Mixed Maths Questions for LIC AAO Exam.

LIC AAO Maths Quiz 5

Direction: Study the following questions carefully and choose the right answer.

1. Shyam and Ram entered into a partnership with investment in the ratio 3 : 2 respectively. Among them, Ram is the working partner for which he gets 10% of the profit and Shyam is the sleeping partner. If at the end of one year they earned a profit of Rs. 75000 out of which 5% goes to the charity. Find the share of Ram in the profit.

A. Rs. 32000 B. Rs. 33000 C. Rs. 31000 D. Rs. 35000 E. None of these

2. An alloy of aluminium, copper and Iron contains 85% aluminium, 8% copper and 7% iron. A second alloy of aluminium and iron melted with the first and the mixture then contains 75% aluminium, 5% copper and 20% iron. Find the percentage of aluminium in the second alloy.

A. 49.4% B. 58.33% C. 53.75% D. 62.6% E. None of these

3. The simple interest on a certain sum for 2 years at a certain rate of interest is Rs.2000 and compound interest on the same sum, same time and same rate of interest is Rs.2050. Then find the ratio between CI for 2 years and CI for 3 years?

A. 820 : 1361 B. 820 : 1261 C. 1261 : 820 D. 1361 : 820 E. None of these

4. If four coins are tossed together, what is the probability of at least getting 2 heads?

A. 13/16 B. 11/16 C. 9/16 D. 15/16 E. None of these

5. A fruit vendor sells apples and oranges and gets equal revenue from each. He gets a profit of 20% on each apple and a profit of 25% on each orange. If the ratio of the number of oranges sold to the number of apples sold is 3 : 2, what is the ratio of the cost price of an orange to that of an apple?

A. 25 : 16 B. 16 : 25 C. 36 : 25 D. 49 : 36 E. 36 : 49

6. There are three members in a family – husband, wife and their son. Husband's age is thrice his son's age and wife is three years younger than his husband. What is the respective ratio of ages of son, husband and wife if their average age is 41?

A. 17 : 9 : 18 B. 15 : 4 : 12 C. 6 : 18 : 17 D. 4 : 12 : 15 E. None of these.

7. There are 3 points P, Q and R in a straight line, such that point Q is equidistant from points P and R. A man can swim from point P to R downstream in 24 hours and from Q to P upstream in 16 hours. Find the ratio of speed of man in still water to speed of stream?

A. 5 : 1 B. 6 : 1 C. 5 : 3 D. 7 : 1 E. None of these

8. In a 1500 m race, Chaitali beats Vrunali by 100 m and in 1200 m race, Vrunali beats Krutika by 75 m. If Chaitali and Krutika are compared, then for how much m Chaitali will beat Krutika in 900 m race?

A. 115 m B. 112.5 m C. 110 m D. 120 m E. 135 m

9. 20 men, 12 women and 18 boys were given a project of doing 3960 designs of a building in 5 days. The ratio of the number of designs made by them respectively in 1 day is 3 : 2 : 1. If on the 1st day all of them worked, on the 2nd day 4 women and 6 boys went absent and on the 3rd day, 6 men and 10 boys went absent but still the work got finished on the 3rd day. Then find the number of designs designed by them on the 3rd day?

A. 1021 B. 1110 C. 1621 D. 1210 E. None of these

10. In a maths test, Anil got 414 marks which was 47 less than Barun's marks. The marks of Chandan were 48% of the sum of Anil and Barun's marks together or 52.5% of the total marks. If the marks of Dinesh was 32 more than that of Chandan's marks. Find how much percent did Dinesh get in that examination?

A. 55.5% B. 54.5% C. 51.5% D. 48.5% E. None of these

11. The average height of 3 boys Bikesh, Sam and Suhas is 208/3 inches while the average height of Bikesh, Vihal and Rakesh is 203/3 inches. What is the average height of Bikesh, Sam, Suhas, Vihal and Rakesh?

A. 65 inches B. 66 inches C. 197/3 inches D. 64 inches E. Can't be determined

12. Sonu and Titu entered into a partnership for a year in which Sonu invested Rs 120000 and Titu invested Rs 70000. After 4 months, Sonu invested Rs 80000 more whereas after 5 months, Titu invested Rs 30000 more. When two months were left Sweety also joined investing Rs 400000 as her contribution. If the profit for the year was 12.5% of 1572000, find the share of Sonu, Titu and Sweety.

A. Rs 40000, Rs 104000, Rs 52500 B. Rs 104000, Rs 52500, Rs 40000
C. Rs 52500, Rs 40000, Rs 104000 D. Rs 78420, Rs. 48645, Rs. 48770
E. None of these

13. A man can swim to a place 120 km distant and come back in 35 hours. He finds that he he can swim 6 km against the stream in the same time as 8 km with the stream. Find the ratio of speed of man in still water to that of stream?

A. 5 :2 B. 4 : 7 C. 7 : 1 D. 2 : 9 E. None of these

14. Shilpa took a loan of Rs. 15,00,000 to purchase a car. The company charges compound interest at 20% per annum. She promised to make the payment after three years. But for the last year of loan tenure, the company increased the rate of interest by 25% from the previous one. Then the extra amount which she had to pay is what per cent of the amount of loan taken by her?

A. 8.3% B. 7.9% C. 8.7% D. 7.2% E. None of these

15. Ajay walked 12 km to reach the station from his house. Then he boarded in a train and reached his destination. The average speed of the entire journey was 62 kmph and he took a total time of 6 hours. If the average speed of train was 120 kmph, then what is the ratio of walking speed of Ajay to the speed of train?

