

## SSC CGL Previous Year Question Paper 2018

### Quantitative Aptitude (Questions and Solutions)

**Q. (1)** A shopkeeper marks his goods at 40% more than their cost price and allows a discount of 25% on the marked price. His gain percent is:

1. 5% loss
2. 10% loss
3. 5% gain
4. 15% gain

**Answer:** 3

**Solution:**

Let the cost price be Rs.  $x$

Marked price =  $x + (40\% \text{ of } x)$

$$= 140x/100$$

$$= \text{Rs. } 7x/5$$

Discounted price (or selling price) =  $7x/5 - (25\% \text{ of } 7x/5)$

$$= (7x/5) - (7x/20)$$

$$= \text{Rs. } 21x/20$$

$$\text{Gain} = \text{SP} - \text{CP}$$

$$= (21x/20) - x$$

$$= \text{Rs. } x/20$$

$$\text{Gain \%} = (\text{Gain}/\text{CP}) \times 100$$

$$= (x/20x) \times 100$$

$$= 5\%$$

**Q. (2)** In a class of 60 students, 40% are girls. The average weight of the boys is 62kg and that of the girls is 55kg. What is the average weight of the whole class?

1. 59.2 kg
2. 58.6 kg
3. 58.8 kg

4. 59 kg

**Answer:** 1

**Solution:**

If 40% are girls, 40% of 60 = 24

Therefore, the number of girls = 24

Number of boys = 60 - 24 = 36

The average weight of boys = (total weight of boys) ÷ (no. of boys)

⇒ 62 = total weight /36

⇒ Total weight = 62 x 36 = 2232

The average weight of girls = (total weight of girls) ÷ (number of girls)

⇒ 55 = total weight /24

⇒ Total weight = 55 x 24 = 1320

For whole class, total weight = 1320 + 2232 = 3552

Hence, average weight of whole class = 3552 ÷ 60 = 59.2 kg

**Q. (3)** Two articles are sold for ₹ 4,956 each. On one, the seller gains 18% and on the other, he loses 16%. What is his overall gain or loss percent nearest one decimal place?

1. 1.9% loss
2. 1.9% gain
3. 2.1% gain
4. 2.1% loss

**Answer:** 1

**Solution:** For article 1,

Selling price (S.P.) = Rs.4956

Gain = 18%

So, Cost price (C.P) =  $100 \times [S.P. / (100 + \text{gain } \%)]$

=  $100 \times [4956 / (100 + 18)]$

= Rs. 4200

For article 2, S.P. = Rs. 4956

Loss = 16%

So, C.P. =  $100 \times [\text{S.P.} / (100 - \text{loss } \%)]$

=  $100 \times [4956 / (100 - 16)]$

= Rs. 5900

Now, total S.P. =  $4956 \times 2 = \text{Rs. } 9912$

And, total C.P. =  $\text{Rs. } (4200 + 5900) = \text{Rs. } 10,100$

Therefore, loss = C.P. - S.P.

=  $\text{Rs. } (10,100 - 9912)$

= Rs. 188

Further, loss% =  $(\text{loss}/\text{C.P.}) \times 100$

=  $(188 / 10100) \times 100$

= 1.86 %

= 1.9 % (approx.)

**Q. (4)** In a circle with centre O, AB is diameter and CD is a chord such that ABCD is a trapezium. If

$\angle BAC = 28^\circ$ , then  $\angle CAD$  is equal to

1.  $32^\circ$
2.  $62^\circ$
3.  $34^\circ$
4.  $28^\circ$

**Answer:** 3

**Solution:** ABCD is a cyclic trapezium with AB parallel to DC.

Given,  $\angle BAC = 28^\circ$

ABC is a right angled triangle, so  $\angle ACB = 90^\circ$

Therefore,  $\angle ABC = 90^\circ - 28^\circ = 62^\circ$

$\angle ABC + \angle ADC = 180^\circ$

$\Rightarrow 62^\circ + \angle ADC = 180^\circ$

$$\Rightarrow \angle ADC = 180^\circ - 62^\circ = 118^\circ$$

$$\Rightarrow \angle ACD = \angle CAB = 28^\circ \text{ (as AB parallel to DC)}$$

$$\text{Hence, } \angle CAD = 180^\circ - (118^\circ - 28^\circ) = 34^\circ$$

**Q. (5)** In  $\triangle ABC$ , P is a point on BC such that BP: PC = 2: 3. If Q is the midpoint of BP, then area ( $\triangle ABQ$ ): area ( $\triangle ABC$ ) is equal to:

