

Arithmetic SSC Special Practice Set-II

- There is a water tank of capacity 500 litres which is connected with two filling pipes P_1 and P_2 , which can fill the tank in $37\frac{1}{2}$ hours and 60 hours respectively. The rate at which P_2 fills the tanks is less than that of P_1 by what per cent?

एक पानी का टैंक जिसकी क्षमता 500 लीटर है दो भरे हुए पाइपों P_1 तथा P_2 से जुड़ा है। जो कि टैंक को, 37.5 घण्टे में भर देता है। तो P_2 पाइप, P_1 पाइप से कितने % कम दर से टैंक को भरता है।

(a) 60% (b) 37.5% (c) 25% (d) 30.5%
(e) None of these
- 300 apples are distributed equally among a certain number of students. Had there been 10 more students, each student would have received one apple less. Find the number of students.

कुछ निश्चित विद्यार्थियों में 300 सेबों को बराबर बाँटा जाता है। यदि 10 विद्यार्थी ओर आ जाते हैं तो प्रत्येक विद्यार्थी को एक सेब कम प्राप्त हुआ। तो विद्यार्थियों की संख्या ज्ञात करें।

(a) 70 (b) 40 (c) 55 (d) 50
(e) None of these
- In a 30-litre mixture of milk and water, the ratio of milk to water is 7 : 3. How much quantity of water should be added to the mixture to make the ratio of milk to water 1 : 2 ?

30 लीटर के मिश्रण में दूध तथा पानी का अनुपात 7:3 है। पानी की कितनी मात्रा ओर मिलाई जाए ताकि मिश्रण में पानी, तथा दूध तथा पानी का अनुपात 1:2 हो।

(a) 30 litres (b) 32 litres (c) 33 litres (d) 35 litres
(e) None of these
- If 3 pumps can empty a tank in 2 days by working 8 hours a day, how many hours a day must 4 pumps work to empty the tank in one day?

यदि 3 पम्प एक टैंक को 2 दिनों में 8 घण्टे/दिन काम करके खाली कर सकते हैं तो कितने घण्टे प्रतिदिन काम करके 4 पम्प उस टैंक को खाली कर सकते हैं।

(a) 12 hours (b) 15 hours
(c) 18 hours (d) 9 hours
(e) None of these
- Anish spends 25% of his salary on house rent, 5% on food, 15% on travel, 10% on clothes, and thus he saves Rs. 22,500. What is Anish's salary?

अनीस अपनी आय का 25% घर के किराये पर, 5% भोजन पर, 15% यात्रा पर तथा 10% कपड़ों पर खर्च करता है। इस प्रकार वह 22500 बचाता है तब अनीस की आय क्या है।

(a) Rs. 40000 (b) Rs. 40500
(c) Rs. 45500 (d) Rs. 50000
(e) None of these
- What is the probability that a card drawn at random from a well-shuffled pack of 52 cards is either a king or a diamond?

52 ताश के पत्तों में किंग (राजा) या डायमंड (ईंट का इक्का) के निकलने की प्रायिकता क्या है।

(a) $\frac{11}{52}$ (b) $\frac{4}{13}$ (c) $\frac{3}{13}$ (d) $\frac{13}{52}$
(e) None of these
- Clock A loses 1 minute a day and clock B gains $1\frac{1}{2}$ minutes a day. If clock B is 30 minutes ahead of clock A, how many days will clock B take to be 45 minutes ahead of clock A?

घड़ी A एक दिन में 1 मिनट कमी तथा B घड़ी B एक दिन में 1.5 मिनट की वृद्धि करती है। यदि घड़ी B, घड़ी A से 30 मिनट आगे है। तो कितने दिनों में घड़ी B, घड़ी A से 45 मिनट आगे होगी।

(a) 10 (b) 6 (c) 18 (d) 8
(e) None of these
- Which of the following equations are equivalent?

निम्न समीकरणों में कौन सी समीकरणे बराबर है।

(A) $2p^2(3p^2 - 5) - 9 - 2p^2(p^2 - 1)$
(B) $(2p^2 - 3)^2$
(C) $(2p^2 - 3)^2$
(D) $4p^4 - 12p^2 - 9$

(a) Only A and B (b) Only B and C
(c) Only B and D (d) All except
(e) All except
- A certain tank can be filled by pipes A and B separately in 4 and 5 minutes respectively. Whereas, pipe C can empty it in 3 minutes How long will it take to fill or empty the $\frac{4}{5}$ th full tank. It all the three pipes start together?

