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SSC CHSL Exam Quantitative Aptitude Question & Answers PDF

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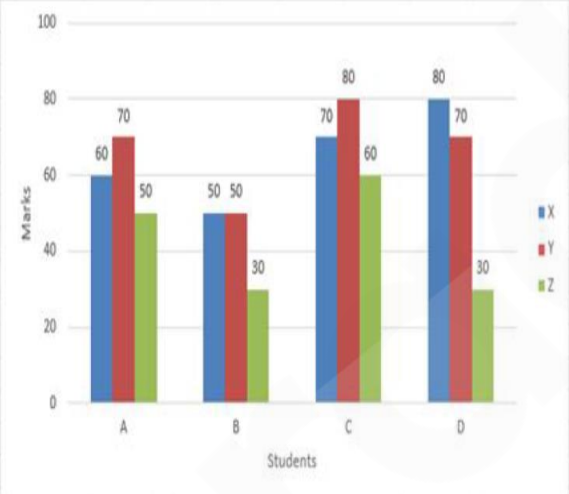
1. For all $\alpha_i^1 s, (i = 1, 2, 3 .....20)$ lying between 0° and 90° , it is given that $\sin\alpha_1 + \sin\alpha_2 + \sin\alpha_3 + ... + \sin\alpha_{20} = 20$ What is the value (in degrees) of $(\alpha_1 + \alpha_2 + \alpha_3 + ... + \alpha_{20})$

A. 1800
B. 900
C. 0
D. 20

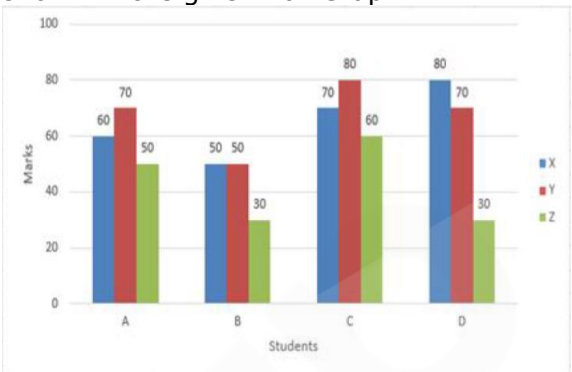
Direction: The full marks for a paper is 300. The break-up of the malts into theory (X). practical (Y) and project (Z), which are the three components of evaluation is 6 : 5 : 4. In order to pass one has to score at least 40%, 50% and 50% respectively in X, Y, Z and 60% in aggregate. The marks scored by four students A, B, C and D are shown in the given Bar Graph.



2. What is the average marks of the four students in theory?

A. 60
B. 65
C. 70
D. 68

Direction: The full marks for a paper is 300 . The break-up of the marks into theory (X), practical (Y) and project (Z), which are the three components of evaluation is 6 : 5 : 4. In order to pass one has to score at least 40%, 50% and 50% respectively in X,Y, Z and 60% in aggregate. The marks scored by four students A, B, C and D are shown in the given Bar Graph.



3. Arrange the students B, C and D according to the ascending order of the aggregate marks scored by them.

A. B, D, C
B. B, C, D
C. C, D, B
D. D, B, C

4. The ten digit number 2x600000y8 is exactly divisible by 24. If x ≠ 0 and y ≠ 0. then the least value of (x + y) is equal to:

A. 5
B. 8
C. 9
D. 2

5. What is the value of $\text{cosec}^2 30° + \sin^2 45° + \sec^2 60° + \tan^2 30°$?

A. $\frac{53}{6}$
B. 8
C. $\frac{25}{3}$
D. 9

6. ΔABC ~ ΔDEF and their perimeters are 64 cm and 48 cm respectively. What is the length AB, if DE is equal to 9 cm?