1. 1:5
2. 1:4
3. 2:3
4. 2:5

**Answer:** 1

**Solution:**

Let say BC = 5x

Therefore, BP = 2x, PC = 3x

Now, BQ = 2x / 2 = x

CQ = 5x - x = 4x

Area of  $\triangle ABC = (\frac{1}{2} BC) \times h = 5xh/2$  (h = Altitude)

Area of  $\triangle AQC = (\frac{1}{2} CQ) \times h = 2xh$

Area of  $\triangle ABQ = \text{Area of } \triangle ABC - \text{Area of } \triangle AQC$

$$= 5xh/2 - 2xh$$

$$= \frac{1}{2} xh$$

Hence, area ( $\triangle ABQ$ ): area ( $\triangle ABC$ ) =  $\frac{1}{2} xh / (5xh/2) = 1: 5$

**Q. (6)** The value of  $3.8 + (8.2 \div 4.1 \times 2) - 4 \times 3 \div 1.2$  is

1. 1.2
2. -2.2

- 3. 2.2
- 4. -1.2

**Answer:** 2

**Solution:**  $3.8 + (8.2 \div 4.1 \times 2) - 4 \times 3 \div 1.2$

$$= 3.8 + [(8.2 \div 4.1) \times 2] - [(4 \times 3) \div 1.2]$$

$$= 3.8 + 4 - 10$$

$$= 3.8 - 6$$

$$= -2.2$$

**Q. (7)** If  $a + b + c = 6$  and  $ab + bc + ca = 5$ , then  $a^3 + b^3 + c^3 - 3abc$  is equal to:

- 1. 108
- 2. 126
- 3. 98
- 4. 116

**Answer:** 2

**Solution:** We know,

$$a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$$

$$= 6[(a^2 + b^2 + c^2) - (ab + bc + ca)]$$

$$= 6[(a + b + c)(a + b + c) - 3(ab + bc + ca)]$$

$$= 6 \times [(6 \times 6) - (3 \times 5)]$$

$$= 6 \times 21$$

$$= 126$$

**Q. (8)** If  $a : b = 2 : 3$ , then  $(5a - 2b) : (5a + 2b)$  is equal to:

- 1. 2:7
- 2. 3:7
- 3. 1:3
- 4. 1:4

**Answer:** 4

**Solution:**  $a/b = \frac{2}{3}$

Therefore,  $b = \frac{3}{2}a$

$$\text{Now, } 5a - 2b = 5a - [2 \times (3/2 a)] = 2a$$

$$5a + 2b = 5a + [2 \times (3/2 a)] = 8a$$

$$\text{Hence, } (5a - 2b) : (5a + 2b) = 2a : 8a = 1 : 4$$

**Q. (9)** A train without stoppage travels with an average speed of 80 km/h and with stoppage, it travels with an average speed of 64 km/h. For how many minutes does the train stop on an average per hour?

1. 8
2. 14
3. 12
4. 10

**Answer:** 3

**Solution:** Without stoppage, average speed = 80 km/h

With stoppages, average speed = 64 km/h

We know that,

$$\text{Time of rest per hour} = [(80 - 64) / 80] \times 60$$

$$= (16/80) \times 60$$

$$= 12 \text{ minutes/hour}$$

Hence, A train stops on an average 12 min per hour.

