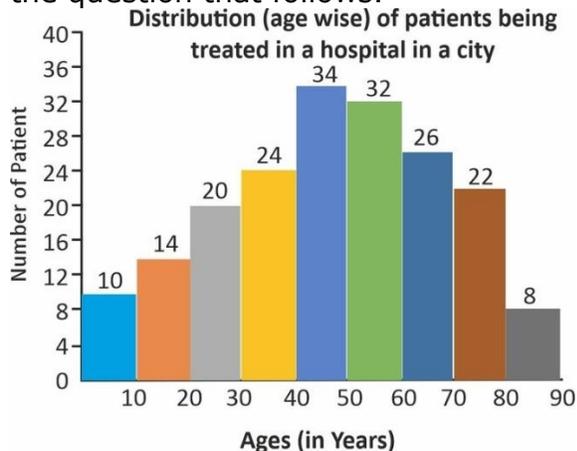


# 50+ Expected Maths Questions for SSC CHSL 2021 Upcoming Shifts PDF



### Bar Graph Questions

1. Study the given graph and answer the question that follows.



The number of patients aged 10 or more years but below 40 years is what per cent less than the number of patients aged 50 or more years but below 80 years?

- A. 30.2
- B. 25
- C. 34
- D. 27.5

Ans. D

Sol.

Number of patients aged 10 or more years but below 40 years

$$= 14 + 20 + 24 = 58$$

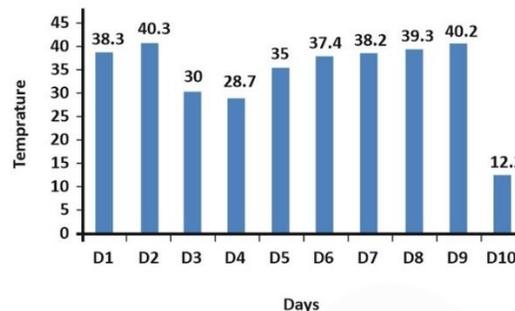
Number of patients aged 50 or more years but below 80 years

$$= 32 + 26 + 22 = 80$$

Required percentage =

$$\frac{80 - 58}{80} \times 100 = \frac{22}{80} \times 100 = 27.5\%$$

2. The Bar graph given below presents the maximum temperature (in C) of a city for 10 different days spread over several months.



What is the average maximum temperature of the city per day for the given ten days?

- A. 44.96°C
- B. 32.96 °C
- C. 33.96 °C
- D. 35.96 °C

Ans. C

Sol.

The average maximum temperature of the city per day for the given ten days

$$= \frac{38.3 + 40.3 + 30 + 28.7 + 35 + 37.4 + 38.2 + 39.3 + 40.2 + 12.2}{10} = 33.96 \text{ } ^\circ\text{C}$$

3.

**Direction:** The following table represents the number of items sold by four divisions of a consumer goods dealer during 2010 to 2013

Year	Division			
	W	X	Y	Z
2010	100	96	110	136
2011	130	134	114	108
2012	140	144	164	96
2013	86	112	76	80

The combined sales figures in 2011 and 2013 of which division was the lowest?

- A. Y
- B. W

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- C. Z
- D. X

Ans. C

Sol.

Sales of W =  $130+86 = 216$

Sales of X =  $134+112 = 246$

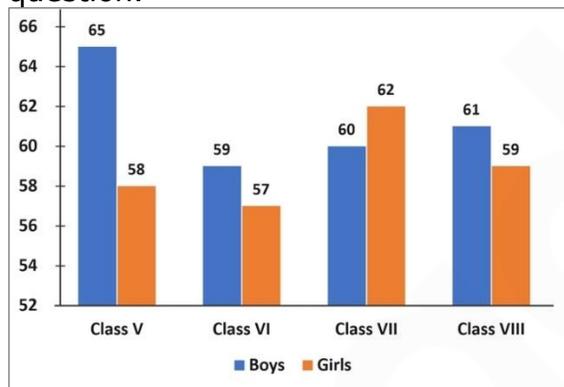
Sales of Y =  $114+76 = 190$

Sales of Z =  $108+80 = 188$

It is clear that sales of Z is lowest in 2011 and 2013.

4.

Direction: The following graph shows the number of boys and girls in Class V, Class VI, Class VII and Class VIII. Study the graph and answer the question.



What is the average number of girls in all the classes?