A. 1 : 30 B. 1 : 60 C. 2 : 35 D. 2 : 65 E. None of these

16. In a train, there are three coaches numbered 1 to 3. In the 1st coach the chairs are numbered 101 to 130, in the 2nd coach the chairs are numbered 201 to 220 and in the 3rd coach the chairs are numbered 301 to 330. The chair occupancy was 50% in 1st coach, 80% in the 2nd coach and 40% in the 3rd coach. The chairs charges are Rs.200, Rs.150 and Rs.300 in each of the coach respectively. Then find the average income per chair in the train?

A. Rs. 112.5 B. Rs. 217.4 C. Rs .128.5 D. Rs. 231.4 E. None of these

17. An exam was conducted in a state over 222 centers. The average number of applicants per centre was found to be 1560. However, it was later realized that in one centre, the number of applicants was counted as 1857 instead of 1747. What was the correct average number of applicants per centre (upto two decimals)?

A. 1557.87 B. 1558.20 C. 1558.92 D. 1559.51 E. 1559.78

18. A chaiwala has 2 types of mixture of tea with him. In 56 kg of first mixture ratio of tea to impurity is 5 : 2 and in 44 kg of second mixture the ratio of tea to impurity is 3 : 1. If he mixes these two mixture with 17 kg of pure tea in a large container, then find the ratio of tea to impurity in the large container.

A. 10 : 3 B. 3 : 1 C. 73 : 27 D. 5 : 3 E. None of these

19. **4 Men can complete a piece of work in 58 days. They started the work together but at the end of every 5th day one man leaves the work and in the place of the man, one woman joins the work and the women continue doing the work and finish it despite all the men left in the mid of the work. Find the total number of days they take to complete the work in this manner if the efficiency of one women is 25% of the efficiency of one man.**

A. 174.5 days B. 194.5 days C. 116 days D. 174 days E. None of these

20. **The respective ratio of the present age of grandfather, father, mother and son is 25 : 14 : 11 : 6. Before 9 years, the ratio of the age of Grandfather and son was 13 : 3 respectively. What will be the average of the age of father and mother after 9 years?**

A. 75 years B. 350 years C. 375 years D. 384 years E. None of these

21. **The speed of current is 5 km/h. What will be the respective downstream speed and upstream speed of a boy rowing a boat, if one third of the distance covered going downstream in a certain time is equal to the distance covered going upstream in the same time.**

A. 15 kmph, 5 kmph B. 20 kmph, 10kmph C. 18 kmph, 8 kmph D. 24 kmph, 14 kmph E. None of these

22. **2 employees and 3 trainees together can finish a project in 7 days, 6 employees and 13 trainees together can finish the same project in 2 days. Find the time taken by 4 employees and 4 trainees together to finish the same work.**

A. 4 days B. 5 days C. 6 days D. 8 days E. None of these

23. **In how many ways can the walls of a cuboidal box be painted using six different colours using one colour for each wall if six different symbols are carved on the box with one on each wall?**

A. 240 B. 560 C. 720 D. 360 E. 180

24. **Instead of normal weighing scale a shopkeeper used forged scale. He used 1.4 kg scale while buying and 840g scale while selling, what will his overall profit percentage, if in the end he offers 10% discount?**

A. 50% B. 48% C. 40% D. 38% E. None of these

25. **A certain amount of money is lent out at compound interest at the rate of 20% per annum for two years, compounded annually. It would give Rs. 482 more if the amount is compounded half yearly. Find the principle.**

A. Rs. 30000 B. Rs. 10000 C. Rs. 15000 D. Rs. 25000 E. Rs. 20000

26. **The income tax department has changed the method of calculating the tax amount from a flat tax of 10% on the taxable income to a fixed charge of Rs. 20,000 plus 5% tax on the taxable income exceeding Rs. 2,00,000. If an individual's tax amount as per the new calculation is Rs.5,000 less than that found by using the old formula, what is his taxable income?**

A. Rs. 2,88,000 B. Rs. 2,92,000 C. Rs. 3,00,000 D. Rs. 2,78,000 E. Rs. 3,25,000

27. **A military truck covers a distance of 9072 km travelling continuously for 5 days 6 hrs. If it covers 4320 km in half the time, by how much does the speed of the military truck for the remaining part of the journey differ from that for the entire journey?**

A. 3.2 kmph more B. 3.2 kmph less C. 3.43 kmph more D. 3.43 kmph less E. 4 kmph less

28. **In a private company 36% of the total employees are engineers and 66.67 % of total engineers are women. If 40% of the total employees are women, then per cent of men who are not engineers?**

A. 50 % B. 60 % C. 70 % D. 80 % E. None of these

29. **If the length of a rectangle is increased by 25% and the breadth is reduced by 33.33% then what will be the effect on its diagonal(approximately)?**

A. 7.6% B. 8.33% C. 6% D. 7.33% E. No change

30. **There are 200 balls (numbered 1 to 200) in a box. Find the probability of choosing a ball which bears either perfect cube or perfect square and the unit digit is either multiple of 3 or multiple of 2?**

A. 11/200 B. 3/50 C. 17/200 D. 13/200 E. None of these

31. **Ankur, Bhanu and Chatur can finish an assignment in their company together in 20 days. They started the assignment together and Ankur left it after first 6 days. After next 4 days, Bhanu also left the assignment. Then Chatur completed the remaining three fifth of the assignment in 72 days. How many days would Bhanu alone take to finish the whole assignment?**

A. 15 days B. 30 days C. 45 days D. 60 days E. None of these

32. **Rajeev's present age is 100/3 % of his father's age and his father's age is half of Rajeev's grandfather's age. The average of the present ages of all of them is 110/3 years. What was the ratio of their ages 10 years ago?**

A. 1 : 43 : 56 B. 1 : 23 : 56 C. 1 : 23 : 46 D. 1 : 26 : 56 E. None of these

33. Meenu has some money. She can buy 40 books or 90 pens with it. She keeps 20% of the money for food and with the remaining buys 36 pens and some books. Find the number of books she buys.

