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SSC CGL Pre

Solution

SCP-9I3604808-E



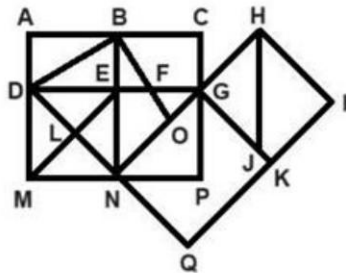
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General Intelligence and Reasoning

1. Solution: B



Triangles in the figure: ABD, BDE, BEF, BDF, FOG, ENG, BON, DLE, DLM, LMN, LNE, MEN, DEN, MED, DMN, DBN, NGP, GHJ and DNG.

So, there are 19 triangles in the given figure.

2. Solution: C

Clues:

- 1) V lives two floors above P.
- 2) Only two persons live between V and T.
- 3) U lives immediately above T.

Inference:

From clue 1, 2 and 3, we get P lives either on 1st or 2nd floor. V lives either on 3rd or 4th floor. T lives either on 6th or 7th floor and U lives either on 7th or 8th floor.

Case 1: When P lives on 1st floor.

Floor	Person
8	
7	U
6	T
5	
4	
3	V
2	
1	P

Case 2: When P lives on 2nd floor.

Floor	Person
8	U
7	T
6	
5	
4	V
3	
2	P
1	

Clues:

- 1) Q lives immediately below R.
- 2) Only two persons live between R and S.
- 3) S lives below W.

Inference:

From Clue 1, we get Q lives either on 4th or 5th floor. R lives either on 5th or 6th floor.

From Clue 2, we get S lives either on 2nd or 3rd floor.

From Clue 3, we eliminate Case 2 as we cannot place W. W lives on 8th floor.

Therefore, the final arrangement is given below:

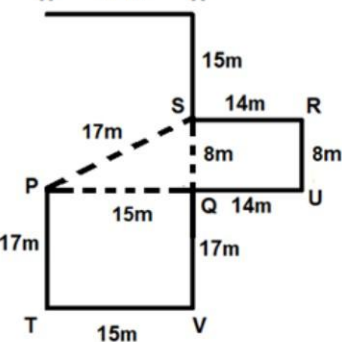
Floor	Person
8	W
7	U
6	T
5	R
4	Q
3	V
2	S
1	P

So, R lives on 5th floor.

3. Solution: D

P - T (17m) means P is 17m north of T.
V × T (15m) means V is 15m east of T.
V ÷ Q (17m) means V is 17m south of Q.
Q + U (14m) means Q is 14m west of U.
R - U (8m) means R is 8m north of U.
S + R (14m) means S is 14m west of R.
× - S (15m) means X is 15m north of S.
X × W (15m) means X is 15m east of W.

The final figure is given below:



4. Solution: B

I. 'sour sweet grape vine' is coded as 'bq, iz, ja, nt'.
II. 'vine grape length' is coded as 'bq, iz, pb'.
III. 'jump sour grape' is coded as 'bq, ja, cp'.
From statement I, II and III, 'grape' is coded as 'bq'.
From statement I and II, 'vine' is coded as 'iz'.
From statement I and III, 'sour' is coded as 'ja'.
From statement I alone, 'sweet' is coded as 'nt'.
From statement II alone, 'length' is coded as 'pb'.
From statement III alone, 'jump' is coded as 'cp'.
So, the word and their respective code are as follows,

Word	grape	vine	sour	sweet	length	jump
Code	bq	iz	ja	nt	pb	cp

So, 'sweet length jump' is coded as 'nt, pb, cp'.

5. Solution: B

Given equation: $225 * (5 * 27 * 22.5) * 16 * 5 * 27$
After replacing '*' with mathematical sign given in option 'a' we get:

225 + (5 × 27 + 22.5) - 16 × 5 = 27

LHS:

= 225 + (135 + 22.5) - 16 × 5
= 225 + 157.5 - 16 × 5
= 225 + 157.5 - 80
= 382.5 - 80
= 302.5

LHS ≠ RHS

So, sign given in option 'a' will not balance the equation.

After replacing '*' with mathematical sign given in option 'b' we get:

225 ÷ (5 × 27 - 22.5) × 16 - 5 = 27

LHS:

= 225 ÷ (135 - 22.5) × 16 - 5
= 225 ÷ 112.5 × 16 - 5
= 2 × 16 - 5
= 32 - 5
= 27

LHS = RHS

So, sign given in option 'b' will balance the equation.

After replacing '*' with mathematical sign given in option 'c' we get:

225 × (5 + 27 - 22.5) ÷ 16 = 5 × 27

LHS:

= 225 × (5 + 27 - 22.5) ÷ 16
= 225 × (32 - 22.5) ÷ 16
= 225 × 9.5 ÷ 16
= 133.59

LHS ≠ RHS

So, sign given in option 'c' will not balance the equation.

After replacing '*' with mathematical sign given in option 'd' we get:

225 - (5 × 27 - 22.5) + 16 × 5 = 27

LHS:

= 225 - (135 - 22.5) + 16 × 5
= 225 - 112.5 + 16 × 5
= 225 - 112.5 + 80
= 305 - 112.5
= 192.5

LHS ≠ RHS

So, sign given in option 'd' will not balance the equation.

6. Solution: B

The logic followed here is:

The 1st, 2nd and 3rd letters are the immediate, 2nd and 3rd succeeding letter as per the English alphabetical series and the 4th, 5th and 6th letter are the immediate, 2nd and 3rd preceding letters as per the English alphabetical series.

For 'GROUND',

Table with 2 rows and 6 columns containing letters G, R, O, U, N, D and their corresponding shifts +1, +2, +3, -1, -2, -3 to form H, T, R, T, L, A.

So, 'GROUND' is coded as 'HTRTLA'.

For 'TROPHY',

Table with 2 rows and 6 columns containing letters T, R, O, P, H, Y and their corresponding shifts +1, +2, +3, -1, -2, -3 to form U, T, R, O, F, V.

So, 'TROPHY' is coded as 'UTROFV'.

Similarly, for 'CAVITY',

Table with 2 rows and 6 columns containing letters C, A, V, I, T, Y and their corresponding shifts +1, +2, +3, -1, -2, -3 to form D, C, Y, H, R, V.

So, 'CAVITY' is coded as 'DCYHRV'.