- A. 59
- B. 58
- C. 60
- D. 57

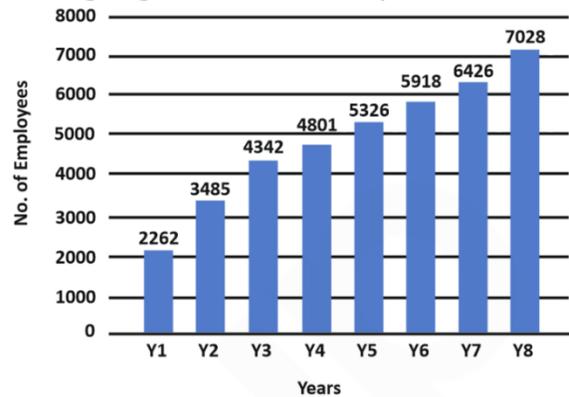
Ans. A

Sol.

Total number of girls in all the classes =  $58 + 57 + 62 + 59 = 236$

Average number of girls in all the classes =  $236/4 = 59$

5. The Bar graph shown below presents the number of employees in an office during eight consecutive years.



What is the growth percentage in the number of employees from Y5 to Y6?

- A. 10.00
- B. 11.96
- C. 11.11
- D. 12.04

Ans. C

Sol.

Number of employees during Y5 = 5326

Number of employees during Y6 = 5918

Difference = 592

$$\text{Growth percentage} = \frac{\text{Difference}}{\text{Number of employees during Y5}} \times 100 = \frac{592}{5326} \times 100 = 11.11\%$$

6. What is the ratio of total number of items sold by Y in 2012 and 2013 to that of Z in the same period?

- A. 15 : 11
- B. 11 : 16
- C. 11 : 15
- D. 16 : 11

Ans. A

Sol.

Total items sold by Y in 2012 and 2013 =  $164+76 = 240$

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Total items sold by Z in 2012 and 2013 =  $96+80 = 176$   
 $\therefore Y : Z = 240 : 176 = 15 : 11$   
Hence, option A is the correct answer.

7. In which class, the percentage increase in the number of boys as compared to its previous class is least?  
A. Class VI  
B. Class V  
C. Class VII  
D. Class VIII

Ans. D  
Sol.

For class V, there is no previous class.  
For class VI, there is a decrease in number of boys from 65 to 59.  
For class VII, percentage increase in number of boys =  $(60 - 59)/59 \times 100 = 100/59 \%$   
For class VIII, percentage increase in the number of boys =  $(61 - 60)/60 \times 100 = 100/60 \%$   
Therefore, percentage increase in number of boys is minimum in VIII class.

8. The following table shows the production of fertilizers (in lakh tonne) by six companies for 5 months (January to May).

Months	Companies					
	I	II	III	IV	V	VI
January	327	180	185	137	145	120
February	326	179	187	162	146	122
March	320	160	188	173	135	130
April	318	167	177	180	140	130
May	310	150	160	178	140	128

There a continuous decrease in production over the months in:  
A. Company III

B. Company II  
C. Company IV  
D. Company I

Ans. D  
Sol.

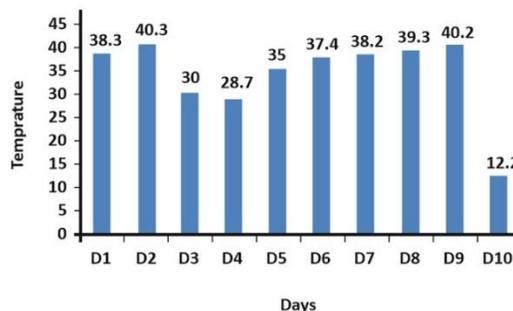
If we see thoroughly, we get company I, where, there is continuous decrease.

9. Which class has the maximum number of students?  
A. Class VI  
B. Class VIII  
C. Class V  
D. Class VII

Ans. C  
Sol.

Total number of students in class V =  $65 + 58 = 123$   
Total number of students in class VI =  $59 + 57 = 116$   
Total number of students in class VII =  $60 + 62 = 122$   
Total number of students in class VIII =  $61 + 59 = 120$   
Therefore, class V has maximum number of students.

10. The Bar graph given below presents the maximum temperature (in °C) of a city for 10 different days spread over several months.



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The temperature on D5 is how much percentage more than the temperature on D3?

- A. 16.67%
- B. 23.01%
- C. 21.07%
- D. 24.57%

Ans. A

Sol.

Temperature on D5 = 35

Temperature on D3 = 30

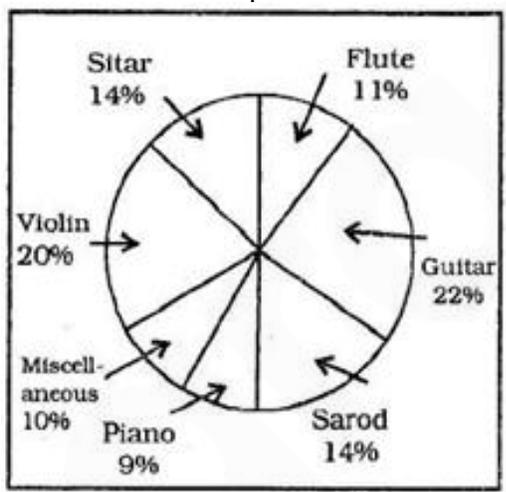
Difference = 5

$$\text{Required percentage} = \frac{5}{30} \times 100 = 16.67\%$$

### Pie Chart Questions

1.