A. 15 B. 14 C. 18 D. 16 E. 12

34. A milkman completely fills his 24 liter cistern with two type of milks A and B in the ratio 7 : 5. The cost price of type A milk is Rs.45 per liter. If he sold this mixture at the rate of Rs.56 per liter at a profit of 12%, then find the per liter cost price of type B milk.

A. Rs. 54 B. Rs. 47 C. Rs. 62 D. Rs. 57 E. None of these

35. Out of total members 100/3 % are in room A and remaining are in room B. If 20 members from room B are shifted to room A, then total members in room A becomes 50% of total members. If 20 members from room A are shifted to room B, then find that total members in room A becomes what per cent of total members?

A. 26.34% B. 16.67% C. 12.75% D. 20.67% E. None of these

36. From 'A' kg of pure tea a shopkeeper removes A% of the mixture (Either pure tea or adulterated tea) and replaces it with same quantity of adulteration. If he repeated this process once more and now the amount of pure tea remaining in the mixture is (90% of 40% of A) kg, then find the value of A.

A. 60% B. 50% C. 40% D. 30% E. None of these

37. In an office some persons are officers and some are non-officer. The number of officers is 30. The average salary of officers is Rs.1040 and that of non-officers is Rs.400. If the average salary of entire staff in office (officers + Non – officers) is Rs.500 per month, then what is the average of total number of employees (officers + Non – officers) in the office?

A. 49 B. 89 C. 92 D. 96 E. None of these

38. Find the probability that a two-digit number, chosen at random, is a multiple of 4 given that it is also a multiple of 6.

A. 8/15 B. 9/13 C. 7/14 D. 6/13 E. None of these

39. A principal of Rs. 6120 becomes Rs. 8330 in 2 years when compounded annually at some rate of interest. How much will be the amount if the same principal was compounded half-yearly?

A. Rs. 8430 B. Rs. 8500 C. Rs. 8300 D. Rs. 8750 E. None of these

40. If the ratio of the speed of a boat in upstream and the speed of the stream is 8 : 1. If the boat can travel 500 km downstream in 20 hours then find the total distance travelled by the boat in still water in the same time?

A. 425 km B. 459 km C. 441 km D. 450 km E. None of these

41. A company hired some trainee employees, the ratio of number of female to male is 2 : 3 and all of them have appeared in an employment test. In the employment test 35% of female and 40% of male had passed. Each female scored 280 marks and each male scored 320 marks. If the number of passed female is 50 less than the number of passed male. Then what is the total number of marks scored by passed male and female together?

A. 58000 B. 56000 C. 57000 D. 56500 E. 54850

42. Arjun is 2 years younger to Bhuvan whose age is 12 years. When 10 years are subtracted from the present age of Shanju and then the result is divided by 6, the present age of his grandson Arjun is obtained. Then what is the ratio of ages of Arjun, Bhuvan and shanju?

A. 5 : 6 : 35 B. 7 : 2 : 23 C. 7 : 2 : 35 D. 5 : 6 : 23 E. None of these

43. There are two mixtures of alcohol and water. In 48 L of first mixture 32 L is alcohol while in 32 L of second mixture 20 L is alcohol. If these mixtures are mixed in a large container in such a way that per cent of water in final mixture becomes 36.8%, then find that in what ratio these two mixtures are mixed to form final mixture?

A. 2 : 5 B. 21 : 104 C. 201 : 104 D. 201 : 14 E. None of these

44. A work is started by a man and it is assumed that he will finish the work in 11 days if working alone. Each subsequent day a new man joined the work. In how many days the four times the original work will be completed, if after the 8th day from the starting of the work no new man will be further added?

A. 11 B. 10 C. 9 D. 8 E. None of these

45. Ajeet purchased 100 books of quantitative aptitude for his book store. He sold 20% of total books at a profit of 10%, 37.5% of remaining at a profit of 15%, 80% of the remaining at a profit of 8% and remaining at a profit of 20%. If he sold all the books at a profit of 16% he would have gained Rs.1505 more, then find the cost price of each book.

A. Rs. 250 B. Rs. 375 C. Rs. 350 D. Rs. 450 E. None of these

46. A milkman makes 80% profit by selling milk mixed with water at Rs. 2/- litre. Compute the ratio of milk and water in the sold mixture if the cost price of Re. 1/- litre pure milk is 100/9.

A. 9 : 1 B. 1 : 9 C. 7 : 8 D. 8 : 7 E. None of these

47. Rohit can row a boat 65Km upstream and 130Km downstream in 23 hours, whereas he can swim 45Km upstream and 104Km downstream in 17 hours. Find the speed of boat in still water and the speed of stream.

A. 4 kmph, 9 kmph B. 8 kmph, 5 kmph C. 9 kmph, 4 kmph D. 5 kmph, 8 kmph E. None of these

48. A group contains 12 males and 15 females out of which 5 males and 7 females are dancers and rest are singers.

A committee of 9 members is to be formed such that the committee contains 4 females and 5 male singers. Find the number of ways in which this can be done.

A. 26988 B. 28665 C. 26868 D. 25668 E. None of these

49. A group contains 12 males and 15 females out of which 5 males and 7 females are dancers and rest are singers.

A committee of 5 members is to be formed. Find the number of ways in which this can be done such that the committee contains at least 3 female singers.

A. 10256 B. 10765 C. 10962 D. 10453 E. None of these

50. If the difference between the compound interest (compounded annually) and the simple interest accrued in one and a half years at 8% per annum is Rs. 80. What is the simple interest in three years on the same amount and at the same rate of interest?

A. Rs. 6400 B. Rs. 7200 C. Rs. 5600 D. Rs. 4800 E. None of these

CORRECT ANSWERS:

1	2	3	4	5	6	7	8	9	10
B	B	B	B	B	C	D	B	B	E
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
E	B	C	D	A	A	D	A	B	D
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
A	A	C	A	E	C	C	D	A	A
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
D	B	D	D	B	C	D	A	A	D
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
A	A	B	C	C	B	C	B	C	E

EXPLANATIONS:

1.