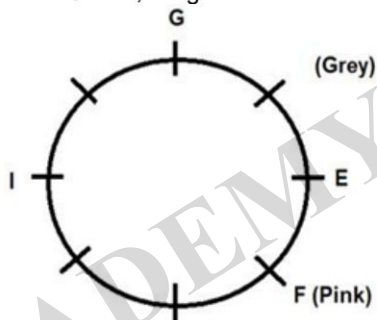
7. Solution: C

Clues:

- 1) I sits second to the right of G.
- 2) G sits immediate right of the one, who likes Grey.
- 3) Only one person sits between G and E.
- 4) F, who likes Pink, sits adjacent to E.

Inference:

From Clue 1 and 2, we get G sits 2nd to the left of I and the one, who likes Grey, sits 3rd to the left of I. From Clue 3, we get E sits 2nd to the left of G. From Clue 4, we get F sits immediate left of E.

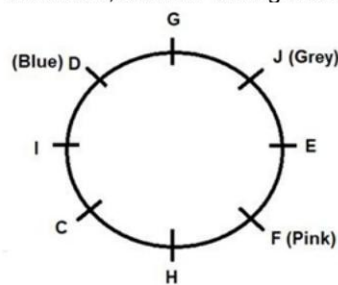


Clues:

- 1) H sits immediate right of C.
- 2) The one, who likes Blue, sits second to the left of C.
- 3) J doesn't like Blue.

Inference:

From Clue 1, we get H sits immediate left of F and C sits 2nd to the left of F. From Clue 2, we get the one, who likes Blue, sits immediate left of I. From Clue 3, we get D likes Blue and J likes Grey. Therefore, the final arrangement is given below:



So, D sits third to the right of E.

8. Solution: B

The logic followed here is as follows,

125 + 12 = 137
137 + 14 = 151
151 + 16 = 167
167 + 18 = 185
185 + 20 = 205
205 + 22 = 227

So, '227' will replace the question mark in the given series.

9. Solution: B

The logic followed here is the second number is equal to the product of first number and first number plus '2'. In 27: 783

$$27 \times (27 + 2) = 27 \times 29 = 783$$

Similarly, in 19: ?

$$19 \times (19 + 2) = 19 \times 21 = 399$$

$$? = 399$$

10. Solution: B

The pattern followed here is:

In each of the given option, there are two figures inside the square. The number of edges in the two given figures, except in option 'B', are different.

11. Solution: C

The logic followed here is:

The 2nd number is the sum of the product of the 1st and 2nd digit of the 1st number and the product of 2nd and 3rd digit of 1st number. The 3rd number is the cube of the sum of the 1st and 2nd digit of the 2nd number.

In every row,

In Row 1,

$$1^{\text{st}} \text{ number} = 468, 2^{\text{nd}} \text{ number} = [(4 \times 6) + (6 \times 8)]$$

$$= [24 + 48] = 72, 3^{\text{rd}} \text{ number} = (7 + 2)^3 = 729$$

In Row 3,

$$1^{\text{st}} \text{ number} = 372, 2^{\text{nd}} \text{ number} = [(3 \times 7) + (7 \times 2)]$$

$$= [21 + 14] = 35, 3^{\text{rd}} \text{ number} = (3 + 5)^3 = 512$$

Similarly,

In Row 2,

$$1^{\text{st}} \text{ number} = 384, 2^{\text{nd}} \text{ number} = [(3 \times 8) + (8 \times 4)]$$

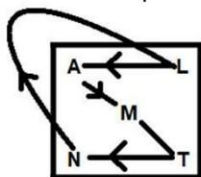
$$= [24 + 32] = 56, 3^{\text{rd}} \text{ number} = (5 + 6)^3 = 1331$$

So, '56' will come in place of question mark.

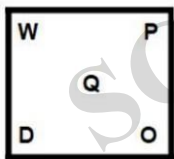
12. Solution: C

The logic followed here is as follows:

Each letter is replaced by its immediate succeeding letter as per English alphabetical series and the letters after replacement are moving as shown below.



The figure that will replace the question mark is as follows:



13. Solution: C

The logic followed here is:

From the left end, the 2nd letter is immediately preceding letter of the 1st letter and the 3rd letter is 5th succeeding letter of the 1st letter as per the English alphabetical series.

In option 'A', 'AZF':

$$A - 1 = Z, A + 5 = F$$

In option 'B', 'GFL':

$$G - 1 = F, G + 5 = L$$

In option 'C', 'RSX':

$$R - 1 = Q \neq S, R + 5 = W \neq X$$

In option 'D', 'YXD':

$$Y - 1 = X, Y + 5 = D$$

So, all of the above options, except option 'C', follow the same pattern.

14. Solution: B

The relationship between the numbers in the given sets is:

$$(58 + 29) \times 2 = 174,$$

$$(62 + 33) \times 2 = 190.$$

Using the same logic, the correct option is $(74 + 31) \times 2 = 210$.

15. Solution: A

The first letter and the second letter in each letter cluster are replaced by the fourth succeeding letter, as per English alphabetical order.

The third letter in each letter cluster is replaced by immediate preceding letter, as per English alphabetical order.

So,

$$G + 4 = K, K + 4 = O, O + 4 = S, S + 4 = W, W + 4 = A$$

$$X + 4 = B, B + 4 = F, F + 4 = J, J + 4 = N, N + 4 = R$$

$$Q - 1 = P, P - 1 = O, O - 1 = N, N - 1 = M, M - 1 = L$$

So, 'ARL' will replace the question mark in the given series.

16. Solution: B

The logic followed here is:

$$2^{\text{nd}} \text{ number} = (1^{\text{st}} \text{ number} + 3^{\text{rd}} \text{ number}) \div 5$$

In (66, 31, 89) :

$$2^{\text{nd}} \text{ number} = 31, 1^{\text{st}} \text{ number} = 66, 3^{\text{rd}} \text{ number} = 89$$

$$= (66 + 89) \div 5$$

$$= 155 \div 5$$

$$= 31$$

In (32, 17.8, 57)

$$2^{\text{nd}} \text{ number} = 17.8, 1^{\text{st}} \text{ number} = 32, 3^{\text{rd}} \text{ number} = 57$$

$$= (32 + 57) \div 5$$

$$= 89 \div 5$$

$$= 17.8$$

In option 'A', (60, 25, 75) :

$$2^{\text{nd}} \text{ number} = (60 + 75) \div 5$$

$$= 135 \div 5$$

$$= 27$$

$$27 \neq 25$$

In option 'B', (28, 24.8, 96) :

$$2^{\text{nd}} \text{ number} = (28 + 96) \div 5$$

$$= 124 \div 5$$

$$= 24.8$$

$$24.8 = 24.8$$

In option 'C', (12, 41, 70) :

$$2^{\text{nd}} \text{ number} = (12 + 70) \div 5$$

$$= 82 \div 5$$

$$= 16.4$$

$$16.4 \neq 41$$

In option 'D', (21, 10, 79) :

$$2^{\text{nd}} \text{ number} = (21 + 79) \div 5$$

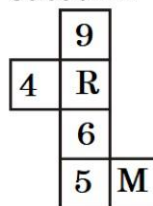
$$= 100 \div 5$$

$$= 20$$

$$10 \neq 20$$

So, only the set of the numbers given in option 'B' are related in the same way as are the numbers of the given set.