**Direction:** The following pie-chart shows the preference of musical instruments of 60,000 people surveyed over whole India. Examine the chart and answer the questions:



Out of the total number of people who like flute, if 2100 people opt for some other instrument, then what will be the new percentage of people who like flute? A. 9.5%

B. 6.5%

- C. 7.5%
- D. 8.5%

Ans. C

Sol. Total people = 60000

Percentage of people who prefer Flute = 11%

Hence number of people who prefer Flute =  $11 \times 60000/100 = 6600$

If 2100 people be less from the number of people who prefer Flute, then new number of people who prefer Flute =  $6600 - 2100 = 4500$

Hence % of new number of people who prefer Flute =  $4500 \times 100/60000 = 4500/600 = 45/6 = 7.5\%$

2.The total number of people who prefer either Sarod or Guitar, is greater than the total number of people who prefer either Violin or Sitar by :

- A. 1200
- B. 1600
- C. 1100
- D. 1400

Ans. A

Sol. Total people = 60000

Percentage of people who prefer either Sarod or Guitar =  $14 + 22 = 36\%$

Percentage of people who prefer either Violin or Sitar =  $20 + 14 = 34\%$

Hence by 2% total number of people who prefer either Sarod or Guitar, is greater than the total number of people who prefer either Violin or Sitar.

Hence 2% people =  $2 \times 60000/100 = 2 \times 600 = 1200$

3.The number of people who prefer the musical instrument Sarod is :

- A. 7400
- B. 8400

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- C. 6400
- D. 8600

Ans. B

Sol. Total people = 60000  
 Percentage of people who prefer musical instrument Sarod = 14%  
 Hence number of people who prefer musical instrument Sarod  
 =  $14 \times 60000/100 = 14 \times 600 = 8400$

$$16\frac{2}{3}\%$$

- 4.If  $16\frac{2}{3}$  of the people who prefer piano join the people who prefer flute, then what will be the new percentage of people who prefer flute?
- A. 13.5%
  - B. 14.5%
  - C. 15.5%
  - D. 12.5%

Ans. D

Sol. Total people = 60000  
 Percentage of people who prefer Piano = 9%  
 Hence number of people who prefer

$$= 9 \times \frac{60000}{100} = 5400$$

Piano

Percentage of people who prefer flute = 11%  
 Hence number of people who prefer

$$= 11 \times \frac{60000}{100} = 6600$$

flute

$$16\frac{2}{3}\%$$

of the people who prefer Piano, would go with the people who prefer Flute

hence  $16\frac{2}{3}\%$  of piano preferred

$$= \left(\frac{50}{3}\right) \times \frac{5400}{100} = 900$$

people

Now new number of flute preferred =  $6600 + 900 = 7500$

Hence new % of people who prefer

$$= 7500 \times \frac{100}{60000} = 12.5\%$$

flute

5.The number of people who prefer Guitar is greater than the total number of people who prefer either Flute or Piano by:

- A. 1200
- B. 1100
- C. 1300
- D. 1400

Ans. A

Sol. Total people = 60000  
 Percentage of people who prefer Guitar = 22%

Percentage of people who prefer either Flute or Piano =  $11 + 9 = 20\%$

Hence  $(22 - 20 = 2\%)$  more people prefer Guitar than either Flute or Piano  
 Hence number of these people

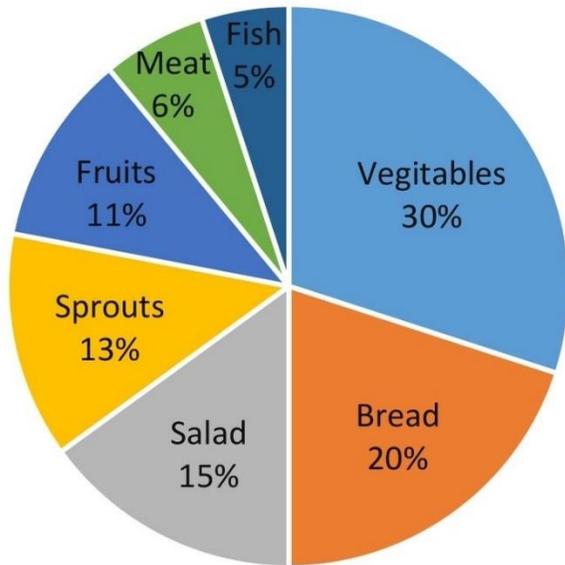
$$= 2 \times \frac{60000}{100} = 1200$$

6.