Amount goes to charity = $\frac{5}{100} \times 75000$ = Rs. 3750

Amount goes to Ram as a working partner = $\frac{10}{100} \times 75000$ = Rs. 7500

Remaining amount = Rs. (75000 – 3750 – 7500) = Rs. 63750

Share of Ram in the remaining profit = $\frac{2}{5} \times 63750$ = Rs. 25500

Total share of Ram = Rs. (7500 + 25500) = Rs. 33000
Hence, option B is correct.

2. Let x and y be the mass of 1st alloy and 2nd alloy.

aluminium in the 1st alloy = $\frac{85x}{100}$

copper in the 1st alloy = $\frac{8x}{100}$

iron in the 1st alloy = $\frac{7x}{100}$

According to question, for copper

$\frac{\frac{8x}{100}}{x + y} \times 100 = 5$

$8x = 5x + 5y$
$3x = 5y$
$\frac{x}{y} = \frac{5}{3}$

x = 5 and y = 3
Let p = percentage of aluminium in the 2nd alloy

According to question,

$5 \times \frac{85}{100} + 3 \times \frac{p}{100} = (5 + 3) \times \frac{75}{100}$

$3p = 175$

$p = \frac{175}{3} = 58.33\%$

Hence, option (B) is correct.

3. SI for 2 years = Rs.2000

SI for 1 year = Rs.1000

In the 2nd year Rs.50 is added in CI which is 5% of 1000
Hence, R = 5%

$\Rightarrow$ 5% = 1000

$\Rightarrow$ 100% = 20000

Sum = Rs.20000

CI for 3 years = $20000\left(\frac{105}{100}\right)^3 - 20000$

$\Rightarrow 23152.5 - 20000$

$\Rightarrow 3152.5$

Required ratio = 2050 : 3152.5

$\Rightarrow$ 20500 : 31525

$\Rightarrow$ 820 : 1261

Hence, option B is correct.

4. P (getting at least 2 heads) = 1 – P (getting no head or exactly one head)

P (getting no head) = P (getting all tails) = $\frac{1}{16}$

Now, P(exactly one head) :

Getting exactly one head means 3 tails and 1 head in any order and the total occurrences here are
$= \frac{4!}{3!} = 4$

Therefore, P(getting exactly one head)= $\frac{4}{16} = \frac{1}{4}$

Hence, P(getting at least 2 heads)

$= 1 - \left(\frac{1}{16} + \frac{1}{4}\right) = \frac{11}{16}$

Hence, option B is correct.

5. Let P be revenue from each apple and orange.

Cost of apples = $P \times \frac{100}{120} = \frac{5P}{6}$

Cost of oranges = $P \times \frac{100}{125} = \frac{4P}{5}$

Let the number of apples sold by the fruit vendor be 2n, then the number of oranges sold would be 3n.

Cost price of each apple = $\frac{1}{2n} \times \frac{5P}{6} = \frac{5P}{12n}$

Cost price of each orange = $\frac{1}{3n} \times \frac{4P}{5} = \frac{4P}{15n}$

Therefore, reqd. ratio = $\frac{4P}{15n} : \frac{5P}{12n} = 16 : 25$

Hence, option B is correct.

6. Let son's age = x

Husband's age = 3x

Wife's age = 3x – 3

According to question-

$\Rightarrow x + 3x + (3x - 3) = 41 \times 3$

$\Rightarrow 7x = 126$

$\Rightarrow X = 18$

Son's age = 18 years

Husband's age = $18 \times 3 = 54$ years

Wife's age = $18 \times 3 - 3 = 51$ years

Required ratio = 18 : 54 : 51 = 6 : 18 : 17

Hence, option C is correct.

7. Let speed of man in still water = x km/h

Speed of current = y km/h

Downstream speed = (x + y) km/h

Upstream speed = (x – y) km/h

Let PQ = QR = A and PR = 2A
So,

$\frac{2A}{x+y} = 24$ and $\frac{A}{x-y} = 16$

By dividing both equations-

$\Rightarrow \frac{2A\,(x-y)}{A\,(x+y)} = \frac{24}{16}$

$\Rightarrow 4x - 4y = 3x + 3y$

$\Rightarrow \frac{x}{y} = \frac{7}{1}$

Required ratio = Speed of man in still water : Speed of current

$\Rightarrow 7 : 1$

Hence, option D is correct.

8. Chaitali can beat Vrunali by 100 m in 1500 m race.

Hence, when Chaitali covers 1500 m, Vrunali covers 1400 m.

So when Chaitali covers 900 m, Vrunali will cover 840 m.

Similarly, when Vrunali covers 1200 m, Krutika covers 1125 m.

So, when Vrunali covers 840 m, Krutika will cover 787.5 m.

∴ Chaitali will beat Krutika by 112.5 m.

Hence, option B is correct.

9. Let the number of designed by men, women and boys in 1 day be 3x, 2x and x respectively.

Designs of building on the 1st day

$\Rightarrow 20 \times 3x + 12 \times 2x + 18 \times x$

$\Rightarrow 102x$

On the 2^{nd} day = $20 \times 3x + 8 \times 2x + 12 \times x = 88x$

On the 3^{rd} day = $14 \times 3x + 12 \times 2x + 8 \times x = 74x$

Now, $102x + 88x + 74x = 3960$

$\Rightarrow 264x = 3960$

$\Rightarrow 74x = \frac{3960}{264} \times 74$

$\Rightarrow 74x = 1110$

Hence, option B is correct.