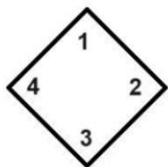
17. Solution: C



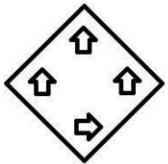
'M' will come on the face opposite to the face containing '4'.

18. Solution: A

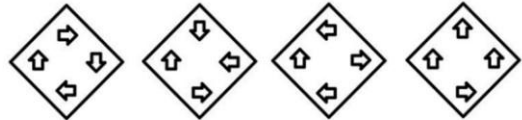
The pattern followed here is:



The arrow at 1st position is rotating 90° in clockwise direction from one figure to the next figure.
The arrow at 2nd position is rotating 90°, 180°, 270° and so on in clockwise direction from one figure to the next figure.
The arrow at 3rd position is rotating 180° from one figure to the next figure.
The arrow at 4th position remains same in every figure.
So, the figure given in option 'a' completes the figure series.



The complete series is:



19. **Solution: B**

Here is the logic behind the relationships of the given number pairs:
 $17^3 = 4913$, $4913 + 1 = 4914$
 $13^3 = 2197$, $2197 + 1 = 2198 \neq 2199$
 $14^3 = 2744$, $2744 + 1 = 2745$
 $12^3 = 1728$, $1728 + 1 = 1729$
Number pair (B) is the odd one out as it does not follow the same pattern as the others.

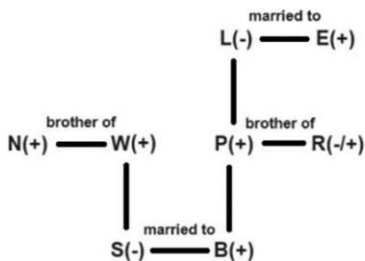
20. **Solution: C**

The mirror image of the given combination is as follows:

N K g H 2 4 5 @ & k n n x j 8 @ 2 4 S H p X I I

21. **Solution: B**

After decoding the code, we get:
N - W means N is the brother of W.
W ÷ S means W is the father of S.
S + B means S is the wife of B.
B × P means B is the son of P.
P × L means P is the son of L.
L + E means L is the wife of E.
E ÷ R means E is the father of R.
The family tree formed after decoding the code is given below:



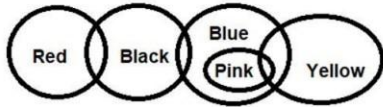
Therefore, W's son-in-law is B and B is the nephew of R.

22. **Solution: C**

'Frightened' is the synonym of 'Scared', similarly, 'Enormous' is the synonym of 'Large'.

23. **Solution: A**

The following Venn diagram can be drawn from the given statements,



From the above Venn diagram, conclusion I and conclusion II follows.

From the above Venn diagram, conclusion III does not follow.

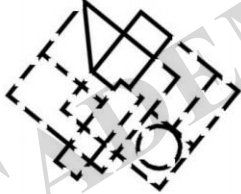
So, only conclusions I and II follow.

24. **Solution: C**

The correct dictionary order will be:
6- Disburse, 1- Discount, 5- Disown, 3- Dissect, 2- Dissolve, 4- Disturb
So, '6, 1, 5, 3, 2, 4' represents the correct dictionary order.

25. **Solution: C**

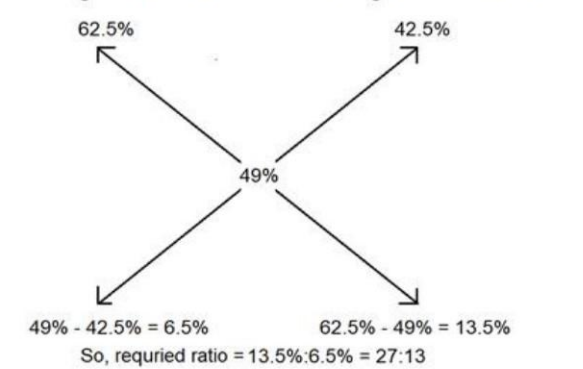
The embedded figure is shown below:



Quantitative Aptitude

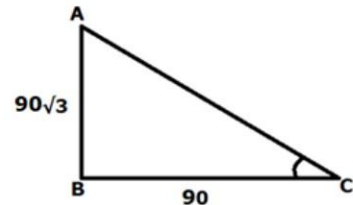
26. **Solution: B**

Percentage of acid in mixture 'A' = $(5/8) \times 100 = 62.5\%$
Percentage of acid in mixture 'B' = 42.5%
Percentage of acid in new mixture = $100 - 53 = 47\%$
Using alligation, we have;
Percentage of acid in mixture 'A' Percentage of acid in mixture 'B'



So, x:y = 27:13
So, required sum = 27 + 13 = 40

27. **Solution: B**



Let AB be the height of building and BC be the length of shadow of building.
Let 'C' be the angle (in degree) of the elevation of sun.

In triangle ABC, $\tan C = (AB/BC)$

Or, $\tan C = (90/\sqrt{3} \div 90)$

Or, $\tan C = \sqrt{3}$

So, $\tan C = \tan 60^\circ$

Therefore, angle of elevation of sun is 60° .

28. **Solution: A**

Volume of hemisphere = $(2/3) \times \pi \times \text{radius}^3$

Volume of sphere = $(4/3) \times \pi \times \text{radius}^3$

Let required number of spheres be 'N'.