**Q. (10)** What is the value of x so that the seven-digit number 91876x2 is divisible by 72?

1. 7
2. 3
3. 2
4. 5

**Answer:** 2

**Q. (11)** If  $x + 1/x = 6$  then  $x^2 + 1/x^2$  is equal to:

1. 18
2. 14
3. 16

4. 12

**Answer:** 2

**Solution:**  $x + 1/x = 6$

$$\Rightarrow (x + 1/x)^2 = (6)^2$$

$$\Rightarrow x + 2 + 1/x = 6$$

$$\Rightarrow x + 1/x = 4$$

$$\Rightarrow (x + 1/x)^2 = 4^2$$

$$\Rightarrow x^2 + (2 \cdot x \cdot 1/x) + 1/x^2 = 16$$

$$\Rightarrow x^2 + 1/x^2 = 14$$

**Q. (12)** The ratio of the capacity to do work of A and B is 3: 2. if they together can complete a work in 18 days, then how long does a take to complete the work alone?

1. 20 days
2. 30 days
3. 45 days
4. 25 days

**Answer:** 2

**Solution:**

It is given that the ratio of the capacity to do work of A and B is 3: 2.

They together can complete the work in 18 days.

Let the efficiency of A and B are  $3x$  and  $2x$  respectively.

The sum of their efficiency =  $3x + 2x = 5x$

Therefore, efficiency = work / time

$$\Rightarrow 5x = \text{work} / 18$$

$$\Rightarrow \text{Work} = 90x$$

The efficiency of A is  $3x$  and the total work is  $90x$ .

Therefore,  $3x = 90x / \text{time}$

$$\Rightarrow \text{time} = 90x / 3x = 30 \text{ days}$$

**Q. (13)** If  $a - b = 5$  and  $ab = 6$ , then  $(a^3 - b^3)$  is equal to:

1. 225
2. 155
3. 90
4. 215

**Answer:** 4

**Solution:**

$$(a - b)^3 = a^3 - b^3 - 3ab(a - b)$$

$$\Rightarrow 5^3 = (a^3 - b^3) - (3 \times 6 \times 5)$$

$$\Rightarrow 125 + 90 = a^3 - b^3$$

$$\Rightarrow a^3 - b^3 = 215$$

**Q. (14)** The value of  $15.2 + 5.8 \div 2.9 \times 2 - 3.5 \times 2 \div 0.5$  is equal to:

1. 4.8
2. 3.2
3. 5.2
4. 5.4

**Answer:** 3

**Solution:**  $15.2 + [(5.8 \div 2.9) \times 2] - [(3.5 \times 2) \div 0.5]$

$$= 15.2 + 4 - 14$$

$$= 15.2 - 10$$

$$= 5.2$$

**Q. (15)** Five cubes, each of edge 3 cm are joined end to end. What is the total surface area of the resulting cuboid, in  $\text{cm}^2$ ?

1. 244
2. 280
3. 270
4. 198



**Answer:** 4

**Solution:** The dimensions of the resulting cuboid = 15cm x 3cm x 3cm

Thus, length (l) = 15 cm, breadth (b) = 3 cm and height (h) = 6 cm

Therefore, surface area of the cuboid =  $2(lb + bh + hl)$

$$= 2 [(15 \times 3) + (3 \times 3) + (3 \times 15)]$$

$$= 2 \times (45 + 9 + 45)$$

$$= 198 \text{ cm}^2$$

**Direction Q. (16 - 17):** The Table shows the number of cars sold by three showrooms over a period of six years.

Showroom	Year					
	2011	2012	2013	2014	2015	2016
A	500	480	520	620	650	630
B	450	420	530	480	520	400
C	400	450	460	520	540	430

**Q. (16)** What is the ratio of the total cars sold by showroom B during the years 2014 and 2016 and the total cars sold by showroom C during 2015 and 2016?

