 4 + 9 = m + 5

3. Ans. D.
Let the average till 14th innings be A.
Then average = $\frac{Sum}{14} = A$
So sum = 14 A
Score of batsman in 15th innings = 92 runs which increases his average by 4.
Hence, $\frac{14A+92}{15} = A + 4$
14 A + 92 = 15A + 60
⇒ 32 = A
Hence average after 15th innings.
A + 4 = 32 + 4 = 36

4. Ans. C.
We know that Average = $\frac{sum\ of\ observations}{Total\ number\ of\ observations}$
Given that average of eleven numbers is 68
Hence sum of 11 numbers = Average × total number of observations = $68 \times 11 = 748$
Now The average of the first four numbers is 78
Hence sum of 4 numbers = Average × total number of observations = $78 \times 4 = 312$
Now The average of the next four numbers is 63
Hence sum of these 4 numbers = Average × total number of observations = $63 \times 4 = 252$
Let 9th , 10th and 11th numbers are x , y and z respectively.
Given that 9th number is two times the 11th number and the 10th number is 4 less than the 11th number
According to question
$x = 2z$…………….(1)
$y = z - 4$……………(2)
x+y+z = (sum of 11 numbers) – (sum of first 8 numbers) = 748 – (312+252) = 184……….(3)
Put the value of (1) and (2) in equation (3)

$\Rightarrow$ 2z + z-4 + z = 184

$\Rightarrow$ 4z -4 = 184

$\Rightarrow$ 4z = 188

$\Rightarrow$ z = 47

Hence, x = $2 \times 47 = 94$

y = 47 – 4 = 43

average of the 9th and 11th number = $\frac{94+47}{2} = 70.5$

5. Ans. C.

Speed of boat upstream = 4/(4/3) = 3 km/hr

Speed of boat downstream = 4/(2/5) = 10 km/hr

Speed of boat in still water = (3+10)/2 = 6.5km/hr

Time taken by boat to travel 13 km in still water = 13/(6.5) = 2hours

6. Ans. D.

Let the speed of boat in downstream be (x + a)

and in upstream be (x - a)

(where x = speed of boat in still water

a = speed of stream)

Distance covered in downstream=7.2km

Distance covered in upstream=3.2km

Total time taken in whole journey=2hr

$$\frac{7.2}{x+a} + \frac{3.2}{x-a} = 2$$

Or

$$\frac{72}{x+a} + \frac{32}{x-a} = 20 \ldots \ldots \ldots (1)$$

After that it covers 1.5km in downstream and 0.6km in upstream in 24min (or $\frac{24}{60} hr$)

$$\frac{1.5}{x+a} + \frac{0.6}{x-a} = \frac{24}{60}$$

Or

$$\frac{15}{x+a} + \frac{6}{x-a} = \frac{240}{60} = 4$$

Multiplying both side by 32/6 we get

$$\frac{80}{x+a} + \frac{32}{x-a} = \frac{64}{3} \ldots \ldots \ldots (2)$$

On subtracting equation (1) from (2) we get

$$\frac{8}{x+a} = \frac{4}{3}$$

$(x + a) = 6$ speed of boat in downstream

7. Ans. B.

$\Rightarrow$ We know that,

Rate in still water = ½ (a + b)

Rate of current = ½ (a – b)

Where, a = downstream rate & b = upstream rate

$\Rightarrow$ According to the condition given in the problem,

Rate in still water = ½ (20 + 40) = 30 kmph

Rate of current = ½ (40 – 20) = 10 kmph

8. Ans. B.

Average speed = $\frac{2 \times 24 \times 40}{24+40}$ = 30 km/hr

9. Ans. B.

Upstream speed $= \frac{60}{2} = 30$ km/h

Speed of Current = 35 – 30 = 5 km/h

Downstream speed = 35 + 5 = 40 km/h

Time taken by the steamer to go 60 km downstream $= \frac{60}{40} = 1 \ hr \ 30 \ min$

10. Ans. C.

Effective % rate of 6% in 2 years = 6 + 6 + $\frac{6 \times 6}{100}$

= 12.36

A.T.Q.