**Directions:** Study the following pie-chart carefully and answer the questions given below :

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What is the total number of people preferring vegetables and those preferring sprouts? A. 11,900  
B. 12,300  
C. 12,500  
D. None of these

Ans. D

Sol. Required ratio =  $30,000 \times (30+13)\%$   
 $= 30,000 \times 43\% = 12900$

7.What is the difference between the total number of people preferring meat to the total number of people preferring fish?

- A. 150
- B. 200
- C. 300
- D. 350

Ans. C

Sol. Required difference =  $3000 \times (6-5)\%$   
 $= 3000 \times 1\% = 300$

8. People preferring fruits are approximately what percent of the preferring vegetables?

- A. 48
- B. 35
- C. 46
- D. 37

Ans. D

$$\frac{3000 \times 11\%}{3000 \times 30\%} \times 100$$
$$\frac{11}{3} \times 10 \approx 37\%$$

Sol. Required % =

9. Out of the total sample population, how many people have given preference for fish?

- A. 1600
- B. 1800
- C. 1500
- D. 1400

Ans. C

Sol. Required no. of people =  $3000 \times 5\%$   
 $= 1500$

10. What is the ratio of the number of people preferring meat to the number of people preferring salad?

- A. 2:5
- B. 3:5
- C. 2:3
- D. 4:3

Ans. A

Sol. Required ration =  $(30000 \times 6\%) : (30000 \times 15\%)$   
 $= 1800 : 4500 = 2 : 5$

### Arithmetic and Trigonometry Questions

1. Bala decided to donate 10% of his salary to PM Care fund. On the day of

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donation, he changed his mind and donated ₹1,800 which was 60% of what he had decided earlier. How much is his salary?

- A. ₹36,000
- B. ₹32,000
- C. ₹30,000
- D. ₹40,000
- E. None of the above/More than one of the above

Ans. C

Sol.

Amount decided by Bala to be donated = 10% of Salary

Amount donated by Bala = 60% of the decided amount = 60% of (10% of salary) = ₹1800

$$60/100 \times (10/100 \times \text{Salary}) = ₹1800$$

$$10/100 \times \text{Salary} = ₹3000$$

$$\text{Salary} = ₹30000$$

2.The value of a motorcycle depreciates every year by 4%. What will be its value after 2 years, if its present value is Rs.75,000?

- A. Rs.69,120
- B. Rs.72,000
- C. Rs.70,120
- D. Rs.69,000

Ans. A

Sol.

Present value = Rs. 75000

Value decreased each year = 4%

Value after 1 year = 96% of 72000

$$= \frac{96}{100} \times 75000 = 72000$$

Again value after 2 years = 96% of 72000

$$= \frac{96}{100} \times 72000 = \text{Rs. } 69120$$

3.The difference between a number and one-third of that number is 228. What is 20% of that number?

- A. 72.5
- B. 68.4
- C. 58.9
- D. 61.8

Ans. B

Sol.

Let the number be x.

∴ According to the question,

$$x - (x/3) = 228$$

$$\Rightarrow (2x/3) = 228$$

$$\Rightarrow (x/3) = 114$$

$$\Rightarrow x = 342$$

So, 20% of 342 = (1/5) × 342 = 68.4

Hence, option B is the correct answer.

4.Rita's income is 15% less than Richa's income. By what percent is Richa's income more than Rita's income?

- A.  $14\frac{11}{17}\%$
- B.  $15\frac{11}{17}\%$
- C.  $16\frac{11}{17}\%$
- D.  $17\frac{11}{17}\%$

Ans. D

Sol.

Let Richa's income be 100x.

Then, Rita's income = 100x - (100x) × 15% = 100x - 15x = 85x

Now, required percentage

$$= \frac{100x - 85x}{85x} \times 100 = \frac{15x}{85x} \times 100 = \frac{300}{17} =$$

$$17\frac{11}{17}\%$$

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5. Two numbers are 30% and 37% lesser than a third number. By how much per cent, is the second number to be enhanced to make it equal to the first number?

- A. 10 percent
- B. 7 percent
- C. 11.11 percent
- D. 18.92 percent

Ans. C

Sol. Let the third number be 100, then first number = 70 and second number = 63

According to the question, Required % increase in the second number to make it equal to the first

$$\text{number} = \frac{70-63}{63} \times 100$$

$$= 11.11\%$$

6. The population of a town is 350000. It increases annually at the rate of 20%. What will be the population after 2 years?