1. 86: 97
2. 88: 97
3. 85: 97
4. 88: 95

**Answer:** 2

**Solution:**

The total number of cars sold by showroom B during the years 2014 and 2016 =  $480 + 400$   
= 880

The total number of cars sold by showroom C during the years 2015 and 2016 =  $540 + 430$   
= 970

Hence, the required ratio =  $880 : 970 = 88 : 97$

**Q. (17)** By what percent did the total number of cars sold by all three showrooms decrease during the year 2016, as compared to that in the year 2015 (nearest to one decimal place)?

1. 14.6%
2. 14.8%
3. 14.4%
4. 14.9%

**Answer:** 1

**Solution:**

The total number of cars sold by all three showrooms during the year 2015 =  $650 + 520 + 540$   
= 1710

The total number of cars sold by all three showrooms during the year 2016 =  $630 + 400 + 430$   
= 1460

Hence, the required percentage =  $[(1710 - 1460) / 1710] \times 100\%$   
=  $(250 / 1710) \times 100\% = 14.6\%$

**Q. (18)** The angles of a triangle are  $(x + 5)^\circ$ ,  $(2x - 3)^\circ$  and  $(3x + 4)^\circ$ . The value of  $x$  is equal to:

1. 30
2. 31
3. 29
4. 28

**Answer:** 3

**Solution:** Sum of angles of a triangle =  $180^\circ$

Therefore,  $x + 5 + 2x - 3 + 3x - 4 = 180^\circ$

$$\Rightarrow 6x + 6 = 180^\circ$$

$$\Rightarrow 6x = 174^\circ$$

$$\Rightarrow x = 29^\circ$$

**Q. (19)** If  $x, y$  are acute angles,  $0 < x + y < 90^\circ$  and  $\sin (2x - 20^\circ) = \cos (2y + 20^\circ)$ , then the value of  $\tan (x + y)$  is:

1.  $1/3$
2.  $3/2$
3. 3
4. 1

**Answer:** 4

**Solution:**  $\sin (2x - 20^\circ) = \cos (2y + 20^\circ)$

$$\Rightarrow \sin (2x - 20^\circ) = \sin (90^\circ - 2y - 20^\circ)$$

$$\Rightarrow (2x - 20^\circ) = (90^\circ - 2y - 20^\circ)$$

$$\Rightarrow 2x + 2y = 70^\circ + 20^\circ$$

$$\Rightarrow x + y = 90^\circ/2 = 45^\circ$$

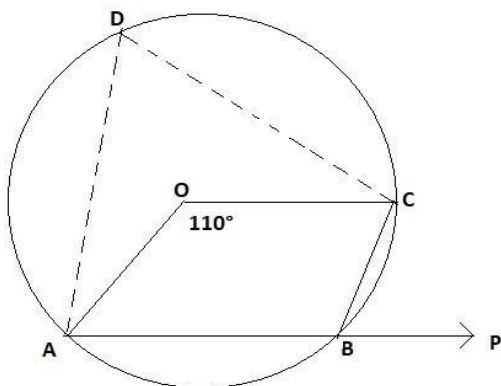
$$\text{Hence, } \tan (x + y) = \tan 45^\circ = 1$$

**Q. (20)** In a circle with centre  $O$ , an arc  $ABC$  subtends an angle of  $110^\circ$  at the centre of the circle. The chord  $AB$  is produced to a point  $P$ . Then  $\angle CBP$  is equal to:

1.  $60^\circ$
2.  $55^\circ$
3.  $65^\circ$
4.  $70^\circ$

**Answer:** 2

**Solution:**



Take any point D on the circumference and join AD and DC.

$$\therefore \angle AOC = 2 \times \angle ADC$$

$$\Rightarrow \angle ADC = 1/2 \times \angle AOC = 1/2 \times 110^\circ = 55^\circ$$

