

SNAP 2018 –EXPLANATORY ANSWERS

SECTION I

Analytical & Logical Reasoning

(Q1) The pattern followed by the given series is:

$$(5 \times 2) - 1 = 9$$

$$(9 \times 2) - 2 = 16$$

$$(16 \times 2) - 3 = 29$$

$$(29 \times 2) - 4 = 54$$

Hence, the next (i.e. sixth) number in the series = $(54 \times 2) - 5$

$$= 108 - 5 = 103$$

Finally, the seventh number in the series = $(103 \times 2) - 6$

$$= 206 - 6 = 200$$

Hence, **option 2**.

(Q2) Each pendulum has to get displaced by 60° . Hence, the distance travelled the ball of each pendulum is equivalent to the length of an arc corresponding to a central angle of 60° .

Length of an arc = $(\theta/360) \times 2\pi r$; where θ is the central angle and r is the radius (corresponding to the length of the string in this case).

Here, the central angle is constant (i.e. 60°) for each pendulum.

Hence, the distance travelled by each pendulum is directly proportional to square root of the length of the string.

Also, the pendulum travelling the maximum distance will take the maximum time (or move the slowest). Hence, the pendulum with the longest string will move the slowest.

By observation, the pendulum in option 2 has the longest string.

Hence, **option 2**.

(Q3) The days available are Monday to Friday.

Also, Tuesday – Finance is a valid schedule.

The relative sequence of Organisational Behaviour, Marketing and Information Systems is: Organisational Behaviour-Marketing-Information Systems

Since these lectures are on consecutive days, they have to be scheduled from Wednesday to Friday (in that order).

Hence, the only lecture left i.e. Operations is scheduled on Monday.

Hence, **option 4**.

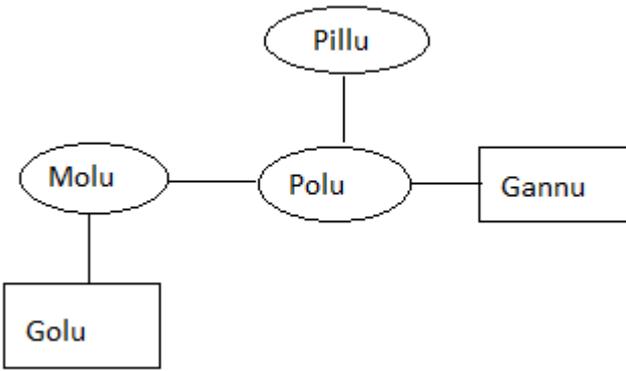
(Q4) Each option requires the relationship between Golu and Gannu.

Golu is the son of Molu while Polu and Molu are sisters. Hence, Molu is the mother of Golu while Polu is the maternal aunt.

Since Pillu is Polu's mother, Pillu is the maternal grandmother of Golu.

Since Gannu is Pilu's son, Gannu is the maternal uncle of Golu.

The family tree can be drawn as follows:



Hence, **option 3**.

(Q5) Though Farrow means the process of giving birth to a young pig or a litter of pigs, the analogy Pig : Farrow and Lion : Cub points to the relationship Animal : Young one of the animal. Hence, the correct analogy corresponding to Bear will be Cub.

Hence, **option 3**.

(Q6) When two trains meet at a point, they necessarily have to be at the same distance from the same point being compared to both trains.

Note that the distance travelled by the two trains is not being compared. This will definitely not be equal. However, their distance from Chennai (or Bengaluru) is equal.

Hence, **option 3**.

(Q7) Consider the difference between successive terms i.e. $-1, -1, -2, -3$.

In a way, this is similar to a Fibonacci series, but on negative numbers.

Hence, the next difference should be $(-2) + (-3) = -5$

Note that S is the 19th letter in the alphabet.

Hence, required letter = $19 + (-5) = 14$

N is the 14th letter in the alphabet.

Hence, **option 1**.

(Q8) Note that the ratio being taken in each case is that of number of vowels in each word.

Consider the number of vowels per word i.e. PUNE = 2; GOA = 2; CHENNAI = 3

Hence, PUNE/GOA = $2/2 = 1$ and CHENNAI/GOA = $3/2 = 1.5$

MUMBAI has three vowels. So, MUMBAI = 2 and PUNE = 2.

Hence, MUMBAI/PUNE = $3/2 = 1.5$

Hence, **option 3**.

(Q9) The pattern here is: middle number = (sum of outer numbers $\times 10$) + 2

First figure: $(3 + 5 + 7 + 9) \times 10 + 2 = 240 + 2 = 242$

Second figure: $(11 + 12 + 13 + 14) \times 10 + 2 = 500 + 2 = 502$

Hence, $(7 + 10 + 21 + x) \times 10 + 2 = 662$

$\therefore 10(38 + x) = 660$

$\therefore 38 + x = 66$ i.e. $x = 28$

Hence, **option 2**.