- A. 490000
- B. 497000
- C. 504000
- D. 508000

Ans. C

Sol.

Population after 2 years,

$$P = 350000 \times \frac{120}{100} \times \frac{120}{100}$$

$$P = 504000$$

7. A certain sum becomes 5 times in 3 years, at simple interest, then in how many years will it become 15 times at the same rate?

- A. 6
- B. 15
- C. 10.5

D. 12

Ans. C

Sol. Let the principal be P.

$$\text{Interest in 3 years} = 5P - P = 4P$$

To be 15 times of Principal, Interest should be 14P.

4P in 3 years.

$$14P \text{ in } = (3/4P) \times 14P = 10.5 \text{ years}$$

Hence, the sum will become 15 times in 10.5 years.

8. The simple interest for two years is changed by Rs. 37.5 when the rate of interest is changed by 0.5%. Find the principal.

- A. Rs. 7500
- B. Rs. 5000
- C. Rs. 3750
- D. Rs. 2250

Ans. C

Sol.

Given-

the change in rate = 0.5%; Time = 2 years

Let the original rate of interest = R<sub>1</sub>

And Increased Rate of interest = R<sub>2</sub>

A.T.Q.

$$R_2 - R_1 = 0.5\%$$

Now,

Change in interest = 37.5 = Simple Interest at the increased rate - Simple Interest at the original rate

$$37.5 = \frac{P \times R_1 \times T}{100} - \frac{P \times R_2 \times T}{100}$$

$$37.5 = (P \times (R_1 - R_2) \times 2) / 100$$

$$37.5 = (P \times (0.5) \times 2) / 100$$

$$P = \text{Rs. } 3750$$

9. Find the interest obtained by depositing a principal of Rs. 30000 for

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6 months in a bank at 8% per annum compounded quarterly.

- A. Rs 1200
- B. Rs. 2400
- C. Rs. 1212
- D. Rs. 2424

Ans. C  
Sol.

**Detailed Method:**

We know that for compound interest calculated quarterly, the rate of interest is divided by 4 and the time period is multiplied by 4. Thus,  $r\% = 8/4 = 2\%$  and  $t = 6 \text{ months} \times 4 = 2 \text{ years}$ .

Interest = Amount - Principal  
 $\text{Interest} = 30000(1 + 8/400)^2 - 30000$   
 $= 30000(1.02)^2 - 30000$   
 $= \text{Rs. } 1212$

Rate of interest quarterly = 2%

**Alternate Approach:**

Rate of interest for 6 months =  $2 + 2 + (2 \times 2)/(100) = 4.04\%$   
 Compound interest =  $4.04 \times 30000/100$   
 $= \text{Rs } 1212$

**Hint Formula:**  $a + a + (a \times a)/100$

10. Dalajit lent Rs 10800 to Jaabir for 3 years and Rs 7500 to Kabir for 2 years on simple interest at the same rate of interest and received Rs 1422 in all from both of them as interest. The rate of interest per annum is

- A. 3.5 percent
- B. 4 percent
- C. 3 percent
- D. 4.5 percent
- E. 6 percent

Ans. C

Sol. Let the rate of interest be  $r$   

$$\text{Simple interest} = \frac{P \times r \times t}{100}$$

$$1422 = \frac{10800 \times r \times 3}{100} + \frac{7500 \times r \times 2}{100}$$

$$1422 = 324r + 150r = 474r$$

$$r = \frac{1422}{474} = 3$$

11. There is 40% increase in an amount in 8 years at simple interest. What will be the compound interest of Rs. 10000 after 3 years at the same rate?

- A. Rs 1576.25
- B. Rs 6305
- C. Rs 7881.25
- D. Rs 4728.75

Ans. A

Sol. We know that,

$$\text{SI} = \frac{\text{Prt}}{100}$$

$$\Rightarrow \frac{\text{SI}}{\text{P}} \times 100 = rt$$

It is given that, there is 40% increase in an amount in 8 years at simple interest, i.e.

$$(\text{SI}/\text{P}) \times 100 = 40$$

Thus,  $rt = 40$

$$\Rightarrow r = 40/8$$

$$= 5\%$$

$$\text{Now, CI} = P \left[ \left( 1 + \frac{r}{100} \right)^n - 1 \right]$$

$$= 10000 \left[ \left( 1 + \frac{5}{100} \right)^3 - 1 \right]$$

$$= 10000 \left[ \frac{9261}{8000} - 1 \right]$$

$$= \text{Rs } 1576.25$$

12. A person borrowed Rs. 1,200 at 8% p.a. and Rs. 1800 at 10% p.a. as simple interest for the same period. He had to pay Rs. 1380 in all as interest. Find the time period.