10. Barun's marks = 414 + 47 = 461

The sum of Anil's and Barun's marks = 414 + 461 = 875

Chandan Marks = 48% of 875 = 420 = 52.5% of the total marks = 52.5% of x (let the total marks is x)

By solving, x = total marks = 800

Dinesh's marks = 420 + 32 = 452

$\text{Reqd. \%} = \frac{452 \times 100}{800} = 56.5\%$

Hence, option E is correct.

11. Height of 3 boys Bikesh, Sam and Suhas is

$\frac{208}{3} \times 3 = 208$ inches.

Height of Bikesh, Vihal and Rakesh is

$\frac{203}{3} \times 3 = 203$ inches.

With the help of this information, the height of 5 boys cannot be determined.

Hence, option (E) is correct.

12. Sonu : Titu : Sweety

(120000 × 4 + 200000 × 8) : (70000 × 5 + 100000 × 7) : (400000 × 2)

208 : 105 : 80

Now,

12.5% of 1572000 = 196500

Therefore, Profit of:

Sonu = $\frac{208}{393}$ × 196500 = Rs. 104000

Titu = $\frac{105}{393}$ × 196500 = Rs. 52500

Sweety = $\frac{80}{393}$ × 196500 = Rs. 40000

Hence, option B is correct.

13. Let he moves 8 km downstream in x hours.

Downstream speed = $\frac{8}{x}$

Upstream speed = $\frac{6}{x}$

Then,

$\Rightarrow \frac{120}{8/x} + \frac{120}{6/x} = 35$

$\Rightarrow 120 \times \frac{7x}{24} = 35$

$\Rightarrow 35x = 35$

$\Rightarrow x = 1$

Then downstream speed = 8 km/h
Upstream speed = 6 km/h

U = $\frac{8 + 6}{2}$ = 7 km/h

V = $\frac{8 - 6}{2}$ = 1 km/h

Required ratio = 7 : 1
Hence, option C is correct.

14. The rate of interest for first two years = 20% per annum

The rate of interest for last one year = 125% of 20 = 25%

According to question-

$\Rightarrow 1500000 \times (1.2)^2 \times (1.25) - 1500000\ (1.2)^3$

$\Rightarrow 1500000 \times (1.8 - 1.728)$

$\Rightarrow 1500000 \times 0.072$

$\Rightarrow 108000$

$\text{Reqd. \%} = \frac{108000}{1500000} \times 100 = 7.2\%$

Hence, option D is correct.

15. Let the time travelled in train be 'x' hours

Total distance = $62 \times 6 = 12 + 120 \times x$

$\Rightarrow 372 = 12 + 120x$

$\Rightarrow x = 3$

So, Ajay walked for (6-3) = 3 hours

Walking speed of Ajay

$= \frac{\text{Distance covered by walking}}{\text{Time taken by walking}} = \frac{12}{3} = 4$ kmph

Required ratio = 4 : 120 = 1 : 30

Hence, option A is correct.

16. Number of chairs in 1st, 2nd and 3rd coaches are 30, 20 and 30 respectively.

Total chairs = 30 + 20 + 30 = 80

Total occupied chairs in 1st coach = 50% of 30 = 15
Total occupied chairs in 2nd coach = 80% of 20 = 16

Total occupied chairs in 3rd coach = 40% of 30 = 12

$\text{Average income} = \frac{15 \times 200 + 16 \times 150 + 12 \times 300}{80} = 112.5$

Hence, option A is correct.

17. Number of applicants that have been counted extra = 1857 − 1747 = 110

Hence, decrease in average = $\frac{110}{222}$ = 0.495

∴ Correct average = 1560 − 0.495 = 1559.505 = 1559.51

Hence, option D is correct.

18. In 56 kg of first mixture, Tea = $56 \times \frac{5}{7}$

= 40 kg and impurity = 56 – 40 = 16 kg

In 44 kg of second mixture, Tea = $44 \times \frac{3}{4}$

= 33 kg and impurity = 44 – 33 = 11 kg

In large container quantity of pure tea = 40 + 33 + 17 = 90 kg

In large container quantity of impurity = 16 + 11 = 27 kg

Required ratio = 90 : 27 = 10 : 3

Hence, option A is correct.

19. Total work = 4 × 58 = 232 units (let the efficiency of one man is 1 unit)

Total work was done in the first 5 days = 5 × 4 = 20 units = $\frac{80}{4}$ units

Now 3 men and one woman will work in the next five days = efficiency of 3m + 1w

$= 3 + \frac{1}{4} = \frac{13}{4}$

Total work was done in the second 5 days = $13 \times \frac{5}{4} = \frac{65}{4}$ units

Total work was done in the third 5 days = 2m + 2w = $2 + \frac{1}{2} = 5 \times \frac{5}{2} = \frac{25}{2} = \frac{50}{4}$ units

Total work was done in the fourth 5 days = 1m + 3w = $1 + \frac{3}{4} = \frac{7}{4} = 7 \times \frac{5}{4} = \frac{35}{4}$ units

After the fourth, 5 days only women will work therefore the total units of work done in the first four, five days = 20 days

= 80 + 65 + 50 + 35 = 230 units

4 4 4 4 4

Remaining work = $232 - \frac{230}{4} = \frac{698}{4} = 174.5$ units

Efficiency of 4 women = $1 \times \frac{4}{4} = 1$ unit

The number of days taken by 4 women to do 174.5 units = 174.5 days

Total number of days = 174.5 + 20 = 194.5 days

Hence, option B is correct.

20. The respective ratio of the present age of grandfather, father, mother and son is 25 : 14 : 11 : 6

The ratio of the present age of grandfather and son = 25 : 6

Let us assume it 25x and 6x

According to the question,

$\frac{25x - 9}{6x - 9} = \frac{13}{3}$

By solving, x = 30

The age of father + mother = 14x + 11x = 25x = 25 × 30 = 750
After 9 years, the sum of their age = 750 + 18 = 768 years

Average = $\frac{768}{2}$ = 384 years

Hence, option D is correct.