एक टैंक A तथा B पाइपों से क्रमशः 4 तथा 5 मिनट में भरा जा सकता है। जबकि पाइप C उसे 3 मिनट में खाली कर सकता है। तो टैंक के $\frac{4}{5}$ हिस्से को कितने समय से भरेगें या खाली करेगें यदि तीनों पाइपों को एक साथ खेल दिया जाए।

- (a) $1\frac{5}{7}$ minutes to fill (b) $6\frac{6}{7}$ minutes of empty
 (c) $1\frac{5}{7}$ minutes to empty (d) $6\frac{6}{7}$ minutes to fill
 (e) None of these

10. What will be the value of $16x^2y - 40xy + 25y$, if $x = 2$ and $y = 1$?
 $16x^2y - 40xy + 25y$, का मान क्या होगा यदि $x = 2$ तथा $y = 1$ हो।
 (a) -32 (b) 9 (c) 49 (d) 25
 (e) None of these

Directions (Q. 11-14): Each of the questions below consists of a question and two statements numbered I and II given below. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and give answer:

नीचे दिये प्रत्येक कथन प्रश्नों के दो कथन, कथन I तथा कथन II दिये गये हैं। निश्चित करते हुए का उपयुक्त उत्तर दीजिए-

(a) If the data in statement I alone are sufficient to answer the question, while the data in statement II alone are not sufficient to answer the question. समको का केवल कथन I उत्तर के लिए पर्याप्त है तथा समको का कथन II उत्तर के लिए पर्याप्त नहीं है।

(b) if the data in statement II alone are sufficient to answer the question, while the data in statement I alone are not sufficient to answer the question. समको का केवल कथन II उत्तर के लिए पर्याप्त तथा समको के केवल कथन I उत्तर के लिए पर्याप्त नहीं है।

(c) if the data either in statement I alone or in statement II alone are sufficient to answer the question.

या तो केवल कथन समको का कथन I या समको का कथन II उत्तर के लिए पर्याप्त है।

(d) if the data even in both the statements I and II together are not sufficient to answer the question. समको का कथन I तथा कथन II उत्तर के लिए पर्याप्त नहीं है।

(e) if the data in both the statements I and II together are necessary to answer the question. समको का कथन I तथा कथन II दोनों उत्तर के लिए पर्याप्त है।

11. A number is divisible by 3. Find the number.

एक संख्या को तीन से भाग किया जाता है, तब संख्या है।

I. Square of the number is divided by 9.

संख्याओं का वर्ग 9 से विभाज्य है।

II. 40% of the number is $\frac{2}{5}$ th of that number.

संख्या का 40% उस संख्या का $\frac{2}{5}$ है।

12. What is the ratio of investments of A, B and C?

A, B तथा C के निवेशों का अनुपात है-

I. Total investment is Rs. 12000 in which A's contribution is Rs. 6000.

कुल निवेश रू. 12000 में A का हिस्सा रू. 6000 है।

II. Ratio of investment of A to B is 3 : 2 and that of B to C is 2 : 1.

A तथा B के निवेश का अनुपात 3:2 है व B तथा C का अनुपात 2:1 है।

13. The marked price of a TV set is Rs. 20,000. At what price a customer buys this TV set?

एक T.V का सूची मूल्य रू. 20000 है जो ग्राहक TV को किस मूल्य पर खरीदता है।

I. The shopkeeper allows successive discounts of 25% and 5%.

दुकानदार 25% तथा 5% के उत्तर बट्टा देता है।

II. The shopkeeper allows successive discounts of 20% and Rs. 1750.

दुकानदार 20% तथा रू. 1750 का उत्तर बट्टा देता है।

14. The average salary of 15 teachers of a school is Rs. 5000 p.m. A group of 4 teachers whose average salary is Rs. 6000 pm leave the school and new teacher joins. What is the average salary of new group of teachers in the school?

15 अध्यापकों के मासिक वेतन का औसत रू. 5000 प्रति माह है। 4 अध्यापकों जिनका औसत मासिक वेतन रू. 6000 प्रतिमाह स्कूल छोड़ देते हैं तथा नये अध्यापक जुड़ते हैं। नये अध्यापकों के समूह का औसत वेतन कितना है।

I. There are 4 teachers in the group which left the school.

4 अध्यापकों का समूह स्कूल छोड़ देते हैं।

II. The salary of the new teacher is Rs. 3000 p.m. नये अध्यापकों का वेतन रू. 3000 प्रतिमाह है।

15. A man invests equal amount at 10% per annum for 3 years, one at simple interest and the other at compound interest. What is the difference in interests earned in two cases.