So, $N \times (4/3) \times (22/7) \times (3/2)^3 = (2/3) \times (22/7) \times 21^3$

Or, 'N' = $343 \times 4 = 1,372$

29. **Solution: C**

'p' = $\sqrt{784} \div 2 + 90 \div 3 + 68 \div 17$

= $28 \div 2 + 30 + 4$

= $14 + 34 = 48$

'q' = $24 \times 21 \div 7 - 8^2 + 88$

= $24 \times 3 - 64 + 88$

= $72 + 24 = 96$

Required value = $p + q = 48 + 96 = 144$

30. **Solution: C**

We know that,

Volume of a pyramid = $(1/3) \times \text{area of the base} \times \text{height of the pyramid}$

Since, base is of the form of equilateral triangle therefore, its area = $(\sqrt{3}/4) \times 12^2$

Required volume = $(1/3) \times (\sqrt{3}/4) \times 12 \times 12 \times 8$
= $96\sqrt{3} \text{ cm}^3$

31. **Solution: B**

When two dice are rolled together at once, total number of possible events = $6^2 = 36$

Favourable events = $\{(4,6), (5,5), (5,6), (6,4), (6,5), (6,6)\}$

So, number of favourable events = 6

Therefore, required probability = $(6/36) = (1/6)$

32. **Solution: C**

Given that, $2x + (1/9x) = 5$

Multiplying on both sides by $(9/2)$

$9x + (1/2x) = (45/2)$

Squaring both sides, we have;

$\{9x + (1/2x)\}^2 = (45/2)^2$

Or, $(9x)^2 + 2 \times 9x \times (1/2x) + (1/2x)^2 = (2025/4)$

Or, $81x^2 + 9 + (1/4x^2) = (2025/4)$

Or, $81x^2 + (1/4x^2) + 9 - (2025/4) = 0$

Or, $81x^2 + (1/4x^2) - (1989/4) = 0$

On adding 51 on both sides, we have

$81x^2 + (1/4x^2) - (1989/4) + 51 = 51$

So, $81x^2 + (1/4x^2) - \{(1989 - 204)/4\} = 51$

Or, $81x^2 + (1/4x^2) - (1785/4) = 51$

33. **Solution: C**

$\text{cosec}^6\theta - \cot^6\theta$

= $(\text{cosec}^2\theta)^3 - (\cot^2\theta)^3$

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

= $(\text{cosec}^2\theta - \cot^2\theta)^3 + 3\text{cosec}^2\theta\cot^2\theta \times (\text{cosec}^2\theta - \cot^2\theta)$

= $(1)^3 + 3\text{cosec}^2\theta\cot^2\theta \times (1)$

= $1 + 3\text{cosec}^2\theta\cot^2\theta$

= $1 + \frac{3}{\sin^2\theta} \times \frac{\cos^2\theta}{\sin^2\theta}$

= $1 + \frac{3\cos^2\theta}{\sin^4\theta}$

34. **Solution: D**

Simple interest = Principal $\times$ rate $\times$ time $\div$ 100 (time is in years)

Time period of loan = $10 + 31 + 30 + 13 = 84$ days

= $(84/365)$ years

Therefore, interest = $8,906 \times 15 \times (84/365) \div 100$
= ₹307.44

35. **Solution: C**

On Tuesday,

Let the number of palm candies sold = 'x'

Then, number of cotton candies sold = $(x + 48)$

According to the data, $x + x + 48 = 2x + 48 = 128$

So, $x = (128 - 48) \div 2 = 40$

Therefore, number of cotton candies sold on Tuesday = $40 + 48 = 88$

On Thursday,

Let the number of palm candies sold = 'y'

Then, number of cotton candies sold = $(y + 16)$

According to the data, $y + y + 16 = 2y + 16 = 128$

So, $y = (128 - 16) \div 2 = 56$

So, required ratio = $88:56 = 11:7$

36. **Solution: D**

Value of bike when Rohit bought it = ₹3,25,000

Value of bike when Rohit sold it = $3,25,000 \times 0.8$

= ₹2,60,000

Selling price of the bike for Rohit = $2,60,000 \times 1.25$
= ₹3,25,000

Value of the bike when Rohan sold it = $3,25,000 \times (0.8)^2 = ₹2,08,000$

So, profit earned by Rohan = $3,00,000 - 2,08,000$
= ₹92,000

37. **Solution: C**

In a cyclic quadrilateral sum of opposite angles is supplementary.

i.e. $\angle P + \angle R = 180^\circ$

Or, $2x + x + 60 = 180$

Or, $3x = 120$

Or, 'x' = 40

Again, $y - 40 + y + 20 = 180^\circ$

Or, $2y = 200$

Or, 'y' = 100

Required value = $(3 \times 100) - (5 \times 40) = 300 - 200$
= 100

38. **Solution: A**

The perpendicular from the centre of the circle to its chord, bisects the chord.

So, $AC = CB = (24/2) = 12 \text{ cm}$

Similarly, $DF = FE$

In right $\triangle AOC$, using Pythagoras theorem,

$AO^2 = AC^2 + CO^2$

Or, $13^2 = 12^2 + CO^2$

So, $CO^2 = 169 - 144 = 25$

Or, $CO = \sqrt{25} = 5 \text{ cm}$

And, $OF = CF - CO = 5 + 4\sqrt{5} - 5 = 4\sqrt{5} \text{ cm}$

In right $\triangle DOF$, using Pythagoras theorem,

$DO^2 = DF^2 + OF^2$

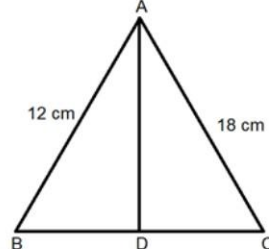
So, $DF^2 = 13^2 - (4\sqrt{5})^2$

Or, $DF^2 = 169 - 80 = 89$

So, $DF = \sqrt{89} \text{ cm}$

$DE = DF + FE = 2DF = 2\sqrt{89} \text{ cm}$

39. **Solution: A**



Since, $BD = DC$, AD is the median.

$$BC = 48 - 12 - 18 = 18 \text{ cm}$$

$$\text{So, } BD = 18 \div 2 = 9 \text{ cm}$$

And, $AB^2 + BC^2 = 2 \times (AD^2 + BD^2)$ {Using Apollonius theorem}

$$\text{So, } 12^2 + 18^2 = 2 \times (AD^2 + 9^2)$$

$$\text{Or, } 144 + 324 = 2 \times (AD^2 + 81)$$

$$\text{Or, } 234 = (AD^2 + 81)$$

$$\text{Or, } AD^2 = 153$$

$$\text{So, } AD = 3\sqrt{17} \text{ cm}$$

40. **Solution: D**

$$(a - b\sqrt{5}) = \sqrt{(94 - 42\sqrt{5})}$$

$$\text{Or, } (a - b\sqrt{5}) = \sqrt{(7^2 + (3\sqrt{5})^2 - 2 \times 7 \times 3\sqrt{5})}$$