21. Let the speed of boy in still water be X km/h
And the speed of current is given = 5 km/h
Downstream speed = (X + 5) km/h
Upstream speed = (X – 5) km/h
Let time be 't' hours.

$\Rightarrow \frac{(X + 5)\, t}{3} = (X - 5)\, t$
$\Rightarrow X + 5 = 3X - 15$
$\Rightarrow 2X = 20$
$\Rightarrow X = 10$ km/h
Downstream speed = 10 + 5 = 15 km/h
Upstream speed = 10 – 5 = 5 km/h
Hence, option A is correct.

22. Let time taken by 4 employees and 4 trainees together is 'x'.

Let one day work of one employee and one trainee is 'E' and 'T' respectively.

Total work = 7 × (2E + 3T) = 2 × (6E + 13T)

⇒ 14E + 21T = 12E + 26T

⇒ 2E = 5T **…… (1)**

Total work done by 4 employees and 4 trainees together in 'x' days = x × (4E + 4T) = 2 × (6E + 13T)

From equation (1)-

⇒ x × (10T + 4T) = 2 × (15T + 13T)

$\Rightarrow x = \frac{56T}{14T} = 4$ days

Hence, option A is correct.

23. No. of ways in which the walls of the box can be painted using six different colours = 6! = 720.

Hence, option C is correct.

24. Let's say the price of 1000g of goods = Rs.1000

Now he gets 1400g of goods at Rs.1000

Hence CP of shopkeeper for 1 g

$= \frac{1000}{1400} = \text{Rs.}\frac{5}{7}$

CP of shopkeeper for 840g $= \frac{5}{7} \times 840 = \text{Rs.}600$

Now instead of selling 1000g he sells 840g for Rs.900 (10% discount)

$\text{Profit} = \frac{900 - 600}{600} \times 100 = 50\%$

Hence, option A is correct.

25. When compounded annually, the amount received at the end of the period is A

$= P\left(1 + \frac{r}{100}\right)^{n}$

When compounded half yearly, the amount received at the end of the period is A

$= P\left(1 + \frac{r/2}{100}\right)^{2n}$

Let the principle be P.

Interest on this amount when compounded annually at the rate of 20% per annum = $P[(1.20)^2 - 1]$

Interest on this amount when compounded half yearly = $P[(1.10)^4 - 1]$

The difference between the two is Rs. 482

$\therefore P[(1.10)^4 - 1] - P[(1.20)^2 - 1] = 482$

$\therefore P[1.4641 - 1.44] = 482$

$\therefore P$ = Rs. 20,000

Hence, option E is correct.

26. Let the taxable income be Rs. x.

Tax amount (in Rs.) as per old calculation = 0.1x

Tax amount (in Rs.) as per new calculation = 20000 + 0.05 (x − 200000) = 0.05x + 20000 − 10000 = 0.05x + 10000

The tax amount as per the new calculation is Rs. 5,000 less than that found by the old calculation.

$\therefore 0.05x + 10000 = 0.1x - 5000$

$\therefore 0.05x = 15000$

$\therefore x = 300000$

Hence, option C is correct.

27.

$$\text{Average speed} = \frac{\text{Total Distance travelled}}{\text{Total time taken}}$$

Total time = 5 day + 6 hours = 126 hours

$$\text{Average speed} = \frac{9072}{126} = 72 \text{ km/hr}$$

Remaining part of journey = 9072 – 4320 = 4752 km

$$\text{Remaining time} = \frac{126}{2} = 63 \text{ hours}$$

$$\text{Speed of remaining part of journey} = \frac{4752}{63} = 75.43 \text{ km/hr}$$

∴ The speed of the military truck for the remaining part of the journey differ from that for the entire journey = 75.43 – 72 = 3.43 km/hr

Hence, option C is correct.

28. Let total employee = 1000x

Women = 400x

Men = 600x

Total engineers = 36% of 1000x = 360x

$$\text{Female engineers} = 360x \times \frac{200}{3 \times 100} = 240x$$

Male engineers = 360x – 240x = 120x

Men who are not engineers = 600x – 120x = 480x

$$\text{Reqd. \%} = \frac{480x}{600x} \times 100 = 80\%$$

Hence, option D is correct.

29. Let the length of the rectangle = 4 units

And breadth of the rectangle = 3 units

Then diagonal of the rectangle = $\sqrt{(4^2 + 3^2)}$ = 5 units

According to the question, the length of a rectangle is increased by 25% and the breadth is reduced by 33.33%

New length = 125% of 4 units = 5 units

New breadth = 66.66% of 3 units = 2 units

In the new rectangle, New diagonal= $\sqrt{(5^2 + 2^2)} = \sqrt{29}$ = approximately 5.38 units

Change = $(5.38 - 5) \times \frac{100}{5} = 7.6\%$

Hence, option A is correct.

30. The balls which bears either perfect cube or perfect square = 1, 4, 8, 9, 16, 25, 27, 36, 49, 64, 81, 100, 121, 125, 144, 169, 196

The total number of balls in which the unit digit is either multiple of 3 or multiple of 2 = 4, 8, 9, 16, 36, 49, 64, 100, 144, 169, 196 = 11

So the required probability = $\frac{11}{200}$

Hence, option A is correct.

31. Given :

Chatur complete $(\frac{3}{5})^{th}$ of assignment in 72 days

Therefore,

Chatur could complete the whole assignment in

$\frac{72 \times 5}{3}$ = 120 days

Now,

(Ankur + Bhanu + Chatur) worked for 6 days.

So, Parts of assignment completed in first six days = $\frac{6}{20}$

Now, according to the question

(Bhanu + Chatur) worked for 4 days

So,

Parts of assignment completed in these four days $= 1 - (\frac{3}{5} + \frac{6}{20}) = 1 - \frac{9}{10} = \frac{1}{10}$

Therefore,

(Bhanu + Chatur) could complete the whole assignment in (10 × 4) = 40 days

Let Bhanu could complete the whole assignment working alone in x days. Therefore,

$\frac{1}{x} + \frac{1}{120} = \frac{1}{40}$

40 (120 + x) = 120x

120x – 40x = 4800

x = 60

Hence, this is the required solution.