- A. 4 years

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- B. 10 years
- C. 6 years
- D. 5 years

Ans. D  
Sol.

Let the time for which person borrowed money be t years.

Total interest = interest on ₹1200 at 8% p.a. for time t years+ interest on ₹1800 at 10% p.a. for time t years.

$$₹1380 = (\₹1200 \times 8 \times t)/100 + (\₹1800 \times 10 \times t)/100$$

$$₹1380 = 96t + 180t$$

$$276t = 1380$$

$$t = 5 \text{ years}$$

13.A certain sum becomes 4 times in 7 years, at simple interest, then in how many years it will become 16 times?

- A. 16
- B. 21
- C. 28
- D. 35

Ans. D

Sol. ATQ,  
 $\frac{p \times r \times t}{100}$

SI =  $\frac{100}{100}$  ∴ If Principal P = x

Simple Interest SI = 3x

Total amount = 4x

$$3x = \frac{x \times r \times 7}{100}$$

$$r = \frac{300}{7}$$

If the total amount is 16 times.

$$15x = \frac{x}{100} \times \frac{300}{7} \times t$$

$$t = 35 \text{ year}$$

14.What will be the amount on Rs 25000 at the rate of 30% per annum compounded yearly for 2 years?

- A. Rs. 42250
- B. Rs. 49870
- C. Rs. 51785
- D. Rs. 40890

Ans. A

$$\text{Sol. Amount} = P \left(1 + \frac{r}{100}\right)^2$$

$$= 25000 \left(1 + \frac{30}{100}\right)^2$$

$$= \text{Rs.}42250$$

15.The compound interest on a certain sum for 2 years at the rate of 11% per annum is ₹1160.5. What will be the simple interest (in ₹) on the same amount at the same rate of interest for 2 years?

- A. 9000
- B. 1000
- C. 1100
- D. 1050

Ans. C

Sol. Formula for compound interest,  
 $P(1 + r/100)^t - P = I$

A.T.Q.

$$P(1 + 11/100)^2 - P = 1160.5$$

$$P[(1.11)^2 - 1] = 1160.5$$

$$P(0.2321) = 1160.5$$

$$P = 5000$$

Therefore, the required simple interest,

$$S = (P \times r \times T)/100$$

$$S = (5000 \times 11 \times 2)/100$$

$$S = 1100$$

16.A seller marks up an article 15% above its Cost Price and offers 10%

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discount. Then find the profit percentage.

- A. 2%
- B. 3%
- C. 2.5%
- D. 3.5%

Ans. D

Sol.

Let the cost price of an article be Rs. 100.

Therefore, Marked up price = 115% of 100 = Rs.115

Discount offered = 10%

∴ Selling price = 90% of 115 =  $(9/10) \times 115 = \text{Rs.}103.5$

Clearly, profit percent = 3.5%

17. 10% discount is offered on an item. By applying a promo code the customer wins 5%. Find the net discount?

- A. 15.25 percent
- B. 14.5 percent
- C. 15 percent
- D. 5.5 percent

Ans. B

Sol. Discount percentage = 10%

Promo code discount percentage = 5%

Net discount = 10% + 5% -  $(10 \times 5)\% / 100 = 14.5\%$  discount

18. A dealer buys an article marked at ₹5000 with two successive discounts of 20% and 5%. He spends ₹200 on repairs and sells it for ₹5000, what is his profit/loss percent?

- A. 25% profit
- B. 25% loss
- C. 20% profit
- D. 20% loss

Ans. A

Sol.

Marked price of the article = Rs 5000

Discounts given = 20 % and 5 %

$$\text{Net discount} = 20 + 5 - \frac{20 \times 5}{100}$$

$$= 24\%$$

$$\text{Amount after 24\% discount} : 5000 - \frac{24}{100} \times 5000 = \text{Rs } 3800$$

Now he spends Rs 200 on repairs .

$$\text{So new amount becomes} = 3800 + 200 = \text{Rs } 4000$$

Selling price of article = Rs 5000

$$\frac{5000 - 4000}{4000} \times 100$$

$$\text{Profit \%} = 25\%$$

Hence he earned a profit of 25%

19. A man bought three articles for 56,000 each. He sold the articles respectively at 15% profit, 12% profit and 15% loss. The total percentage profit/loss he earned is:

- A. 4% profit
- B. 3% loss
- C. 4% loss
- D. No profit no loss

Ans. A

Sol.