A. 17.5 cm
B. 16 cm
C. 12 cm
D. 18 cm

7. If $(3x + 1)^3 + (x - 3)^3 + (4 - 2x)^3 + 6(3x + 1)(x - 3)(x - 2) = 0$, then x is equal to:
A. -1
B. $-\frac{1}{2}$
C. 1
D. $\frac{1}{2}$

8. For $0° \le \theta \le 90°$, what is θ, when $\sqrt{3}\cos\theta + \sin\theta = 1$?
A. 90°
B. 0°
C. 45°
D. 30°

9. The average of 1088 real numbers is zero. At most how many of them can be negative?
A. 100
B. 38
C. 544
D. 1087

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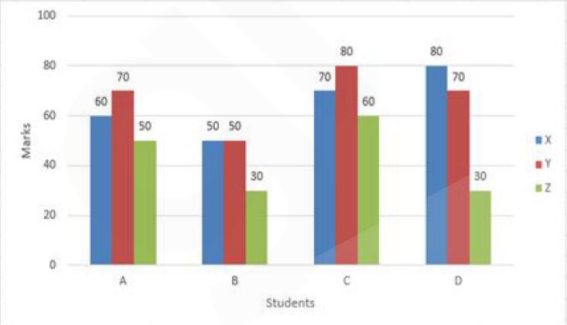
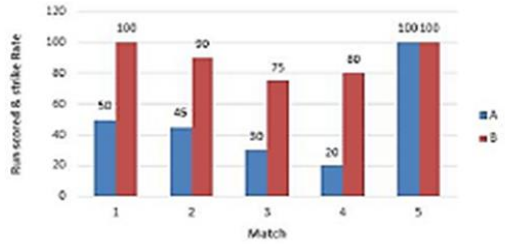


10. Who among the students could not pass?
A. A only
B. B and C
C. B only
D. B and D

11. The perimeter of ΔABC is 24 cm and its side. BC' = 9 cm. AD is the bisector of $\angle BAC$, while I is the incentre. AI : ID is equal to:
A. 7:5
B. 5 :2
C. 3 :2
D. 5:3

12. A man loses 20% by selling an article for Rs.96. For what amount should he have sold the article to gain 15%?
A. Rs. 120
B. Rs. 115
C. Rs. 138
D. Rs. 140

13. The given Bar Graph presents the runs scored (A) and strike rate (B) of a batsman in five matches. Strike Rate is the number of runs scored per 100 balls faced. The strike rate (B) is taken on record only when the batsman scores at least 30 runs in a match.



What is the average run scored by the batsman in the five matches?
A. 50
B. 49
C. 45
D. 56.25

14. The simplified value of $\frac{1.0025 + 6.25 \times 10^{-6}}{0.0025 + 0.95}$ is:
A. 1.0025
B. 1.0525

C. 1.0005
D. 1.0505

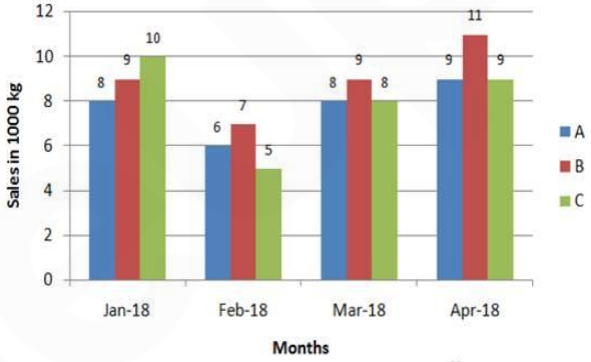
15. If $(3x+1)^3 + (x-3)^3 + (2x-4)^3 = 6(3x+1)(x-3)(x-2)$, then x is equal to:
A. 3
B. 1
C. 2
D. $-\frac{1}{3}$

16. If a : b : c = 1 : 3 : 5. what is the value of $\frac{4a-b+2c}{3(a+b+c)}$?
A. $\frac{8}{27}$
B. $\frac{10}{27}$
C. $\frac{11}{27}$
D. $\frac{1}{3}$

17. If A, B and C can respectively complete a piece of work in 20, 24 and 36 days respectively, how many days will they take to complete the work, if they work together?
A. $8\frac{16}{43}$
B. $6\frac{1}{4}$
C. $9\frac{1}{4}$
D. $7\frac{19}{20}$

18. If θ is an acute angle. and it is given that 5 $\sin\theta$ + 12 $\cos\theta$=13, then what is the value of $\tan\theta$?
A. $\frac{5}{13}$
B. $\frac{13}{12}$
C. $\frac{12}{13}$
D. $\frac{5}{12}$

19. The given Bar Graph presents the sale (in 1000 kg) of a particular brand of tea by three outlets, A, B and C during the months Jan, Feb, Mar and Apr, 2018.