112.36% of P = 280900

P = 28090000/112.36

P = Rs. 250000.

11. Ans. D.

The simple interest on a sum of money for 3 years at an interest rate of 6% p.a. is Rs 6,750.

$$\text{Simple interest} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$$

$$6750 = \frac{\text{Principal} \times 6 \times 3}{100}$$

$\Rightarrow$

$\Rightarrow$ Principal = (675000/18) = 37500

Now we will find compound interest on Rs. 37500 for 3 years at an interest rate of 6% p.a.

$$Compound\ Interest = Principal\left(1 + \frac{rate}{100}\right)^{TIME} - Principal$$

$$= \frac{37500\left(1 + \frac{6}{100}\right)^3 - 37500}{}$$

$$= \left(37500 \times \frac{106}{100} \times \frac{106}{100} \times \frac{106}{100}\right) - 37500$$

= 44663.1-37500 = Rs. 7163.1

12. Ans. B.

Compound interest for one year :

Rate = 8% and time = 1 year

Compound interest when calculated half yearly :

Rate = 4% and time period will be 6 months + 6 months

Effective rate = 4 + 4 + (16/100) = 8.16%

Difference of rate = 8.16% - 8% = 0.16%

Then compound interest = 0.16% of 7800

= (0.16/100)×7800 = Rs. 12.48

13. Ans. C.

Let Principal = Rs. P

According to the question:

1,250 = P (1 + R/100) ………………(i)

1,458 = P (1 + R/100)^3 ………………(ii)

Divide equation (ii) by (i):

⇒ 1458/1250 = (1 + R/100)^2

⇒ 27/25 = 1 +R/100

∴ R = 8%

Put R = 8% in equation (i), we get

P = Rs. 1250 × (100/108)

S.I = (P×R×T)/100 = 1250×(100/108) × (8/100) × (27/5) = Rs. 500

14. Ans. B.

Let P = Rs. x

S.I. = 2x – x = Rs. x

According to the question:

S.I = (P×R×T)/100 and Amount = P + S.I

⇒ x = (x × R × 13)/100

∴ R = 7.69%

15. Ans. D.

After subtracting 12 out of 732 ; we have

732 – 12 = 720

The number 720 when divided by x ; the remainder is 0 .

The factors of 720 = $2^4 \times 3^2 \times 5^1$

No. of factors = (4+1)(2+1)(1+1) = 30

The ten factors which will give remainder less than 12

= 1 , 2, 3 , 4 , 5 , 6, 8 , 9 , 10, 12

Left factors = 30 – 10 = 20 factors

16. Ans. A.

By divisibility of 8 : last three digits of the number should be divisible by 8.

Hence, in the number 1005x4

5x4 must be divisible by 8

So if x = 0 we have 504 which is divisible by 8 .

Hence smallest integer in place of x should be 0.

17. Ans. D.

Natural numbers divisible by 3 upto 2001

= 2001/3 = 667

Natural numbers divisible by 4 up to 2001

= 2001/4 = 500

Total numbers that are divisible by both 3 and 4 or divisible by 12

= 2001/12 = 166

Now we need to find the numbers that are not divisible by 5.

In case of 3 : taking LCM as 15

= 2001/15 = 133

In case of 4 : taking LCM = 20

= 2001/20 = 100

Now excluding the numbers that are occurring in both of them

; taking LCM 60

2001/60 = 33

Total number = 667 + 500 - 166 - 133 – 100 + 33 = 801

18. Ans. D.

Let when 3738, 5659 and 9501 are divided by x then quotient will be A, B and C respectively and y is the remainder in each case.