$$\text{Using, } (x - y)^2 = x^2 - 2xy + y^2$$

$$\text{Or, } a - b\sqrt{5} = \sqrt{(7 - 3\sqrt{5})^2}$$

$$\text{Or, } a - b\sqrt{5} = 7 - 3\sqrt{5}$$

$$\text{So, 'a' = 7 and 'b' = 3}$$

$$\text{Therefore, required value} = 7^2 - 3^2 = 49 - 9 = 40$$

41. **Solution: C**

Let the speed of train 'A' = 'x' m/s

Let the length of train 'A' = 'd' metres

Distance covered by train 'A' in 24 seconds = 24x metres = 'd' metres

Relative speed of train 'A' w.r.t the car = $(x - 12)$ m/s

Relative distance covered by train 'A' w.r.t. the car, in 40 seconds = $(x - 12) \times 40 = 40x - 480 = \text{'d' metres}$

$$\text{So, } 40x - 480 = 24x$$

$$\text{Or, } x = 480 \div 16 = 30$$

$$\text{Length of train 'A' = } 24 \times 30 = 720 \text{ metres}$$

$$\text{Length of train 'B' = } 720 + 30 = 750 \text{ metres}$$

$$\text{Speed of train 'B' = } 30 - 30 \times (50/300) = 25 \text{ m/s}$$

$$\text{So, time taken by train 'B' to cross a tree} = 750 \div 25 = 30 \text{ seconds}$$

42. **Solution: A**

$$(1 - \cos^2 A) (\operatorname{cosec} A - \cot A) (1 + \cot^2 A) (\cot A + \operatorname{cosec} A)$$

$$\text{Using } x^2 - y^2 = (x + y)(x - y) \text{ and } \sin^2 A + \cos^2 A = 1$$

$$= - (1 - \cos^2 A) (\cot A - \operatorname{cosec} A) (1 + \cot^2 A) (\cot A + \operatorname{cosec} A)$$

$$= - \sin^2 A (\cot^2 A - \operatorname{cosec}^2 A) (1 + \cot^2 A)$$

$$\text{Using } \operatorname{cosec}^2 A = 1 + \cot^2 A$$

$$= - \sin^2 A \times -1 \times \operatorname{cosec}^2 A$$

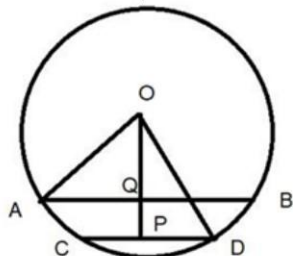
$$\text{We know that } \operatorname{cosec} A \text{ is reciprocal of } \sin A, \text{ so } - \sin^2 A \times (1/\sin^2 A) = -1$$

$$- \sin^2 A \times -1 \times \operatorname{cosec}^2 A = -1 \times -1 = 1$$

43. **Solution: C**

Let 'O' be the centre of circle and perpendicular drawn from centre passes through points 'Q' and 'P' of the chords AB and CD, respectively.

$$OA = OD = \text{'r' (radii of the same circle)}$$



We know that perpendicular drawn from centre bisects the chord

$$\text{So, } AQ = QB = (24/2) = 12 \text{ cm}$$

$$\text{And, } PD = PC = (18/2) = 9 \text{ cm}$$

$$\text{Let } OQ = \text{'x' cm}$$

In ΔOQA , using Pythagoras theorem

$$(x^2 + 12^2) = r^2 \text{ ----- (I)}$$

In ΔOPD , using Pythagoras theorem

$$(x + 7)^2 + 9^2 = r^2 \text{ ----- (II)}$$

From equation (I) and (II), we get

$$(x + 7)^2 + 9^2 = x^2 + 12^2$$

$$\text{Or, } x^2 + 49 + 14x + 81 = x^2 + 144$$

$$\text{Or, } 14x = 14$$

$$\text{Or, 'x' = 1}$$

On putting value of 'x' in equation (I),

$$r^2 = 1^2 + 144$$

$$\text{Or, } r^2 = 145$$

$$\text{Or, 'r' = } \pm\sqrt{145}$$

But, radius cannot be negative. So, 'r' = $\sqrt{145}$ cm

Therefore, diameter = $2r = 2\sqrt{145}$ cm

44. **Solution: A**

$$\text{Number of credit cards sold by agent 'B' = } 252 \times (5/14) = 90$$

$$\text{Number of credit cards sold by agent 'C' = } 192 \times (3/8) = 72$$

$$\text{So, required average} = (90 + 72) \div 2 = 81$$

45. **Solution: D**

We know that,

If last three digits of a number is divisible by '8', then the number itself is divisible by '8'

$$\text{For, '53B' to be divisible by 8, 'B' = 6}$$

Now, for a number to be divisible by 11 difference between sum of digits at odd places and sum of digits at even places must be either '0' or a multiple of '11'.

$$8 + 5 + 5 + 6 - (A + 6 + 3) = 0 \text{ or multiple of 11}$$

$$\text{Or, } 24 - 9 - A = 0 \text{ or multiple of 11}$$

$$\text{Or, } 15 - A = 0 \text{ or multiple of 11}$$

Since, 'A' is a single digit number, so possible value of 'A' = 4

$$\text{So, } (B - A) = 6 - 4 = 2$$

46. **Solution: A**

Let the efficiency of a man and that of a boy be 'M' units/day and 'B' units/day, respectively.

Let the total work = L.C.M of 28 and 30 = 420 units

$$\text{Then, } 2M + 4B = 420 \div 30 = 14 \text{ - [I]}$$

$$\text{And, } 3M + 2B = 420 \div 28 = 15 \text{ - [II]}$$

Multiplying [II] by 2, we get

$$6M + 4B = 15 \times 2 = 30$$

$$6M + 4B - (2M + 4B) = 30 - 14$$

$$\text{Or, } M = 16 \div 4 = 4$$

$$\text{So, } 2 \times 4 + 4B = 14$$

$$\text{Or, } B = (14 - 8) \div 4 = 1.5$$

$$\text{Working done by 7 boys together in 18 days} = 1.5 \times 7 \times 18 = 189 \text{ units}$$

$$\text{So, percentage of work completed} = (189/420) \times 100 = 45\%$$

47. **Solution: D**

Let original speed of the traveller be 'x' km/hr

ATQ:

$$2x + 2 \times (x + 5) + 2 \times (x + 10) + 2 \times (x + 15) = 348$$

$$\text{Or, } 8x + 60 = 348$$

$$\text{Or, 'x' = } (288/8) = 36$$

Therefore, speed of the traveller at the start of 6th hour:

$$= (x + 10) = 36 + 5 + 5 = 46 \text{ km/hr}$$

48. **Solution: D**

Let the total work be 180 units (LCM of 36 and 60).

