Arithmetic for SSC Special Practice Set-I

1. **5 persons are chosen at random from a group of 4 men, 3 women and 5 children. The probability that exactly 3 of them are children is**

   4 अदमी, 3 औरते तथा 5 बच्चों में एक समूह में 5 व्यक्तियों को यादृच्छ चुना जाता है। उनमें से वास्तविक 3 बच्चे की होने का सम्भावना हैं।

   (a) $\frac{36}{48}$ (b) $\frac{35}{132}$
   (c) $\frac{34}{139}$ (d) $\frac{35}{221}$
   (e) $\frac{37}{135}$

2. **There are two mixtures in which milk and water are in the ratio of 2 : 3 and 3 : 7 respectively. In what ratio should the two mixtures be mixed to form a new mixture in which the ratio of milk to water is 4 : 7?**

   दो मिश्रण जिसमें दूध तथा पानी का अनुपात क्रमशः 2:3 तथा 3:7 हैं।4:7 का नया मिश्रण बनाने के लिए उस मिश्रण में दोनों मिश्रणों को किस अनुपात में मिलाना चाहिए।

   (a) 7 : 4 (b) 7 : 3 (c) 7 : 2 (d) 3 : 8
   (e) None of these

3. **A money lender finds that due to a fall in the rate of interest from 13% to $12\frac{1}{2}$% his yearly income has reduced by Rs. 104. What is his capital?**

   13% तथा 12.5% की वार्षिक ब्याज दर कमी करने पर एक कर्जदाता की आय भी रू. 104 कम हो जातीहै। व्यक्ति की पूंजी क्या है।

   (a) Rs. 10400 (b) Rs. 20800
   (c) Rs. 10800 (d) Rs. 20400
   (e) None of these

4. **The traffic lights at three different road crossings change after every 48 seconds. 72 seconds and 108 seconds respectively. If they all change simultaneously at 8 : 20 hours then at what time will they again change simultaneously?**

   यातायात की लाइट तीन अलग चौराहों पर 48 सेकण्ड, 72 सेकण्ड, तथा 108 सेकण्ड में बदलती है यदि ये सभी 8:20 घण्टे पर एक साथ बदले तो अगली बार पुनः एक साथ वे कब बदलेगी।

   (a) 8 : 27min 12 sec (b) 8 : 28 min 12 sec
   (c) 8 : 30 min 12 sec (d) 8 : 29 min 12sec
   (e) None of these

5. **An aeroplane started 30 minutes later than the scheduled time from a place-1800 km away from its destination. To reach the destination at the scheduled time the pilot increased the speed by 300 kmph. What was the speed of the aeroplane in kilometre per hour during the entire journey?**

   एक हवाई जहाज अपने नियत से 30 मिनट बाद उडकर अपनी नियत दूरी से 1800 km पहले पहुँच जाता है। नियत दूरी पर सही समय पर पहुचने के लिए विमान वाहक अपनी चाल को 300 km/h बढा देता है। पूरी यात्रा के दौरान उस हवाई जहाज की चाल किमी/घण्टा में क्या है।

   (a) 1300 km/h (b) 1200 km/h
   (c) 1250 km/h (d) 1320 km/h
   (e) 1420 km/h

6. **There is an equilateral triangle of which each side is 2m. With all three corners as centres, circles of radius in each are described. Calculate the area common to all the circles and triangles.**

   समबाहु Δ की प्रत्येक भुजा की लम्बाई 2 m है। तीनों कोनों (त्रिभुज) पर वृत्त खीचे गये तो वृत्त के उभयनिष्ठ भाग तथा त्रिभुज का क्षेत्रफल हैं।

   (a) 1.57 m^2 (b) 15.7 m^2
   (c) 0.157 m^2 (d) 1.67 m^2
   (e) None of these

7. **What sum of money at compound interest will amount to Rs. 2249.52 in 3 years, if the rate of interest is 3% for the first year, 4% for the second year and 5% for the third year?**

   रू. 2249.52 पर 3 वर्ष का च० ब्याज पर मिश्रधन क्या है। यदि ब्याज की प्रथम वर्ष की दर 3% , द्वितीय वर्ष की दर 4% तथा तृतीय वर्ष की दर 5% हो।

   (a) Rs. 4000 (b) Rs. 5000
   (c) Rs. 3080 (d) Rs. 2000
   (e) Rs. 2530

8. **Three partners altogether invested Rs. 114000 in a business. At the end of the year, the first partner got Rs. 337.50, the second partner got Rs. 1125 and the third partner got Rs. 675 as profit. What is the ratio of their investments?**

   एक व्यापार 1 में तीन साझेदारों ने एक साथ रू. 114000 का निवेश किया। वर्ष के अंत में प्रथम साझेदार को रू. 337.50, द्वितीय साझेदार को रू. 1125 तथा तीसरे साझेदार को रू. 675 का लाभांस हुआ। उनके निवेश का अनुपात हैं।

   (a) 3 : 10 : 6 (b) 10 : 3 : 6
   (c) 6 : 10 : 3 (d) 6 : 3 : 10
   (e) None of these

9. **A box contains 4 white balls, 3 black balls and 9 red balls. In how many ways can 4 balls be drawn from the box, if at least one white ball is to be included in a draw?**

एक बक्शे में 4 सफेद, 3 काली, तथा 9 लाल गेदें है। 4 गेदों को उस बक्शे कितने तरीके से निकाला जा सकता है। यदि कम से कम एक सफेद गेंद उनमें शामिल हो?