Therefore, option D is correct.

32. Let Rajeev's present age = x

His father's present age = 3x

Grandfather's present age = 6x

$\Rightarrow \frac{x + 3x + 6x}{3} = \frac{110}{3}$

$\Rightarrow$ 10x = 110

$\Rightarrow$ x = 11

Rajeev's present age = 11 years

10 years ago Rajeev's age = 1 year

His father's present age = 33 years

10 years ago = 23 years

His grandfather's present age = 66 years

10 years ago = 56 years

Required ratio = 1: 23: 56
Hence, option B is correct.

33. Let Meenu has Rs x

For simplification, x = LCM (40, 90) = 360

Thus, price of one book = $\frac{360}{40}$ = Rs. 9

Similarly, price of one pen = $\frac{360}{90}$ = Rs. 4

Now, amount left after keeping money for food = Rs. (360 – 20% of 360) = Rs. 288

Price of 36 pens, P = 4 × 36 = Rs. 144

Amount left = Rs. (288 – 144) = Rs. 144

Therefore, No. of books Meenu buys = $\frac{144}{9}$ = 16

Hence, option D is correct.

34.

Quantity of type A milk = 24 × $\frac{7}{12}$ = 14 liters

Quantity of type B milk = 24 × $\frac{5}{12}$ = 10 liters

SP of mixture = 24 × 56 = Rs.1344

CP of mixture when sold at 12% profit

= 1344 × $\frac{100}{112}$ = Rs.1200

CP of type A milk = 14 × 45 = Rs.630

CP of type B milk = Rs. (1200 – 630) = Rs.570

Per liter CP of type B milk = $\frac{570}{10}$ = Rs. 57

Hence, option D is correct.

35. Let total members = N

Members in room A = $33\frac{1}{3}$ % of N = $\frac{N}{3}$

Members in room B = $N - \frac{100N}{3} = \frac{2N}{3}$

According to question-

$\Rightarrow \frac{N}{3} + 20 = \frac{N}{2}$

$\Rightarrow 20 = \frac{N}{6}$

$\Rightarrow N = 120$

Now, if 20 members from room A are shifted to room B-

$\Rightarrow \frac{\frac{N}{3} - 20}{N} \times 100 = \frac{20}{120} \times 100 = 16.67\%$

Hence, option B is correct.

36. Initial amount of tea = A kg
Amount of tea removed = A% of A = $A^2/100$
After two operations as given in the question,
Remaining amount of pure tea = (90% of 40% of A)

$= A\left(1 - \frac{A^2}{100A}\right)^2$

$\Rightarrow 0.36A = A\left(\frac{100 - A}{100}\right)^2$

$\Rightarrow 10000 \times 0.36A = A(100 - A)^2$
$\Rightarrow 3600 = (100 - A)^2$
$\Rightarrow 100 - A = 60$
$\Rightarrow A = 40$
Hence, option C is correct.

37. Let the number of non-officers in office = x

Now, according to question-

$\Rightarrow 400x + 1040 \times 30 = 500(30 + x)$

$\Rightarrow 400x + 1040 \times 30 = 500 \times 30 + 500x$

$\Rightarrow 100x = 30\ (1040 - 500)$

$\Rightarrow 100x = 30(540)$

$\Rightarrow x = 162$

$\text{Reqd. average} = \frac{30 + 162}{2} = 96$

Hence, option D is correct.

38. We can use this formula,

$P\ (AIB) = \frac{(P(A \cap B))}{(P(B))}$

Number of two-digit numbers = 90 (from 10 to 99)

Let A be the event that a two-digit number is divisible by 4 and B be the event that a two-digit number is divisible by 6.

Then, $(A \cap B)$ denotes the event that the number is divisible by both 4 and 6, i.e it is divisible by L.C.M of 4 and 6 which is 12.

The two-digit numbers divisible by 12 are 12, 24, 36, 48, 60, 72, 84 and 96. Thus, there are total of 8 such numbers.

$\therefore P\ (A \cap B) = \frac{8}{90}$

And there are 15 such numbers which are divisible by 6 (6, 12……96)

$\therefore P\ (B) = \frac{15}{90}$

From formula,

$P\ (AIB) = \frac{8}{90} \times \frac{90}{15}$

$P\ (AIB) = \frac{8}{15}$

Hence, option (A) is correct.

39. Now the formula for amount on compound interest basis can be given as

$$A = P\left(1 + \frac{R}{100}\right)^{t}$$

Where A = Amount

P = Principal

R = Rate of interest

T= Time period

Now as per our data P = 6120, A = 8330, t = 2 years

$$\therefore 8330 = 6120\left(1 + \frac{R}{100}\right)^{2}$$

$$\therefore \frac{8330}{6120} = \left(1 + \frac{R}{100}\right)^{2}$$

$$\therefore \frac{49}{36} = \left(1 + \frac{R}{100}\right)^{2}$$

$$\therefore \frac{7}{6} = 1 + \frac{R}{100}$$

$$\therefore R = \frac{100}{6} = 16.67\%$$

Now the amount when the same principal is compounded half-yearly for the same time period can be given as

$$A = 6120\left[1 + \left(\frac{16.67}{200}\right)\right]^{2\times 2}$$

$$\therefore A = 6120 \times 1.377$$

$$\therefore A = \text{Rs. } 8430$$

Hence, option A is correct.