So , using remainder theorem

3738 = Ax + y………………………(1)

5659 = Bx + y………………………(2)

9501 = Cx + y…………………………(3)

Subtract (3) from (2)

⇒ (9501 - 5659) = (C- B) x

⇒ 3842 = (C- B) x………………(1)

Subtract (2) from (1)

5659 - 3738 = (B - A)x

⇒ 1921 = (B - A)x………………(2)

Now we will evaluate HCF of 3842 & 1921

1921 = 1921×1

3842 = 1921×2

Hence HCF of 3842 & 1921 = 1921…………………(3)

From (1) , (2) and (3)

So, x = 1921

3738 = 1921 * 1 + y

⇒ y = 1817

x = 1921

y = 1817

x + y = 1921 + 1817= 3738

Hence , sum of x and y = 3738

19. Ans. A.

The HCF and LCM of two numbers are 8 and 48 respectively.

Ratio of the two numbers is 2 : 3.

Let the numbers be 2x and 3x .

Now ; Product of two numbers = HCF × LCM

$$(2x)(3x) = 8 \times 48$$

$$6x^2 = 8 \times 48$$

$$x^2 = 64$$

Hence, x = 8

Largest of two numbers = 3x = 3× 8 = 24

20. Ans. A.

We need to find the greatest and the smallest numbers that are divisible by 23.

Greatest three-digit number = 999

Remainder left when greatest number divisible by 23 = $\frac{999}{23} = 10$

Greatest three-digit number divisible by 23 = 999 – 10 = 989

Smallest four-digit number = 1000

Remainder left when smallest number divisible by 23 = $\frac{1000}{23} = 11$

smallest number divisible by 23 = 1000 + (23 – 11) = 1012

sum = 989 + 1012 = 2001

21. Ans. A.

I Bottle contains = 35% orange juice = 35/100 = 105/300

II Bottle contains = 33(1/3)% orange juice = 100/(3×100)

Now left quantity of juice will be apple juice in I = 195/300

Quantity of apple juice in II = 200/300
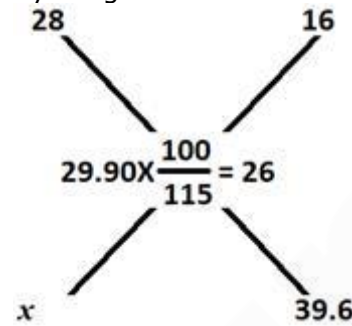
Total quantity of apple juice = (195+200)/600 = 395/600

Required percentage = (395/600)×100 = 65(5/6)%

22. Ans. A.

Let the x kg salt costing Rs.28/kg mixed in the mixture.

By allegation method –

$$\frac{28x + 16 \times 39.6}{x + 39.6} = 26$$

$x = 198$ kg.

23. Ans. B.

Ratio of Acid : Water = 5 : 3

Quantity of Acid $= \frac{32}{8} \times 5 = 20$
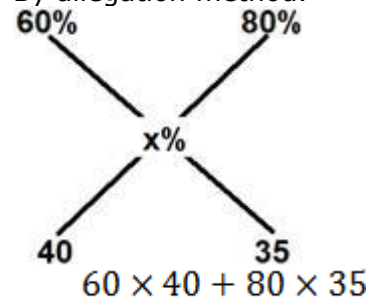
Quantity of water $= \frac{32}{8} \times 3 = 12$

A.T.Q.

$$\frac{A}{W} = \frac{20 - 12 \times \frac{5}{8}}{12 - 12 \times \frac{3}{8} + \frac{15}{2}} = \frac{5}{6}$$

24. Ans. C.

Let the concentration of acid in new solution $= x$

By allegation method.

$$x = \frac{60 \times 40 + 80 \times 35}{40 + 35}$$

$$= \frac{5200}{75} = 69\frac{1}{3}\%$$

25. Ans. D.

We will solve it by allegation method.

C. P. of sugar $= 56 \times \dfrac{100}{112} = ₹\,50$ per kg

A. T. Q.

$\left.\begin{array}{l}₹60\text{per Kg}\\ ₹42\text{per Kg}\end{array}\right\}\, ₹50\text{per Kg}\left\{\begin{array}{l}8\\ 10\end{array}\right.$

$= 4 : 5$

26. Ans. A.

Let the total capital $= 6x$

A.T.Q.