(a) 1325 (b) 1421
(c) 325 (d) 428
(e) 912

10. **The area of a rectangle is equal to the area of the circle whose radius is 21 cm. If the length and the breadth of the rectangle are in the ratio of 14:11, what is its perimeter?**

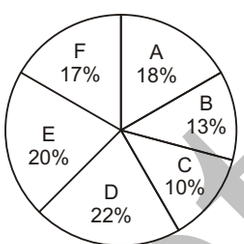
एक वृत्त जिसकी त्रिज्या 21 *cm* है उसका क्षेत्रफल आयत के क्षेत्रफल के बराबर है यदि आयत की लम्बाई तथा चौडाई में 14:11 का अनुपात है, तो उसका परिमाप क्या है।

(a) 142 cm (b) 140 cm
(c) 132 cm (d) 136 cm
(e) 150 cm

Directions (Q. 11-15): Study the following information carefully and answer the questions given below:

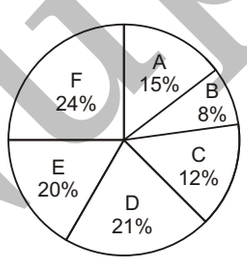
Pie-chart-I shows the percentage distribution of students who appeared in an examination from six different schools and pie-chart-II shows the percentage distribution of students who passed from these schools.

Pie-chart-I



Total students appeared = 9500

Pie-chart-II



Total students passed = 2400

11. **What is the difference between the number of students appeared from School A and those appeared from School D?**

स्कूल *A* तथा स्कूल *B* के विद्यार्थियों के बीच में क्या अन्तर है।

(a) 320 (b) 340 (c) 360 (d) 380
(e) 400

12. **How many students passed from School B and School F together?**

स्कूल *B* तथा स्कूल *F* में कितने विद्यार्थी पास हुऐ।

(a) 760 (b) 768 (c) 774 (d) 784
(e) 788

13. **How many students failed from School C?**

स्कूल *C* में कितने विद्यार्थी फेल हुये।

(a) 662 (b) 664 (c) 666 (d) 668
(e) 672

14. **What is the difference between the total number of failed and passed students from School D?**

D स्कूल में कुल असफल विद्यार्थियों में कुल, क्या अंतर हैं।

(a) 1012 (b) 1048 (c) 1064 (d) 1078
(e) 1082

15. **Total number of failed students from School E is approximately what percentage of the total number of appeared students from all six schools together?**

स्कूल *E* में कुल असफल विद्यार्थियों का, कुल 6 स्कूलों के विद्यार्थियों के साथ लगभग % क्या है।

(a) 15% (b) 18% (c) 21% (d) 24%
(e) 27%

ANSWER KEY

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

Hint & Solutions

1. **$n(S)$ = Number of ways of selecting 5 persons out of 12 = $^{12}C_5 = \frac{12}{5!7!} = 792$**

$n(E)$ = Number of ways of selecting 3 children out of 5, and 2 persons out of $(4+3=)7$ persons =

$$^5C_3 \times {}^7C_2 = \frac{\lfloor 5}{\lfloor 3 \lfloor 2} \times \frac{\lfloor 7}{\lfloor 5 \lfloor 2} = 210$$

$$\therefore \quad P(E) = \frac{n(E)}{n(S)} = \frac{210}{792} = \frac{35}{132}$$

2. **Let the two mixture be mixed in the ratio of x :y**

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

In the second mixture, milk = $\frac{3y}{10}$ and water = $\frac{7y}{10}$

Now, we have, $= \frac{2x}{5} + \frac{3y}{10} : \frac{3x}{5} + \frac{7y}{10} : \frac{4}{7}$

or, $\frac{4x+3y}{6x+7y} = \frac{4}{7}$

or, $28x + 21y = 24x + 28y$

or, $4x = 7y$

$\therefore \quad \frac{x}{y} = \frac{7}{4} = 7:4$

3. **Let the capital be x.**

Then, $\frac{x \times 1 \times 13}{100} - \frac{x \times 25 \times 1}{2 \times 100} = 104$

or $\frac{x}{100}\left(13 - \frac{25}{2}\right) = 104$

or, $\frac{x}{100} \times \frac{1}{2} = 104$

$\therefore \quad x = 104 \times 200 = \text{Rs. } 20800$

4. **LCM of 48, 72, 108 = 432 seconds**

So, $\frac{432}{60} = 7$ min, 12 sec

Thus required time = 8hrs 20 min +7 min 12 sec = 8 : 27 : 12 seconds

5. **Let the time taken at normal speed be $\left(x + \frac{1}{2}\right)$ hrs. Then time taken, when speed increases to 300 km/h, is x hrs.**