Here CP of one article = Rs 56000

CP of three articles = RS 168000

For **Ist article** after 15% profit:

SP=

$$56000 + \frac{15}{100} \times 56000 = 56000 + 8400 = 64400$$

For **IInd article** after 12% profit :

$$\text{SP} = 56000 + \frac{12}{100} \times 56000 = 62720$$

For **IIIrd article** after 15% loss:

SP=

$$56000 - \frac{15}{100} \times 56000 = 56000 - 8400 = 47600$$

SP of all articles = 64400 + 62720 + 47600 = Rs 174720

CP of all articles = 3 × 56000 = 168000

Profit percent :

$$\frac{174720 - 168000}{168000} \times 100$$

$$= \frac{6720}{168000} \times 100$$

$$= 4\%$$

20. What will be the net discount (in percentage) after two successive discounts of 50% and 60%?

- A. 85
- B. 80
- C. 100
- D. 95

Ans. B

Sol.  $100 \xrightarrow{50\%} 50 \xrightarrow{-60\%} 20$

Total discount = 100 - 20 = 80%

21. A trader buys two articles at Rs 4000 each. While selling, if he gains 12.5% on one and losses 20% on the other, then what will be the overall loss percentage?

- A. 2.5
- B. 3.75
- C. 5
- D. 5.25

Ans. B

Sol.  $\because 12.5\% = \frac{1}{8} \therefore 20\% = \frac{1}{5}$

$\because 12.5\%$  of gain  $\Rightarrow$  hence if CP = 8x then SP = 9x

Similarly for 20% = If CP = 5y then SP = 4y

For Article 1:

If 8x  $\rightarrow$  4000

9x  $\rightarrow$  4500

Profit of 500 Rs

For Article 2:

If 5x  $\rightarrow$  4000

4x  $\rightarrow$  3200

Loss of 800 Rs

New profit/loss = 300 Rs loss

$$\text{Loss\%} = \frac{300}{8000} \times 100$$

$$= 3.75\%$$

22. Selling price of a fan is Rs 4644. If profit percentage is 29%, then what is the cost price (in Rs) of fan?

- A. 5900
- B. 3500
- C. 3800
- D. 3600

Ans. D

Sol. Selling price = Cost Price + Profit

Profit is calculated on Cost Price

Given Profit = 29% of CP

So, SP = 129% of CP

4644 = 129% of CP

$$100\% \text{ of CP} = \frac{4644}{129} \times 100$$

$$= 3600$$

Hence, option D is the correct option

23. The total cost of a microwave oven with mixer was Rs 36750. The mixer was sold at a profit of 32% and the microwave oven at a loss of 22%. If the sale price was the same in both the items, then the cost price of the cheaper item was \_\_\_\_\_.

- A. Rs 13100
- B. Rs 18375
- C. Rs 13650
- D. Rs 16850

Ans. C

Sol. Let the cost price of microwave be x

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Then cost price of oven =  $36750 - x$   
As per question  $x + 32\% \text{ of } x = 36750 - x - 22\% \text{ of } (36750 - x)$   
 $1.32x = 36750 - x - 8085 + .22x$   
 $1.32x + .78x = 28665$   
 $X = 13650$   
Cost price of oven =  $36750 - 13650 = 23100$   
So cost price of cheaper item is 13650

24. If two T-shirts are offered free on purchase of one T-shirt priced Rs 800 each, then what is the effective discount on each T-shirt?

- A. 25 percent
- B. 33.33 percent
- C. 66.67 percent
- D. 15 percent

Ans. C

Sol. Let the CP of 1 T-shirt be Rs. 100, then CP of 3 T-shirt = Rs. 300

Marked Price = CP of 3 T-shirt = Rs. 300

Customer pays CP of one T-shirt = Rs. 100

Effective Discount  $300 - 100 = \text{Rs. } 200$

Discount % =  $(200/300) \times 100 = 66.67\%$

25. A sum of Rs. 1,260 is distributed between Ravi and Mohan. If the shares of Ravi and Mohan are in ratio 5 : 4, then the shares of Ravi and Mohan are respectively:

- A. Rs. 680 and Rs. 580
- B. Rs. 800 and Rs. 460
- C. Rs. 700 and Rs. 560
- D. Rs. 750 and Rs. 510

Ans. C

Sol.

Let the shares of Ravi and Mohan be  $5x$  and  $4x$ .

According to the question:

$$9x = 1260$$

$$x = 140$$

$$\text{Ravi's share} = 5 \times 140 = \text{Rs. } 700$$

$$\text{Mohan's share} = 4 \times 140 = \text{Rs. } 560.$$

26. If an amount of Rs. 8192 is divided among Rajan, Nitesh and Upanshu in the ratio of 5 : 4 : 7, then Nitesh will get:

- A. Rs. 2048
- B. Rs. 2420
- C. Rs. 2225.5
- D. Rs. 2560

Ans. A

Sol.