A invests $33\frac{1}{3}\%$ of total capital $= 6x \times \dfrac{1}{3} = 2x$

B invests 25% of remaining $= 4x \times \dfrac{25}{100} = 1x$

C invests the remaining $= 3x$

Total profit $= (A + B + C) = 162000$

$6x = 162000$

$x = 27000$

A's share in profit $= 2x = 2 \times 27000 = ₹54000$

27. Ans. A.

A : B : C

Amt. 54000 : x : y

Time 12 : 8 : 6

Profit 1P : 4P : 5P

Investment × time = Profit

$54000 \times 12 = P$

Profit of B,

$4P = x \times 8$

$4 \times 54000 \times 12 = x \times 8$

$x = 27000 \times 12 = 324000$

Profit of C,

$5 \times 54000 \times 12 = 6y$

$y = \dfrac{5 \times 54000 \times 12}{6} = 540000$

Required –

$y - x = 540000 - 324000$

$= 216000$

28. Ans. D.

A : B   B : C

6 : 7   3 : 2

$A : B : C$

$18x : 21x : 14x$

Difference between A and C's shares –

$\Rightarrow 18x - 14x = 540$

$4x = 540$

$x = 135$

Total sum $= 18x + 21x + 14x = 53x$

$= 56 \times 135 = 7155$

29. Ans. D.

A : B : C

Investment $2x : 3x : 5x$

Time 4 : 2 : 3

Profit $8x : 6x : 15x$

A.T.Q.

C's profit – A's profit = 147000

$15x - 8x = 147000$

$x = 21000$

B's share of profit $= 6x$

$= 6 \times 21000 = ₹126000$

30. Ans. A.

Let the number be $= x$

And it is multiplied by n,

$\Rightarrow nx = 1.25x$

$\Rightarrow n = 5/4$.

31. Ans. B.

Let the original income of Anu be Rs. 100

Original expenditure = 68% of 100 = Rs. 68

Original savings = Rs. (100 – 68) = Rs. 32

New income = Rs. 120

New savings = 32 × (1 + 75/800) = Rs. 35

New expenditure = 120 – 35 = Rs. 85

Percentage increase in expenditure = [(85 - 68)/68] × 100 = 25%

32. Ans. A.

Let 'x' be the maximum marks can be scored in the exam.

31% of x -----(add 16)-------> Passing marks <-------(subtract 56)---------40% of x

A.T.Q.:

(31% of x) + 16 = (40% of x) – 56

$\Rightarrow$ 9% of x = 72

$\therefore$ x = 800

Thus, Passing Marks = (40% of x) – 56

$\Rightarrow$ (40% of 800) – 56 = 320 – 56 = 264

33. Ans. B.

Let the original radius (circle) be 100 units

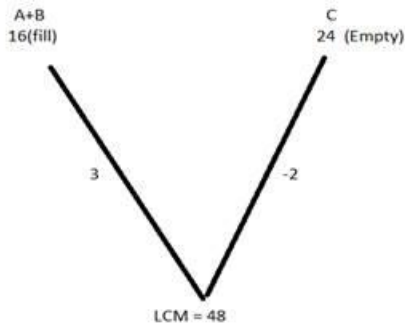∴ New radius (circle) = 100 - 11% of 100 = 89 units

Since area of a circle is directly proportional to the square of radius.

So, original area (circle) $\equiv (100)^2$

New area (circle) $\equiv (89)^2$

Percentage decrease in area (circle) = $\dfrac{(100)^2 - (89)^2}{(100)^2} \times 100 = \dfrac{189 \times 11}{(100)^2} \times 100 = 20.79\%$

34. Ans. D.

Let capacity of tank = 48 units

Efficiency of (A+B) = 3

Tank filled by A+B together in 10 hours = $3 \times 10 = 30$ units

Efficiency of pipe C = -2

Here negative sign only shows that this pipe is an emptying pipe.