So, $\frac{1800}{x} - \frac{1800}{\left(x + \frac{1}{2}\right)} = 300$

or, $6\left(x + \frac{1}{2}\right) - 6x = x\left(x + \frac{1}{2}\right)$

or, $2x^2 + x - 6 = 0$

or, $2x^2 - 3x + 4x - 6 = 0$

$x(2x-3) + 2(2x-3) = 0$

or $(x+2)(2x-3) = 0$

or, $(x+2) = 0$

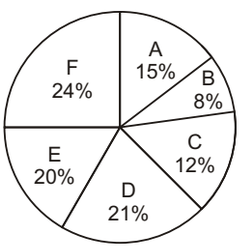
$\therefore \quad x = -2$ (neglect negative value)

And $(2x-3) = 0$

$\therefore \quad x = \frac{3}{2}$ hr

$\therefore \quad$ Speed $= \frac{1800}{\frac{3}{2}}$ km/h = 1200 km/h

6.



AB = BC = CA = 2m

Now, PA = PB = BO = OC = MC = AM = 1m

$\angle ABC = \angle ACB = \angle BAC = 60°$

Area of $\Delta ABC = \frac{\sqrt{3}}{4}(side)^2 = \frac{\sqrt{3}}{4} \times 2^2 = \sqrt{3} = 1.72 m^2$

Area of ΔABC covered by all circles

$$= 3 \times \frac{\pi r^2}{360°} \times 60° = 3 \times \frac{\pi r^2}{6}$$

$$= \frac{3 \times 3.14 \times 1^2}{6} = 1.57 m^2$$

7. **Let money be Rs. x.**

Then, $x\left(1 + \frac{3}{100}\right)\left(1 + \frac{4}{100}\right)\left(1 + \frac{5}{100}\right) = \text{Rs. } 2249$

or, $x \times 1.03 \times 1.04 \times 1.05 = 2249.52$

$\therefore \quad x \frac{2249.52}{1.03 \times 1.04 \times 1.05} = \text{Rs. } 2000$

P

$= 2249.52 \times \frac{100}{103} \times \frac{100}{104} \times \frac{100}{105}$

$= \text{Rs. } 2000$

8. **HCF or 337.50, 1125 and 675 is 112.5. Then, ratio is $\frac{337.50}{112.5} : \frac{1125}{112.5} : \frac{675}{112.5} = 3 : 10 : 6$**

9. **Reqd number of ways**

$= (^4C_1 \times {}^{12}C_3) + (^4C_2 \times {}^{12}C_2) + (^4C_3 \times {}^{12}C_1) + {}^4C_4$

$= \left(4 \times \frac{12 \times 11 \times 10}{6}\right) + \left(\frac{4 \times 3}{2} \times \frac{12 \times 11}{2}\right) + (4 \times 12) + 1$

$= (4 \times 22 \times 10) + (6 \times 6 \times 11) + 48 + 1$

$= 880 + 396 + 48 + 1 = 1325$

10. **Area of circle = $\pi r^2 = \frac{22}{7} \times (21)^2$**

Let the length be $14x$ and breadth be $11x$.

Then,

$$\text{Area of rectangle} = 14x \times 11x = \frac{21}{7} \times (21)^2$$

Now, $x^2 \times 14 \times 11 = \frac{22}{7} \times 21 \times 21$

or, $x^2 = \frac{22 \times 21 \times 21}{7 \times 14 \times 11} = 9$

$\therefore \quad x = 3$

Length of rectangle $= 14 \times 3 = 42$ cm.

Breadth $= 11 \times 3 = 33$ cm

$\therefore$ Perimeter $= 2(42 + 33) = 2 \times 75 = 150$ cm

11. **Reqd difference** $= \mathbf{9500} \times \frac{\mathbf{(22 - 18)}}{\mathbf{100}} = \mathbf{380}$

12. **Total number of students passed from School B and F together**

$$= 2400 \times \frac{(8 + 24)}{100}$$

$$= 24 \times 32 = 768$$

13. $\because \quad \mathbf{C_{App}} = \mathbf{9500} \times \frac{\mathbf{10}}{\mathbf{100}} = \mathbf{950}$

$$C_{pass} = 2400 \times \frac{12}{100} = 288$$

$\therefore$ Number of failed students $= 950 - 288 = 662$

14. $\mathbf{D_{App}} = \mathbf{9500} \times \frac{\mathbf{22}}{\mathbf{100}} = \mathbf{2090}$

$$D_{Pass} = 2400 \times \frac{21}{100} = 504$$

$\therefore \quad D_{Fail} = 2090 - 504 = 1586$

$\therefore \quad$ Reqd difference $= 1586 - 504 = 1082$

15. $\mathbf{E_{Fail}} = \left(\mathbf{9500} \times \frac{\mathbf{20}}{\mathbf{100}}\right) - \left(\mathbf{2400} \times \frac{\mathbf{20}}{\mathbf{100}}\right)$

$$= 1900 - 480 = 1420$$

$\therefore$ Total appeared students $= 9500$

$\therefore \quad \text{Reqd}\% = \frac{1420}{9500} \times 100 = 14.94 \approx 15\%$