The amount of money = Rs. 8192

Given, ratio = 3 : 4 : 2

Amount that Nitesh will get =

$$\frac{4}{5+4+7} \times 8192 = \frac{8192}{4} = \text{Rs. } 2048$$

27. In an army selection process, the ratio of selected to unselected candidates was 9:2. If 80 less had applied and 20 less selected, the ratio of selected to unselected would have been 5:1. How many candidates had applied for the process?

- A. 6160
- B. 1540
- C. 3080
- D. 9240

Ans. C

Sol. Let the number of selected and unselected candidates be  $s = 9x$  and  $u = 2x$  respectively

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Then, total number of candidates applied,  $t = 11x$

Now, according to the question

New number of applied students,  $t' = 11x - 80$

And number of selected students,  $s' = 9x - 20$

$\therefore$  Number of unselected students =  $11x - 80 - 9x + 20 = 2x - 60$

Now, new ratio between them =  $\frac{9x-20}{2x-60} = \frac{5}{1}$

$$\Rightarrow 9x - 20 = 10x - 300$$

$$\Rightarrow x = 280$$

Then, total number of candidates applied =  $11x$

$$= 11 \times 280$$

$$= 3080$$

28. In an army selection process, the ratio of selected to unselected candidates was 9:2. If 80 less had applied and 20 less selected, the ratio of selected to unselected would have been 5:1. How many candidates had applied for the process?

- A. 6160
- B. 1540
- C. 3080
- D. 9240

Ans. C

Sol. Let the number of selected and unselected candidates be  $s = 9x$  and  $u = 2x$  respectively

Then, total number of candidates applied,  $t = 11x$

Now, according to the question

New number of applied students,  $t' = 11x - 80$

And number of selected students,  $s' = 9x - 20$

$\therefore$  Number of unselected students =  $11x - 80 - 9x + 20$

$$= 2x - 60$$

Now, new ratio between them =  $\frac{9x-20}{2x-60} = \frac{5}{1}$

$$\Rightarrow 9x - 20 = 10x - 300$$

$$\Rightarrow x = 280$$

Then, total number of candidates applied =  $11x$

$$= 11 \times 280$$

$$= 3080$$

29.  $2\sin\frac{C+D}{2}\sin\frac{D-C}{2}$  is equal to -

- A.  $\cos C + \cos D$
- B.  $\cos C - \cos D$
- C.  $\sin C - \sin D$
- D.  $\sin C + \sin D$

Ans. B

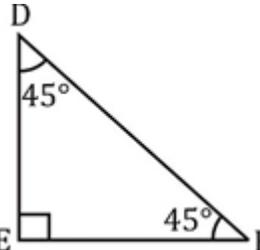
$$\text{Sol. } 2\sin\frac{C+D}{2}\sin\frac{D-C}{2}$$

$$= \cos C - \cos D$$

30.  $\triangle DEF$  is right-angled at E. If  $\angle F = 45^\circ$ , then what is the value of  $\sin F \times \tan F$ ?

- A.  $\sqrt{2}$
- B.  $1/\sqrt{3}$
- C.  $1/\sqrt{2}$
- D.  $2/\sqrt{3}$

Ans. C



Sol.  $\sin F \times \tan F$   
 $= \sin 45^\circ \times \tan 45^\circ$

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$$= \frac{1}{\sqrt{2}} \times 1 = \frac{1}{\sqrt{2}}$$

31. If  $\cot \theta = \sqrt{6}$ , then the value of  $\frac{\operatorname{cosec}^2 \theta + \sec^2 \theta}{\operatorname{cosec}^2 \theta - \sec^2 \theta}$  is:

- A.  $\frac{49}{36}$
- B.  $\frac{43}{36}$
- C.  $\frac{7}{5}$
- D.  $\frac{48}{35}$

Ans. C

Sol.

Here  $\cot \theta = \sqrt{6}$

$$(\cot \theta)^2 = 6$$

$$\operatorname{cosec}^2 \theta = 1 + \cot^2 \theta = 1 + 6 = 7$$

$$\tan^2 \theta = \frac{1}{6}$$

$$\sec^2 \theta = 1 + \tan^2 \theta = 1 + \frac{1}{6} = \frac{7}{6}$$

$$\text{So, } \frac{\operatorname{cosec}^2 \theta + \sec^2 \theta}{\operatorname{cosec}^2 \theta - \sec^2 \theta}$$

$$\Rightarrow \frac{7\left(1 + \frac{1}{6}\right)}{7\left(1 - \frac{1}{6}\right)} = \frac{49}{35}$$

$$= \frac{7}{5}$$

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