Tank emptied by pipe C in 1 hour = 2 unit

Hence 30 units will be emptied in $\dfrac{30}{2} = 15$ hours

35. Ans. C.

If pipe A, B and C are opened together, they took 80 minutes to empty $\dfrac{5}{18}$ of the tank.

We know that 80 minutes = $1\dfrac{1}{3} hrs = \dfrac{4}{3} hrs$

So, tank emptied by pipe A and B in $\dfrac{4}{3} hrs = -\dfrac{4}{3}\left[\dfrac{1}{6} + \dfrac{1}{16}\right] = -\dfrac{4}{3}\left[\dfrac{8+3}{48}\right] = \dfrac{-11}{36}$ of the tank

Here, the negative sign only shows that tank is emptied by Pipe A and B.

Tank emptied by pipe A, B and C in $\dfrac{4}{3} hrs = -\dfrac{5}{18} = \dfrac{-10}{36}$ of the tank.

Tank filled by pipe C in 80 minutes = $-\dfrac{10}{36} - \left(-\dfrac{11}{36}\right) = \dfrac{1}{36}$ of the tank

Tank filled by pipe C in 60 minutes = $\dfrac{1 \times 60}{36 \times 80} = \dfrac{1}{48}$ of the tank

Hence, Pipe C alone can fill the tank in 48 hours.

36. Ans. B.

$A \to 72\,minutes \quad B \to 90\,minutes$
$A+B+C \to 120\,minutes$

Let the capacity of tank $= l.c.m.(72, 90, 120)$
$= 360$

Efficiency of A $= \dfrac{360}{72} = 5$

Efficiency of B $= \dfrac{360}{90} = 4$

Efficiency of $A+B+C = \dfrac{360}{120} = 3$

$A = 5, B = 4, C = 3 - (A+B) = 6$

Tank filled by $(A+B)$ in 12 minutes
$= (5+4) \times 12 = 108$

Time required by C to empty the tank
$= \dfrac{108}{6} = 18 min.$

37. Ans. A.

Let capacity of tank $= L.C.M.(16, 24, x) = 48x$

Tank filled by pipe A in an hour $= \dfrac{48x}{16} = 3x$

Tank filled by pipe B in an hour $= \dfrac{48x}{24} = 2x$

Tank filled by pipe C in an hour $= \dfrac{48x}{x} = 48$

A.T.Q.

$(A+B) \times 10 - C \times 6 = 48x$

$$5x \times 10 - 48 \times 4 = 48x$$
$$2x = 192$$
$$x = 96$$

38. Ans. C.
Let the capacity of tank = LCM (30,40,60)
$= 120$ unit

Tank filled by by A in an hour $= \frac{120}{30} = 4$ unit

Tank filled by by B in an hour $= \frac{120}{40} = 3$ unit

Tank filled by by C in an hour $= \frac{120}{60} = 2$ unit

Tank filled by A from 7 to 10 A. M.
$= 4 \times 3 = 12$ unit
Tank filled by B from 8 to 10 A. M.
$= 3 \times 2 = 6$ unit

Total work done by $(A + B)$ till 10 A. M.
$= 18$ unit
Now, all the three pipes will work together

Required time $= \frac{120 - 18}{eff. of (A+B+C)}$

$= \frac{102}{9} = 11 hr\ 20 min$

So, the tank will be full by 9 : 20 P. M.

39. Ans. C.
Let the ages of A and B four years ago were 4x and 5x
$$\frac{4x + 4 + 8}{5x + 4 + 8} = \frac{11}{13}$$
55x - 52x = 156 - 132
3x = 24
x = 8
Sum of the present ages of A and B
= 4x + 4 + 5x + 4
= 9x + 8
= 72 + 8 = 80