What is the ratio of rate of growth in sales from B to the rate of growth in sales from C in Mar 2018 with reference to its previous month?
A. 9 : 16
B. 10 : 19
C. 9 : 19
D. 10 : 21

20. The circumcenter, in Centre, orthocenter and the centroid of a triangle are one and the same point. The triangle must be: (a) isosceles (b) right-angled (c) right- angled isosceles (d) equilateral
A. (a)
B. (d)
C. (b)
D. (c)

21. Which among the following increases continuously in the range 0° < θ < 90° ?
A. cot θ
B. cosec θ
C. tan θ

D. $\cos\theta$

22. The value of the expression $\frac{1}{4}\left\{\left(a+\frac{1}{a}\right)^2-\left(a-\frac{1}{a}\right)^2\right\}$.

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. 1

D. 4

23. For θ being an acute angle, it is given that- $3\left(cosec^2\theta+cot^2\theta\right)=5$ then θ is equal to:

A. 45°

B. 60°

C. 0°

D. 30°

24. Two items are sold for Rs.18,602, each at the same sold price. On one item there has been a gain of 31% and on the second item a loss of 29%. What was the overall loss or gain in the transaction?

A. Loss 7.91%

B. Loss 8.25%

C. Gain 8.25%

D. Gain 7.91%

25. In a stadium an athlete is running on a circular path with uniform speed during a practice session. The angle covered by him during one second is found to be 10° by a coach observing him from the centre of the circular track. What would be the measure of angle (in degrees) described by the athlete by an observer standing in the opposite side on the circle?

A. 5°

B. It depends on the exact position of the observer on the circle

C. 10°

D. 20°

###ANSWERS###

1. Ans. A.
Here
$sin\alpha_1 + sin\alpha_2 + \cdots \ldots \ldots . + sin\alpha_{20} = 20$
Here there are total 20 values and this will sum up 20 if all these values are equal to 1
⇒
$sin\alpha_1 = 1, sin\alpha_2 = 1, \ldots \ldots \ldots . sin\alpha_{20} = 1$
$\Rightarrow sin90° = 1$
Hence
$\alpha_1, \alpha_2, \alpha_3 \ldots \ldots \ldots \alpha_{20} = 90°$
⇒ (90+ 90 + ……. + 90)
= 20 × 90
= 1800
2. Ans. B.
Total Marks in theory = 60 + 50 + 70 + 80
Average marks in theory :
$$\frac{60 + 50 + 70 + 80}{4} = \frac{260}{4} = 65$$
3. Ans. A.
Aggregate marks scored by :
A = 60+70+ 50 = 180
B = 50 + 50 + 30 = 130
C = 70 + 80 + 60 = 210
D = 80 + 70 + 30 = 180
In ascending order :
B < D < C
4. Ans. A.
The ten digit number 2x600000y8 is exactly divisible by 24.
The factors of 24 are = 8 × 3
Divisibility of 8 : last three digits of the numbers must be divisible by 8
Then 0y8 must be divisible by 8
⇒ **y = 4** as 048 or y = 8 as 088; are divisible by 8
Divisibility of 3 : the sum of the digits of the number must be divisible by 3
(i) y = 4; 2 + x + 6 + 0 + 4 + 8 = 20 + x must be divisible by 3
⇒ **x = 1**
(ii) y = 8 ; 2 + x + 6 + 0 + 8 + 8 = 24 + x must be divisible by 3
⇒ **x = 0**
But according to the question; x cannot be zero.
So, (x+y) = 4 + 1 = 5
5. Ans. A.
The value of
$cosec^2 30° + sin45° + \sec^2 60° + \tan^2 30°$
Putting the values of trigonometric angles:
$$(2)^2 + \left(\frac{1}{\sqrt{2}}\right)^2 + (2)^2 + \left(\frac{1}{\sqrt{3}}\right)^2$$
$$4 + \frac{1}{2} + 4 + \frac{1}{3} = 8 + \frac{5}{6} = \frac{53}{6}$$
6. Ans. C.
We know that, ΔABC ~ ΔDEF
Then
$$\frac{AB}{DE} = \frac{per(ABC)}{per(DEF)}$$
$$\frac{AB}{9} = \frac{64}{48}$$
$$AB = \frac{64 \times 9}{48}$$
$$AB = 12\ cm$$
7. Ans. A.
Here
$(3x + 1)^3 + (x - 3)^3 + (4 - 2x)^3 + 6(3x + 1)(x - 3)(x - 2) = 0$
$(3x + 1)^3 + (x - 3)^3 + (4 - 2x)^3 - 3(3x + 1)(x - 3)(4 - 2x) = 0$
$(3x + 1)^3 + (x - 3)^3 + (4 - 2x)^3 = 3(3x + 1)(x - 3)(4 - 2x)$
We know,
$a^3+b^3+c^3=3abc$
if (a + b + c) = 0
Here,
(3x + 1) + (x - 3) + (4 - 2x) = 0
2x + 2 = 0
x = -1
8. Ans. A.
$\sqrt{3}cos\theta + sin\theta = 1$
When **θ = 90°;** Then
$\sqrt{3}\cos(90°) + sin90° = 1$
√ 3(0) + 1 = 1
hence LHS = RHS
9. Ans. D.
Average is given by:

$$\frac{x_1 + x_2 + \cdots \ldots \ldots \ldots + x_{1088}}{1088} = 0$$

$$\Rightarrow x_1 + x_2 + \cdots \ldots \ldots \ldots + x_{1088} = 0$$

If one number is 1088 then at most 1087 numbers can be negative.

10. Ans. D.

The value of practical, theory and project respectively.

Theory = $\frac{6}{15} \times 300 = 120$

Practical = $\frac{5}{15} \times 300 = 100$

Project = $\frac{4}{15} \times 300 = 80$

In order to pass one has to score at least 40%. 50% and 50% respectively in X, Y, Z and 60% in aggregate.

⇒ theory : 40% of 120 = 48

Practical : 50% of 100 = 50

Project : 50% of 80 = 40

Aggregate marks = 60% of 300 = 180

Here total marks of A = 180 ……..Pass

Total marks of B = 130 …… fail

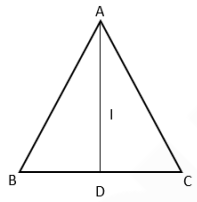
Total mark of C = 210 …….. Pass

Total marks of D = 180 but minimum marks for project = 40

But D has scored 30 marks in project …….. Fail

B and D are fail.

11. Ans. D.



We know, the in-centre divides the line AD in the ratio -

$$\frac{AI}{ID} = \frac{AB + AC}{BC}$$

Here perimeter = 24 cm

AB + BC + CA = 24

AB + AC = 24 – 9 = 15

$$\frac{AI}{ID} = \frac{15}{9} = \frac{5}{3}$$

Ratio AI : ID = 5 : 3

12. Ans. C.

Here selling price = Rs 96

Loss% = 20%

CP = $\frac{100 \times SP}{100 - loss\%} = \frac{100 \times 96}{100 - 20} = \frac{9600}{80} = Rs.120$

Given;

Gain% must be = 15%

For that selling price:

SP = $\frac{((100 + Profit\%) \times CP)}{100} = \frac{(100+15) \times 120}{100}$

SP = $\frac{115 \times 120}{100} = Rs.138$

13. Ans. B.

Total runs scored = 50 + 45 + 30 + 20 + 100

= 245

Average score $= \frac{245}{5} = 49$.

14. Ans. B.

$$\frac{1.0025 + 6.25 \times 10^{-6}}{0.0025 + 0.95}$$

$$= \frac{10025 \times 10^{-4} + 0.0625 \times 10^{-4}}{25 \times 10^{-4} + 9500 \times 10^{-4}}$$

$$= \frac{10025 + 0.0625}{9525}$$

$= 1.0525$.

15. Ans. B.

$$(3x+1)^3 + (x-3)^3 + (2x-4)^3 = 6(3x+1)(x-3)(x-2)$$

$$(3x+1)^3 + (x-3)^3 + (2x-4)^3 = 3(3x+1)(x-3)(2x-4)$$

Let $a = 3x+1$, $b = x-3$, $c = 2x-4$

We know that –

If $a+b+c=0$ then $a^3 + b^3 + c^3 = 3abc$

Comparing this equation, we get-

$a+b+c=0$

$3x+1+x-3+2x-4=0$

$6x-6=0$

$x=1$.