Now,  $\angle CBP = \angle ADC$  [exterior angle of cyclic quadrilateral]

$$\Rightarrow \angle PBC = 55^\circ$$

**Q. (21)** The value of  $\tan 4^\circ \cdot \tan 43^\circ \cdot \tan 47^\circ \cdot \tan 86^\circ$  is:

1. 2
2. 3
3. 1
4. 4

**Answer:** 3

**Solution:**  $\tan 4^\circ \cdot \tan 43^\circ \cdot \tan 47^\circ \cdot \tan 86^\circ$   
 $= \tan 4^\circ \cdot \tan 43^\circ \cdot \tan (90^\circ - 43^\circ) \cdot \tan (90^\circ - 4^\circ)$   
 $= \tan 4^\circ \cdot \tan 43^\circ \cdot \cot 43^\circ \cdot \cot 4^\circ$  [since,  $\tan (90^\circ - \theta) = \cot \theta$ ]  
 $= 1$  [since,  $\tan \theta = 1/\cot \theta$ ]

**Q. (22)** If  $x = a + 1/a$  and  $y = a - 1/a$ , then,  $(x^4 + y^4 - 2x^2y^2)$  is equal to:

1. 4
2.  $16a^2$
3.  $8/a^2$
4. 8

**Answer:** 1

**Solution:**  $x^4 + y^4 - 2x^2y^2 = (x^2 - y^2)^2$   
 $= (x^2 - y^2)$   
 $= (x + y)(x - y)$   
 $= (a + 1/a + a - 1/a)(a + 1/a - a + 1/a)$

$$= 2a \times 2/a$$

$$= 4$$

**Q. (23)** If  $ab + bc + ca = 8$  and  $a^2 + b^2 + c^2 = 20$  then the possible value of

$\frac{1}{2} (a + b + c)[(a - b)^2 + (b - c)^2 + (c - a)^2]$  is:

1. 84
2. 72
3. 56
4. 80

**Answer:** 2

**Solution:**  $\frac{1}{2} (a + b + c)[(a - b)^2 + (b - c)^2 + (c - a)^2]$

$$= \frac{1}{2} (a + b + c)[a^2 - 2ab + b^2 + b^2 - 2bc + c^2 + c^2 - 2ca + a^2]$$

$$= \frac{1}{2} (a + b + c) [2(a^2 + b^2 + c^2) - 2(ab + bc + ca)]$$

$$= \frac{1}{2} (a + b + c) [(2 \times 20) - (2 \times 8)]$$

$$= 12 (a + b + c)$$

Since,  $(a+b+c)^2 = a^2 + b^2 + c^2 + 2(ab+bc+ca)$

$$\text{Hence, } \frac{1}{2} (a + b + c)[(a - b)^2 + (b - c)^2 + (c - a)^2] = 12 [a^2 + b^2 + c^2 + 2(ab + bc + ca)]$$

$$= 12 \times 20 + 16$$

$$= 12 \times 6 = 72$$

**Q. (24)** If  $a + 1/a = 3$ , then,  $(a^4 + 1/a^4)$  is equal to:

1. 81
2. 77
3. 47
4. 27

**Answer:** 3

**Solution:**  $a + 1/a = 3$

$$\Rightarrow (a + 1/a)^2 = 3^2$$

$$\Rightarrow a^2 + (2 \times a \times 1/a) + 1/a^2 = 9$$

$$\Rightarrow a^2 + 1/a^2 = 7$$

$$\text{Now, } (a^2 + 1/a^2)^2 = 7^2$$

$$\Rightarrow a^4 + (2 \times a^2 \times 1/a^2) + 1/a^4 = 49$$

$$\Rightarrow a^4 + 1/a^4 = 49 - 2 = 47$$

**Q. (25)** In triangle ABC,  $AB = AC$ . If  $\angle B = 70^\circ$  then  $\angle A$  is:

1.  $45^\circ$
2.  $80^\circ$
3.  $40^\circ$
4.  $60^\circ$

**Answer:** 3

**Solution:** In  $\triangle ABC$ , If  $AB = AC$  then  $\angle C = \angle B$

Therefore,  $\angle A + \angle B + \angle C = 180^\circ$

$$\angle A = 180^\circ - (\angle B + \angle C)$$

$$= 180^\circ - (70^\circ + 70^\circ)$$

$$= 180^\circ - 140^\circ$$

$$= 40^\circ$$