$$\text{Efficiency of 'A' = } 180 \div 36 = 5 \text{ units/day}$$

$$\text{Efficiency of 'B' = } 180 \div 60 = 3 \text{ units/day}$$

$$\text{Combined efficiency of 'B' and 'C' = } 180 \div 36 = 5 \text{ units/day}$$

$$\text{So, efficiency of 'C' = } 5 - 3 = 2 \text{ units/day}$$

$$\text{Total time taken to finish the work} = 180 \div (5 + 3 + 2) = 18 \text{ days}$$

Total wages earned by 'B' = $(3/10) \times 4,320 = ₹1,296$
Therefore, average wage earned by 'B' on each day = $(1,296/18) = ₹72$

49. **Solution: B**

We know that $14\frac{2}{7}\% = \frac{1}{7}$

Cost price of the shirt = $480 \div \frac{8}{7} = ₹420$

Marked price of the shirt = $480 \div 0.8 = ₹600$

New selling price of the shirt = $420 \times 1.5 = ₹630$

New marked price of the shirt = $(630/0.9) = ₹700$

Marked price should be increased by ₹100 i.e. (700 - 600)

50. **Solution: C**

Let the present age of Mohit be $(x + 5)$ years.

So, five years ago from now, Mohit's age was 'x' years

And, Mohit's father's age was 'x²' years

ATQ;

$(x^2 + 5 + 6) \times (3/10) = x + 5 + 6$

Or, $3x^2 + 33 = 10x + 110$

Or, $3x^2 - 10x - 77 = 0$

Or, $3x^2 - 21x + 10x - 77 = 0$

Or, $3x(x - 7) + 10(x - 7) = 0$

Or, $(x - 7)(3x + 10) = 0$

So, $x = 7$ or $x = (-10/3)$

So, present age of Mohit = $7 + 5 = 12$ years

General Awareness

51. **Solution: B**

Mukesh Ambani's family secured the top spot on Bloomberg's Asia Richest Families List with a wealth of \$90.5 billion. He leads Reliance Industries, one of India's largest business groups. The Chearavanont family from Thailand ranked second with \$42.6 billion in wealth.

52. **Solution: D**

The **Pradhan Mantri Matsya Sampada Yojana (PMMSY)**, the flagship scheme of the Government of India envisaged to revolutionize the seaweed sector, aiming to increase seaweed production of the country over **1.12 million tonnes by 2025**.

Under the scheme, the Government has taken many steps to strengthen seaweed farming activities the prominent of which is the establishment of Multipurpose Seaweed Park in Tamil Nadu with a total investment of ₹127.7 crore.

Hence, Option D is the correct answer.

53. **Solution: A**

The third edition of the **World Test Championship** final will be held at **Lord's Stadium** in London. The one-off Test match is scheduled from **June 11 to June 15, 2025**, with June 16 reserved as a backup day if necessary.

The first edition in 2021 was held in **Southampton**.

The second edition in 2023 took place at **The Oval**.

The final will feature the top two teams from the WTC standings at the end of the current cycle.

As of now, **India** is at the top spot, followed by reigning champions Australia.

Teams such as New Zealand, England, Sri Lanka, South Africa, and Bangladesh are also in contention for a place in the final.

Hence, Option A is the correct answer.

54. **Solution: B**

ITC was initially a British owned company registered in Calcutta.

Mohammed Hashim Premji is the founder of Wipro.

Infosys was founded by N.R Narayana Murthy, Nandan Nilekani, S.D. Shibulal, Kris Gopalakrishnan, Ashok Arora, N.S. Raghavan and K.Dinesh. Dhirubhai Ambani was the founder of Reliance.

55. **Solution: C**

Nibble is also called Half byte.

56. **Solution: B**

In computers all data is represented as binary codes. That is, all data is represented as strings of 0s and 1s.

57. **Solution: A**

Kepler's law is also known as the law of Ellipse. His laws are related to the planetary motif the earth and planets with sun at the centre. The shape of the orbit is elliptical so, kepler's law is also known as the law of Ellipse.

58. **Solution: A**

The bats emit ultrasonic waves of frequency 20 to 100 Kilohertz and returning echo of the sound waves give information about prey.

59. **Solution: C**

A Ghotul system is a tribal youth dormitory in the form of a spacious hut surrounded by earthen or wooden walls.

It is an integral part of Gond and Muria tribal life in regions of **Chhattisgarh** and the neighbouring areas in Madhya Pradesh, Maharashtra and Andhra Pradesh in India.

60. **Solution: A**

Meera was exploring **Halebidu** in Karnataka.

The Hoysala temples are a remarkable architectural legacy of the Hoysala Empire in Karnataka. The three most representative Hoysala-style temples are the **Chennakeshava Temple in Belur, the Hoysaleswara Temple in Halebidu, and the Keshava Temple in Somanathapura**. These temples were built between the 12th and 13th centuries and were added to the UNESCO World Heritage List in 2023.

Hence, Option A is the correct answer.

61. **Solution: B**

Eventually, the ice will burst the glass bottle

If a glass bottle is completely filled with water, sealed with a lid and put into the freezer, it will eventually result in a burst of glass bottle.

62. **Solution: A**

Isobars are atoms (nuclides) of different chemical elements that have the same number of nucleons. Correspondingly, isobars differ in atomic number (or number of protons) but have the same mass number. An example of a series of ⁴⁰S, ⁴⁰Cl, ⁴⁰Ar, ⁴⁰K, and ⁴⁰Ca.

63. **Solution: D**

Cathode rays are streams of electrons observed in discharge tubes.

64. **Solution: B**

Pensi-La is a mountain pass in the **Ladakh** union territory of India. It is located 4400 meters above sea level and it is also known as the **Gateway to Zaskar**. It connects **Kashmir Valley to Kargil**. It also connects **Suru Valley and Zaskar Valley**.

Hence, Option B is the correct answer.

65. **Solution: C**

Chandra Shekhar Azad participated in the following revolutionary activities to avenge the murder of Lala Lajpat Rai:

- **Kakori Train Robbery in 1925**
- **Shooting of John P. Saunders in Lahore in 1928**
- **Attempt to attack the Viceroy of India's train in 1929**

Hence, Option C is the correct answer.

66. **Solution: D**

Digestion begins in the mouth, well before food reaches the stomach. ... A digestive enzyme in saliva called amylase starts to break down some of the carbohydrates (starches and sugars) in the food even before it leaves the mouth.