16. Ans. C.

$a:b:c = 1:3:5$

Let $a=k$, $b=3k$, $c=5k$

Putting these values in the given expression;

$$\frac{4a-b+2c}{3(a+b+c)}$$

$$= \frac{4k-3k+10k}{3(k+3k+5k)}$$

$$= \frac{11k}{27k}$$

$$= \frac{11}{27}.$$

17. Ans. A.

Let total work = LCM (20, 24, 36) = 360

Efficiency of A = $\frac{360}{20}=18$

Efficiency of B = $\frac{360}{24}=15$

Efficiency of C = $\frac{360}{36}=10$

Total efficiency (A + B + C) = 18 + 15 + 10 = 43

Time taken = $\frac{360}{43}=8\frac{16}{43}$.

18. Ans. D.

If $a\sin\theta+b\cos\theta=c$ then a, b & c are Pythagorean triplets.

When we compare,

$\sin^2\theta+\cos^2\theta=1$ (Trigonometric Identity)

With,

$5\sin\theta+12\cos\theta=13$

$$\frac{5}{13}\sin\theta+\frac{12}{13}\cos\theta=1$$

Then, $\sin\theta=\frac{5}{13}, \cos\theta=\frac{12}{13}$

$$\tan\theta=\frac{a}{b}=\frac{5}{12}.$$

19. Ans. D.

Sale of B in march = 9

Sale of B in Feb = 7

Increase = 9 – 7 = 2

Sales of C in March = 8

Sales of C in Feb = 5

Increase = 8 – 5 = 3

Ratio of Increase rate B : C = $\frac{2/7}{3/5}=10/21$

20. Ans. B.

We know that in the equilateral triangle, circumference, incentre, orthocenter and the centroid are one and the same point.

21. Ans. C.

Value of $\tan\theta$ increases continuously in the range $0°<\theta<90°$.

$\tan 0°=0$

$$\tan 30°=\frac{1}{\sqrt{3}}$$

$\tan 60°=\sqrt{3}$

$\tan 90°=\infty$

22. Ans. C.

$$\frac{1}{4}\left\{\left(a+\frac{1}{a}\right)^2-\left(a-\frac{1}{a}\right)^2\right\}$$

$$= \frac{1}{4}\left\{a^2+\frac{1}{a^2}+2-\left(a^2+\frac{1}{a^2}-2\right)\right\}$$

$$= \frac{1}{4}\{4\}$$

= 1.

23. Ans. B.

We know that-

$\operatorname{cosec}^2\theta-\cot^2\theta=1$

Or, $\operatorname{cosec}^2\theta=1+\cot^2\theta$

In the given equation

$3\left(\operatorname{cosec}^2\theta+\cot^2\theta\right)=5$

$3\left(1+\cot^2\theta+\cot^2\theta\right)=5$

$3\left(1+2\cot^2\theta\right)=5$

$3+6\cot^2\theta=5$

$6\cot^2\theta=2$

$\cot^2\theta=\frac{1}{3}$

$\cot\theta = \frac{1}{\sqrt{3}} = \cot 60°$

Therefore, $\theta = 60°$.

24. Ans. A.

Let cost price of both article is = 100

C.P$_1$ = 100, SP$_1$ = 131

C.P.$_2$ = 100, SP$_2$ = 71

We will make the SP same:

CP$_1$ = 100×71, SP$_1$ = 131 × 71 = 9301

CP$_2$ = 100×131, SP$_2$ = 71 × 131 = 9301

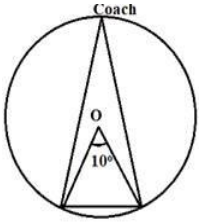
Total CP = 7100 + 13100 = 20200

Total SP = 18602

Loss = 20200 – 18602 = 1598

% Loss = $\frac{1598}{20200} \times 100 = 7.91\%$.

25. Ans. A.



Let O be the centre of circle.

If the coach stands on the circle then

Angle = $\frac{10}{2}$ =5°

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