एक आदमी 10% प्रतिवर्ष, 3 वर्ष के बराबर धन निवेश करता है। एक साधारण ब्याज तथा दूसरा चक्रवृद्धि याज पर। दोनों स्थितियों में ब्याज की दरों का अंतर है।

I. Total investments is Rs. 20,000

कुल निवेश रू. 20,000 है।

II. Ratio of the interests earned is 300 : 331

निवेश का अनुपात 300:331 है।

Answer Key

1. (b) 2. (d) 3. (c) 4. (a) 5. (d) 6. (b) 7. (b) 8. (e) 9. (a) 10. (b)
 11. (d) 12. (b) 13. (c) 14. (e) 15. (a)

Hint & Solutions

1. **The rate of filling water by the two pipes are as follows :**

Rate of P_1 $\frac{500}{75} = 2$
 $13\frac{1}{3}$ litres per hour

Now, Rate of Filling by P_2 $\frac{500}{60} = 8\frac{1}{3}$

The rate at which P_2 fills the tank is less than that of P_1 by

$$\frac{13\frac{1}{3} - 8\frac{1}{3}}{13\frac{1}{3}} \times 100 = \frac{5}{40} \times 100 = 12.5\%$$

2. **Let the number of students be x .**

Then, in the first mixture, milk $\frac{2x}{5}$ and water = $\frac{3x}{5}$

Then, $\frac{300x}{x} = \frac{300}{x} \times 1$
 or, $\frac{300x}{x(x-10)} = 1$

or, $x^2 - 10x - 3000 = 0$
 or, $x^2 - 60x + 50x - 3000 = 0$
 or, $x(x-60) - 50(x-60) = 0$
 or, $(x-60)(x-50) = 0$
 or, $x = 50$ and $(x-60) = 0$
 $x = -60$ (neglect the negative value)

3. **Let the water be $3x$ and milk be $7x$ in the mixture.**

Then, $\frac{7x}{x} = \frac{3x}{3} = 3$

Again, let x litre be added,

Milk : water
 $21 : 9$

Now, $\frac{21}{9} = \frac{x}{x}$
 or, $21 = 9$
 or, $x = 33$ litres

4. **Let the pumps be P_1 and P_2 ,**

the days be D_1 and D_2

and the hours be h_1 and h_2

Then, $P_1 D_1 h_1 = P_2 D_2 h_2$
 or, $3 \times 8 \times 2 = 4 \times 1 \times h_2$

5. **Let Anish's salary be x .**

Then, Anish's spend on house rent $\frac{x}{100} \times 25$

$h_2 = \frac{3}{4} \times \frac{8}{1} = 6$ 12 hours

Rs. $\frac{x}{4}$
 food $\frac{x}{100} \times 5$ Rs. $\frac{x}{20}$
 travel $\frac{x}{100} \times 15$ Rs. $\frac{3x}{20}$
 clothe $\frac{x}{100} \times 10$ Rs. $\frac{x}{10}$

Remaining amount

$x - \frac{x}{4} - \frac{x}{20} - \frac{3x}{20} - \frac{x}{10} = 22500$
 or, $\frac{20x - (5x + x + 3x + 2x)}{20} = 22500$

$\frac{20x - (5x + x + 3x + 2x)}{20} = x$

Rs. 50000

6. **Let E and F be the event of getting diamond and a king respectively.**

Then $E \cap F$ is the event of getting a king of diamond.

$n(E) = 13, n(F) = 4$ and
 $n(E \cap F) = 1$
 So, $P(E) = \frac{13}{52}, P(F) = \frac{4}{52}$ and $P(E \cap F) = \frac{1}{52}$

$P(E \cup F) = \frac{1}{4} + \frac{1}{13} - \frac{1}{52} = \frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$

7. **According to question,**

Clock B gains per hour to

A $\frac{1}{24} - \frac{1}{16} = \frac{2}{48} - \frac{3}{48} = -\frac{1}{48}$ min

Now,

Clock B gains $\frac{5}{48}$ min in an hour

Clock B gains 15 min in $\frac{48}{5}$ 15 hour
 $\frac{48}{5} \frac{15}{24}$ days 6 days.

8. $2p^2(3p^2 - 5) - 9 - 2p^2(p^2 - 1)$
 $6p^4 - 10p^2 - 9 - 2p^4 - 2p^2$
 $4p^2 - 12p^2 - 9 - (2p^2 - 3)^2$
 (b) $(2p^2 - 3)^2$
 (c) $(2p^2 - 3)^2$
 (d) $4p^2 - 12p^2 - 9$
 $(2p^2 - 3)^2$
 (a) (b) (d)

Therefore, the required answer is option (e).