40. Let the speed of boat in upstream = 8x km/hr

And the speed of the stream = x km/hr

Speed of boat in downstream = $\frac{500}{20}$ = 25 km/hr

Let the speed of boat in still water = p km/hr

Then, p + x = 25 km/hr **.....(i)**

P – x = 8x , p = 9x **.....(ii)**

Put the value of p in the equation (i)

10x = 25, x = 2.5

From the equation (ii) speed of boat in still water = 9x = 9 × 2.5 = 22.5 km/hr

The total distance travelled by the boat in still water in 20 hours = 450 km

Hence, option D is correct.

41. Let total female are 200x and total male are 300x.

Passed female = 35% of 200x = 70x and passed male = 40% of 300x = 120x

Difference between passed male and female = 120x – 70x = 50

⇒ x = 1

Total marks scored by passed candidates = (70 × 1 × 280) + (120 × 1 × 320) = 58000

Hence, option (A) is correct.

42. Bhuvan's age = 12 years
Arjun's age = 12 – 2 = 10 years
Let Shanju's age be 'x' years
Then, according to question-

$\Rightarrow \frac{x - 10}{6} = 10$

⇒ X – 10 = 60
⇒ X = 70
Required ratio = Arjun : Bhuvan : Shanju
⇒10 : 12 : 70
⇒ 5 : 6 : 35
Hence, option A is correct.'

43. Let the ratio in which 2 mixtures are mixed = x : y.

Per cent of water in the final mixture = 36.8%

Per cent of water in first mixture = $\frac{48-32}{48} \times 100 = \frac{100}{3}\%$

Per cent of water in second mixture = $\frac{32-20}{32} \times 100 = 37.5\%$

By the rule of allegation-

$\Rightarrow$ Ratio = $\frac{\text{Water in second} - \text{Water in final}}{\text{Water in final} - \text{Water in first}}$

$\Rightarrow x : y = \frac{37.5 - 36.8}{36.8 - \frac{100}{3}}$

$\Rightarrow x : y = \frac{0.7}{\frac{10.4}{3}}$

$= 2.1 : 10.4 = 21 : 104$

Hence, option B is correct.

44. One day work of a man = 1 unit

Total work = 4 × 11 = 44 units

If on each subsequent day a new man joined -

The work on 2nd day = 2 unit

The work on 3rd day = 3 unit

So on….

Than for the first 8 days the total work = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 = 36 units

Remaining work = 44 – 36 = 8 units

This remaining 8 unit of work will be completed in 1 more day as 8 men are employed in the work.

Hence total time taken = 8 + 1 = 9 days.

Therefore, option C is correct.

45. Let cost price of each book = 'P'.

Books sold at 10% profit = 20% of 100 = 20

Books sold at 15% profit = 37.50% of 80 = 30

Books sold at 8% profit = 80% of 50 = 40

Books sold at 20% profit = 100 – 20 – 30 – 40 = 10

Total SP of books = [20 × 1.1P] + [30 × 1.15P] + [40 × 1.08P] + [10 × 1.2P] = 22P + 34.5P + 43.2P + 12P = 111.7P

Total SP when all the books are sold at 16% profit = 116% of 100 × P = 116P

Difference = 116P – 111.7P = 1505 (Given)

⇒ 4.3P = 1505
⇒ P = 350
Hence CP of each book = Rs.350
Therefore, option C is correct.

46. It is given that selling price of mixture is S mix = Rs 2

And Profit percentage on this S mix = 80%

So, cost price of mixture C mix = $\frac{100 \times 2}{180} = \frac{10}{9}$

Cost of milk given is $\frac{100}{9}$

and we find that cost of mixture is 10% of cost of pure milk

$= \frac{\frac{10}{9}}{\frac{100}{9}} \times 100 = 10\%$

Also, cost of mixture is proportional to the quantity of milk in mixture. Therefore, we can say that lot of water is mixed in milk to form a mixture due to which price has gone down to 10% of pure milk, which means 90% is water and 10% milk.

So, the ratio of milk to water is 1 : 9.

Hence, option (B) is correct.

47. Upstream, U = Speed of boat – speed of stream

Downstream, D = Speed of boat + speed of stream

$\frac{65}{U} + \frac{130}{D} = 23$

$\frac{45}{U} + \frac{104}{D} = 17$

On solving the above two equations, we will get

U = Speed of boat – speed of stream = 5

D = Speed of boat + speed of stream = 13

Thus, Speed of boat = 9 and speed of stream = 4
Hence, option C is correct.

48. Total number of males = 12

Male dancers = 5

Male singers = 7

Total number of females = 15

Female dancers = 7

Female singers = 8

Required number of ways = $^{15}c_4 \times {}^{7}c_5 = 1365 \times 21 = 28665$
Hence, option B is correct.

49. Total number of males = 12

Male dancers = 5

Male singers = 7

Total number of females = 15

Female dancers = 7

Female singers = 8

Required number of ways = $^{8}c_3 \times 19c2 + 8c4 \times 19c1 + 8c5$

$= 56 \times 171 + 70 \times 19 + 56$
$= 9576 + 1330 + 56 = 10962$
Hence, option C is correct.

50. Then CI of one and a half year

$= \left[P\left(1+\frac{8}{100}\right)^{1}\left(1+\frac{8}{2\times100}\right)^{1}-p\right]$.....(i)

SI of one and a half year = $P \times 3 \times \frac{8}{2\times100}$ .....(ii)

According to the question, CI – SI = 80

Equation (i) – equation (ii) = 80

By solving, P = 25000

Time = 3 years and Rate of interest = 8% per annum

Therefore SI = $25000 \times 3 \times \frac{8}{100}$ = Rs. 6000

Alternate method: CI of one and a half year = $8 + 4 + 8 \times \frac{4}{100}$ = 12.32%

SI of one and a half year = 8 + 4 = 12%

According to the question, (12.32 – 12) % = 80

1% = 250

SI of 3 years = 8 × 4 = 24% = 250 × 24 = Rs. 6000

Hence, option E is correct.