40. Ans. C.
Let the present ages be 8x and 15x.

8 years ago $\frac{8x-8}{15x-8} = \frac{6}{13}$

Thus x = 4

8 years hence ratio = (32+8)/(60+8) = 40/68 = 10:17

41. Ans. B.
Let the MP = 100x
SP = 92x
He sells to his brother at 90x.
A.T.Q.
92x – 90x = 70
x = 35
then MP = 3500.

42. Ans. C.
Let he buys each book for Rs. 100.
For 1st book SP = 120, CP : SP = 100 : 120
= 5 : 6
For 2nd book SP = 90, CP : SP = 100 : 90
= 10 : 9
Total CP,
15k → 300
k → 20
then SP of 1st book = 6k = 120.
OR
Let the C.P of first book be 'x' ad second book is 'y'.
Now, because there is no profit no loss, the profit of the first book will be equal to the loss of the second book.
So, 20% of x = 10% of y
2x = y
x + y = 300 (Given)
x + 2x = 300
x = 100 = C.P of first book
S.P of first book = 120% of 100 = Rs. 120

43. Ans. A.
Number of girls studying Arts = 45
Number of girls studying in other streams
= 18 + 42 + 30 = 90
Required ratio = 45 : 90 = 1 : 2

44. Ans. C.
Let 3A = 4B = 5C = k
A = k/3 , B = k/4 , C = k/5
A : B : C = (k/3):(k/4):(k/5)
Now, LCM(3,4,5) = 60
Multiply ratio by 60.
A : B : C = (k/3):(k/4):(k/5) = 20k : 15k : 12k = 20 : 15 : 12

45. Ans. D.
Total students = 65
Girls = 35, boys = 30
Required Ratio = 30 : 35 = 6 : 7.

46. Ans. A.

A : B = 3 : 5
B : C = 2 : 3
_____
A : B : C = 3×2 : 5×2 : 5×3

∴ A : B : C = **6 : 10 : 15**

47. Ans. D.

Let, 100k is the sum of money to be deposite

D.

Difference in S.I. = (5 × 7 − 3 × 9)k = 475

⇒ 8k = 475

⇒ k = 475/8

100k = 100 × 475/8

= Rs. 5937.5.

48. Ans. C.

Principal = Rs. 4300

Amount after 2 years = Rs. 4644

Time = 2 years

Interest = 4644 - 4300 = Rs.344

We have: (P×R×T)/100 = S.I

⇒ (4300×R×2)/100 = 344

⇒ R = 4%

Now in second case, let us suppose that Principal amount be Rs x

And the amount received after simple interest = Rs. 10104

∴ Simple interest = 10104 − x

Time = 5 years, rate = 4%

Putting in the formula:

⇒ (x×4×5)/100 = 10104-x

⇒ x = 50520 − 5x

⇒ 6x = 50520

Hence, x = 8420

∴ Principal = Rs. 8420

49. Ans. A.

X and Y are two stations which are 280 km apart.

Distance travelled by train X in 2 hours =

$Speed \times Time$ = $60 \times 2 = 120$ km

Remaining Distance = 280 − 120 = 160 km

Speed of train leaving from X = 60 km/h

Speed of train leaving from Y = 20 km/h

As both trains are moving towards each other.

Hence, Relative Speed = 60 km/hr + 20 km/hr = 80 km/hr

Time taken to travel 160 km = 160/80 = 2 hour

Hence, Time taken by train leaving from X in meeting the train which left from Y = 2 +2 = 4 hours

50. Ans. D.

Let the speed of boat in still water = x

Speed of stream = y

A.T.Q.

$$\frac{12}{x-y} + \frac{12}{x+y} = \frac{60}{60}$$

$$\Rightarrow \frac{2x}{x^2 - y^2} = \frac{1}{12}$$

⇒ $x^2 − y^2 = 24x$ {y = 3 kmph}

⇒ $x^2 − 9 = 24x$

⇒ $x^2 − 24x − 9 = 0$

$$\Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{24 \pm \sqrt{576 + 36}}{2}$$

$$= 12 \pm \frac{\sqrt{612}}{2}$$

$$= 12 \pm \frac{6\sqrt{17}}{2}$$

$$= 12 \pm 3\sqrt{17}$$

= 3(4 + √17) [Positive Number].

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