9. A's work in one minute $\frac{1}{4}$
 B's work in one minute $\frac{1}{5}$
 C's work in one minute $\frac{1}{3}$
 (A + B + C)'s work in minute
 $\frac{1}{4} + \frac{1}{5} + \frac{1}{3}$
 $\frac{15}{60} + \frac{12}{60} + \frac{20}{60} = \frac{47}{60}$

Time taken to fill 1 $\frac{4}{5}$

i.e., $\frac{1}{5}$ part of tank $\frac{60}{7} \frac{1}{5} \frac{12}{7} \frac{5}{7}$ min

10. Given expression $16x^2y - 40xy + 25y$
 $16x^2 - 40x + 25$
 $64 - 80 + 25 = 9$
11. If a number is divisible by 3 it can be written as $3x$ square of the number $(3x)^2 = 9x^2$

Hence square of the number is divisible by 9.
 Thus, statement I does not yield any additional information.

$$40\% \text{ of } x = \frac{40}{100}(3x) = \frac{2}{5}(3x)$$

Thus, statement II too does not given any additional information.

We can also see that even both statements I and II together can't give the solution.

12. Statement I : Total investment of A + B + C = Rs. 12000
 A's investment = Rs. 6000
 It says nothing about the investments of B and C.
 Therefore, statement I alone is not sufficient to answer the question.
 Statement II. A : B = 3 : 2
 B : C = 2 : 1

B is common to both ratios. Therefore, we can directly write,

A : B : C = 3 : 2 : 1. (Because 2 is common to both the ratios)

Thus, we see that statement II alone is sufficient to answer the question.

13. Marked price of the TV set = Rs. 20,000
 discount of 25% and 5%

Price after 25% discount

$$= (1 - 0.05) \times \text{Rs. } 20000 = \text{Rs. } 15000$$

Price after 2nd discount of 5%

$$= (1 - 0.05) \times \text{Rs. } 15000 = \text{Rs. } 14250$$

Thus, statement I alone is sufficient to answer the question.

Statement II : The shopkeeper allows successive discount of 20% and Rs. 1750

$$\text{Price after 20\% discount} = (1 - 0.20) \times \text{Rs. } 20000 = \text{Rs. } 16000$$

Thus, statement II alone is sufficient to answer the question

Hence, either statement I or statement II alone is sufficient to answer the question.

14. Average monthly salary of 15 teachers is Rs. 5000

$$\text{Total monthly salary of 15 teachers} = 15 \times \text{Rs. } 5000 = \text{Rs. } 75000$$

Statement II : A group of 4 teachers whose average monthly salary is Rs. 6000 leaves the school.

Total monthly salary of these 4 teacher.

$$= 4 \times \text{Rs. } 6000 = \text{Rs. } 24000$$

But a new teacher has joined the school and its statement gives no data about his saary. Therefore, statement I alone is not sufficient to answer the question.

Statement II : Salary of the new teacher is Rs. 3000 per month.

But it says nothing about the no. of teachers who left the school. So, this statement alone is not sufficient.

Let us combine the two statements.

Total monthly salary of remaining 11 teachers in the school = Rs. 51000.

Monthly salary of the new teacher who jons = Rs. 3000

Total monthly salary of new group of 12 teachers in the school = Rs. (51000 + 3000) = Rs. 54000

Average monthly salary of new group of 12 teachers in the school $\frac{\text{Rs. } 54000}{12} = \text{Rs. } 4500$

15. Let the sum invested in each case be Rs. x

$$\text{Simple interest} = \frac{\text{Principal} \times \text{rate} \times \text{time}}{100}$$

$$\text{Compound interest} = 1 + \frac{R}{100} \times T - 1$$

$$\text{Compound interest} = x \left(\frac{11}{10} \right)^3 - x$$

$$x \frac{1331}{1000} - x = \frac{331}{1000} x$$

Statement I :

Total investment = Rs. 20,000

$$\text{Investment in each case} = x = \frac{20000}{2} = \text{Rs. } 10,000$$

$$SI = \frac{3}{10} \times x = \frac{3}{10} \times 10000 = \text{Rs. } 3000$$

$$CI = \frac{331}{1000} \times x = \frac{331}{1000} \times 10000 = \text{Rs. } 3310$$

$$CI - SI = \text{Rs. } (3310 - 3000) = \text{Rs. } 310$$

Thus, statement I alone is sufficient information as we can get it from

$$\frac{SI}{CI} = \frac{\frac{3x}{10}}{\frac{331x}{1000}} = \frac{3x}{10} \times \frac{1000}{331x} = \frac{300}{331}$$

This data is not sufficient to find the answer because the total interest is not given.