67. **Solution: A**

Vitamin B complex is composed of eight B vitamins: - B-1 (thiamine), B-2 (riboflavin), B-3 (niacin), B-5 (pantothenic acid), B-6 (pyridoxine), B-7 (biotin), B-9 (folic acid), B-12 (cobalamin)

68. **Solution: C**

Article 19 (1) 1 of the Constitution, guarantees six fundamental rights, subject to the power of the State to impose restrictions on the exercise of those rights.

- Freedom of speech and expression (Article 19(1) (a));
- Freedom to assemble peacefully and without arms (Article 19(1) (b));
- Freedom to form associations, unions or co-operative societies (Article 19(1) (c));
- Freedom to move freely throughout the territory of India (Article 19(1) (d));
- Freedom to reside and settle in any part of the territory of India (Article 19(1) (e)), and
- **Freedom to practice any profession**, or to carry on any occupation, trade or business (Article 19(1) (g)).

Hence, Option C is the correct answer.

69. **Solution: C**

Statement (I) is correct.

Litchi (*Litchi chinensis*) is a small, oval roundish fruit that is native to Southeast Asia. It is a member of the soapberry family (Sapindaceae) and is also known as lychee or lichee. It is influenced by various factors such as temperature, rainfall, humidity, and soil conditions.

Statement (II) is correct.

Bihar is the largest producer of litchi in India, accounting for nearly 40% of the country's total litchi production.

Hence, Option C is the correct answer.

70. **Solution: B**

The **Incredible India** campaign was launched in **2002** to promote India as a premier global tourist destination. It changed the paradigm of Indian Tourism with each passing year. In 2017, Incredible India 2.0 was introduced with a focus on digital promotion and a revamped marketing strategy targeting niche segments like adventure, medical, and wellness tourism.

Hence, Option B is the correct answer.

71. **Solution: B**

Rajya Sabha:

- Council of States i.e., Rajya Sabha is the Upper House of the Indian Parliament. It consists of the representatives of the States and the Union Territories and persons nominated by the President of India.
- It is an **indirectly elected body**. The elected members of the State Legislative Assembly elect the members of the Rajya Sabha.

- Members of the Rajya Sabha are elected for a term of six years. They can get re-elected.
- All members of the Rajya Sabha do not complete their terms at the same time.

- Every two years, one-third members of the Rajya Sabha complete their term, and elections are held for those one-third of seats only.

- The Vice-President of India is the ex-officio Chairman of the Rajya Sabha.

Hence, Option B is the correct answer.

72. **Solution: B**

Housing Finance Companies (HFCs) :

They are corporate entities incorporated under the Companies Act of 1956. They provide housing loans and finance in a streamlined manner.

Regulated by: Reserve Bank of India

Types: Deposit-taking HFCs and non-deposit-taking HFCs

Hence, Option B is the correct answer.

73. **Solution: C**

Types of Cooperative Societies in India:

- **Consumers' Cooperative Society:** Formed to provide consumer goods at reasonable prices, eliminating middlemen by purchasing directly from producers. Examples include Kendriya Bhandar and Apna Bazar.

- **Producers' Cooperative Society:** Supports small producers by providing necessary production items such as raw materials and equipment. Notable examples are APPCO and Haryana Handloom.

- **Cooperative Marketing Society:** Assists small producers in marketing their products by collectively selling on their behalf. The Gujarat Cooperative Milk Marketing Federation (AMUL) is a prominent example.

- **Cooperative Credit Society:** Provides financial assistance to members by accepting deposits and granting loans at reasonable interest rates. Examples include Village Service Cooperative Society and Urban Cooperative Banks.

- **Cooperative Farming Society:** Small farmers form these societies to gain benefits of large-scale farming. Examples include lift-irrigation cooperatives and pani-panchayats.

- **Housing Cooperative Society:** Offers affordable residential options by purchasing and developing land for members. Examples include Employees' Housing Societies and Metropolitan Housing Cooperative Society.

Hence, Option C is the correct answer.

74. **Solution: D**

Nagara style of architecture:

- The temples generally followed the Panchayatana style of temple making.

- Presence of assembly halls or mandaps in front of the principal shrine.

- Outside the garbhagriha, images of the river goddesses, Ganga and Yamuna, were placed.

- There were no water tanks or reservoirs present in the temple premises.

- The temples were generally built on upraised platforms.

- The Shikharas were generally of three types: Rekha-prasad, Phamsana, and Valabhi.

- Inside the temple, the wall was divided into three vertical planes called rathas.

Generally, the temple premises did **not** have elaborate boundary walls or gateways.

75. **Solution: C**

- The Congress session of the year 1929 was held in Lahore. It was presided over by **Jawahar Lal Nehru**.
- This session was very significant because in this session the prominent party Indian National Congress, took the resolution of **Poorna Swaraj** or complete independence.
- The Congress approved a motion for complete Independence and also the President of Congress hoisted the flag of Complete Freedom on the bank of the Ravi River on the midnight of 31 December 1929, in front of huge crowds.
- This was the day when for the first time the nationalists unfurled the tricolor Congress hence decided to observe **26th January 1930** as the total independence or **Purna Swaraj Day**. Hence, Option C is the correct answer.

English Language

76. **Solution: A**

In A, replace the singular verb EXPECTS with the plural verb EXPECT to agree with the plural noun DEVELOPING COUNTRIES. Thus, A is the right answer.

77. **Solution: B**

The correct sequence is RQSP. R begins the passage by introducing us to Vitamin B12. It is a very important vitamin that our bodies need but cannot produce. Q follows R to describe its importance for our bodies. SP follows as a mandatory pair to describe the ways in which humans can consume this vitamin. S tells us that one source is animal products and the other one is an oral supplement. P concludes by describing the benefits of including this supplement in one's diet. Thus, B is the right answer.

78. **Solution: D**

The sentence tells us how reading stories in difficult times helps a person get a better understanding of such times and also helps him to get through them without giving up. The highlighted phrase is correct and conveys the intended meaning. PERSEVERE (to continue trying to do or achieve something despite difficulties). Thus, D is the right answer.

A and B are incorrect as the base form phrasal verbs GIVE UP and PUSH THROUGH should be used to fit in the infinitive structure (TO + VERB 1).

C is incorrect as the plural pronoun THEM should be used to refer to the plural noun TIMES.

79. **Solution: B**

The sentence is in indefinite tense with a modal verb, and active voice. To change the subject to the passive voice, follow the below rules:

I. The subject SMITA will become the object. The object THE FLOWERS will change to the subject of the sentence.

II. The verb phrase SHALL BRING will be replaced by SHALL BE BROUGHT, as the passive construction for indefinite tense with a modal verb is MODAL VERB + BE + PAST PARTICIPLE. Modals do not change their form when changing voice.

III. The preposition BY will be added to the sentence, and SMITA will become its object.

Thus, B is the right answer.

80. **Solution: A**

We need a base form verb to come after the modal verb WILL. ELIMINATE (to remove or take away someone or something) will fit here as the sentence seeks to convey that everywhere workers are worried that the technology will take away their jobs. Thus, A is the right answer.

Threat (noun) - the possibility of trouble or danger. Intrigue - to make someone interested or curious. Hold - to keep something in a certain position.

81. **Solution: A**

We need to replace the subjective case pronoun I with the objective case pronoun ME to function as the object of the preposition FROM. Thus, A is the right answer.

82. **Solution: B**

IN AND OUT (going regularly to a place) will fit here as the sentence tells us how the speaker's friend has been going regularly to get therapy for the last five years. Thus, B is the right answer.

On tap - available to be used any time. Out and out - in every way. Up and down - moving upwards and downwards.

83. **Solution: D**

The sentence seeks to convey that the highest point (pinnacle) of her individual (personal) journey (perfectly) luckily came at the same time (coincided) when her company finally (ultimately) reached its highest point (apex) during the current (ongoing) financial difficulty (crisis). PINNACLE and APEX are synonyms. Thus, D is the right answer.

84. **Solution: D**

The sentence is in simple present tense and passive voice. Follow the instructions below to change a sentence from passive to active voice:

I. The subject clause will become the object clause. The subject in the sentence, MARTIAL ARTS, will change to the object of the verb, the preposition BY will be omitted, and its object, MR. HIROSHI, will become the subject and begin the sentence.

II. The simple present tense passive voice construction ARE TAUGHT will be replaced by the simple present tense active voice construction TEACHES. The singular verb TEACHES is suitable to agree with the singular noun Mr. Hiroshi.

Thus, D is the right answer.

85. **Solution: C**

In option C, replace the noun INNOVATION with the adjective INNOVATIVE to modify the noun GADGETS. Thus, C is the right answer.

86. **Solution: B**

FELL THROUGH (to fail or not happen) will fit here as the sentence tells us that after putting in a lot of effort, the celebrity agreed to work on the project, but then suddenly the deal failed to happen. Thus, B is the right answer.

Fell in - took one's place in a line or formation. Fell about - laughed uncontrollably. Fell behind - not been able to keep level with someone or something.

87. **Solution: D**

We need a phrasal verb that gives the meaning of collapsing or breaking down; also, the word should be in present participle form to fit in the IS + VERB present continuous tense construction. The sentence seeks to convey that irrespective of our best efforts, it feels like our world is breaking down and now we have to deal with the results. FALLING APART

(breaking down) will fit here. Thus, D is the right answer.

The other options have different meanings:

Cheering up - becoming happier.

Going ahead - starting; beginning, or continuing with a plan.

Holding on - maintaining a condition or position.

88. **Solution: A**

We need a noun to be modified by the definite article THE. LEAK (a small hole or crack) will fit here as the sentence seeks to convey that the crack or hole has caused the room to slowly gather nitrous oxide. Thus, A is the right answer.

Leek - a long, white vegetable with green leaves on top that taste and smell like an onion. Lick (verb) - to move your tongue across something. Lack - scarcity or shortage.

89. **Solution: D**

DISSIPATING means exhausting or wasting. The sentence uses it to convey that at the moment, she is wasting her time and energy on too many different things. SAVING (preserving) is its antonym. Thus, D is the right answer.

Mixing - combining. Transferring - moving from one place to another. Mastering - learning how to do something well.

90. **Solution: D**

The correct spelling of the word is EXPEDITIONS (tours or trips undertaken by a person or a group). The sentence seeks to convey that Gabriel Sachter-Smith has great knowledge about bananas and has found about 500 types of bananas during his trips to tropical areas around the world. Thus, D is the right answer.

91. **Solution: B**

The sentence talks about how as per a recent study, hydrogen was not a chief component of the atmosphere when life came into existence. The phrase mentioned in B correctly captures this idea. Thus, B is the right answer.

The highlighted phrase is incorrect. We need the past tense verb BEGAN instead of the past participle verb BEGUN to fit in the simple past tense structure as indicated by the use of WAS earlier in the sentence.

A is incorrect. We need the noun COMMENCEMENT (the beginning of something) instead of the verb COMMENCE (to begin) to be modified by the definite article THE.

C is incorrect. We need the past tense verb EMERGED instead of the base form verb EMERGE to describe the past event as indicated by the use of WAS earlier in the sentence.

92. **Solution: A**

The idiom WET BEHIND THE EARS refers to a person who is young and without experience. Thus, A is the right answer.

The remaining options do not convey the intended meaning.

93. **Solution: A**

ADROIT means skillful and clever and will fit here as the sentence seeks to convey that the minister handled the situation skillfully and helped resolve the issue. INCOMPETENT (lacking the necessary skill to do something well) is the antonym of the word. Thus, A is the right answer.

Brevity (noun) - the state of being short or quick. Alacrity (noun) - speed and eagerness. Draconian - extremely severe.

94. **Solution: C**

The correctly spelt word is BOASTED (talked with too much pride about something that a person has or can do). Thus, C is the right answer.

95. **Solution: B**

DBCA is the correct sequence of the sentences. D begins the paragraph by telling us how our universe is filled with cosmic wonder, of which the naked human eye can see very little. B follows D to tell us that meteor showers are one such phenomenon that a naked human eye can see. C provides information related to the current observable meteor shower which has been active since mid-July and is predicted to continue until the end of August. At last, A describes that this meteor shower will reach its peak August 11 to 12. Thus, B is the right answer.

96. **Solution: B**

The passage describes AI as something trending in various products. "Craze" means a popular trend, making it the best choice. "Invention" refers to a creation, not necessarily a trend. "Necessity" is too strong, and "function" does not fit the context.

97. **Solution: B**

"Coined" means to create a new term, which suits the context. "Introduced" and "invented" could work but are not as precise. "Discovered" is incorrect because words are not "discovered" like natural phenomena.

98. **Solution: A**

The passage discusses the metaverse, where people use "avatars" to represent themselves. "Profiles" and "characters" could work but do not fit as naturally in this context. "Personalities" is unrelated.

99. **Solution: C collapsed**

The passage contrasts headlines with reality, stating that WeWork did not succeed but instead "collapsed." The other choices imply growth, which contradicts the intended meaning.

100. **Solution: C**

The passage discusses how headlines influence public perception, making "headlines" the best choice. "Media" is related but too broad. "Governance" and "leadership" do not fit the context.