(Q10) First figure: $11 = (2 \times 3) + 5$

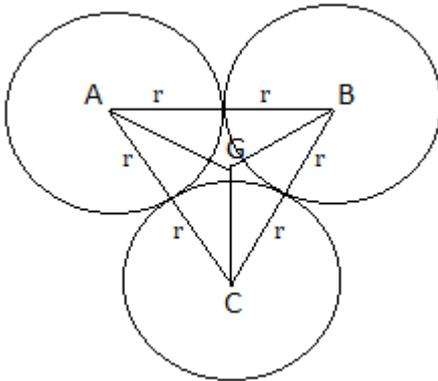
Second figure: $-12 = (-5 \times 2) + (-2)$

Similarly, third figure = $(-10 \times 6) + (-10)$
 $= (-60) + (-10) = -70$
Hence, **option 2.**

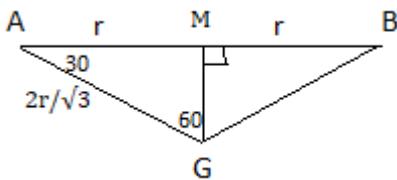
(Q11) The shaded part represents the region that belongs only to A.
Hence, it can be represented as $A - A \cap B$ or $A \cup B - B$.
Neither is given in the options.
Hence, **option 4.**

(Q12) Since Unmesh turns right by 90° every time the bell rings, Unmesh would have turned by 360° after four rings i.e. Unmesh will again be facing Jayesh.
Hence, Unmesh will face Jayesh after every multiple of 4 rings.
 $3926 = 4(981) + 2$
Hence, Unmesh will face Jayesh and then make two more turns, thereby facing Mahesh.
Hence, **option 2.**

(Q13) Let the radius of each cone be r cm. The diagram can be drawn as follows:



A, B and C are the centers of the bases of the three cones. ABC is an equilateral triangle with side $2r$ cm. long and centroid G. In an equilateral triangle, centroid and circumcentre coincide. Consider the triangle AGB.



Angle GAM is half the angle CAB i.e. 30° . GM is perpendicular to AB. Thus, Triangle AMG is a $30^\circ - 60^\circ - 90^\circ$ triangle.
 $AM = \sqrt{3}/2 \times AG \implies AG = 2/\sqrt{3} \times AM = 2r/\sqrt{3} = 1.154r > r$
Hence, **option 3.**

(Q14) Oil and water cut off the oxygen supply to the already burning wick while, being highly inflammable itself, petrol provides additional oxygen to the wick.
Hence, A and C are put off while B glows brightly.
Hence, **option 2.**

(Q15) Consider each digit of the numbers shown as on a digital calculator.
First the water image of each digit is taken and then the mirror image is taken.
After doing this, the series becomes 91, __, 89, 88.

Hence, the missing number should correspond to 90.
Now, mirror image and then water image of 90 gives 06.
Hence, **option 1**.

(Q16) In an elimination based tournament with 30 players, 29 players need to get eliminated for the 30th to win.

Since one player is eliminated in each match, the number of matches needed to identify a winner is 29.

Hence, **option 3**.

Note: In an elimination based tournament with N players, number of matches to identify the winner = $(N - 1)$.

(Q17) Let Ramu have $15x$ friends (LCM of 5 and 3).

Hence, number of friends who went to Mumbai = $(15x/5) = 3x$

and number of friends who went to Delhi = $(15x/3) = 5x$

\therefore Number of friends who went to Chennai = $3(5x - 3x) = 6x$

Number of friends who went to Pune = 1

$\therefore 3x + 5x + 6x + 1 = 15x$

$\therefore x = 1$

\therefore Number of friends who went to Mumbai = $3x = 3$

Hence, **option 2**.

(Q18) There is exactly one true message and two false messages.

The messages are:

Carton 1: Cash is not in the carton.

Carton 2: No cash in the carton.

Carton 3: Cash is in the second carton.

The messages on Carton 2 and Carton 3 are contradictory i.e. one of them must be true and the other must be false. So, the message on the carton must be false.

Hence, cash has to be in carton 1.

Hence, **option 1**.

(Q19) None of the figures, when folded, gives the required L-shaped figure.

Hence, **option 4**.

(Q20) None of the figures, when folded, gives the required triangular figure.

Hence, **option 4**.

(Q21) The four classes are RM, DM, IM and SM.

Based on the options, consider individual statements or combinations of statements.

(1) Statement I alone:

Since IM ends at 10 a.m.; it is scheduled from 9 a.m. to 10 a.m.

Since it was preceded by SM, SM was scheduled from 8 a.m. to 9 a.m.

i.e. SM IM __ __

The timing for DM cannot be found. So, option 1 is eliminated.

(2) Statement II alone:

RM was the last class i.e. 11 a.m. to 12 p.m.

However, the timing for DM cannot be found. So, option 2 is eliminated.

(4) Statement II and III together:

IM was immediately followed by DM and RM was the last class.

Hence, there are two possibilities i.e. IM DM ___ RM or ___ IM DM RM
The timing for DM cannot be found. So, option 4 is eliminated.
Hence, **option 3.**

Note: Option 3 can be verified as shown below.

I and II together:

SM IM ___ RM i.e. DM has to be the third class i.e. from 10 a.m. to 11 a.m.

I and III together:

SM IM DM ___ i.e. DM has to be the third class i.e. from 10 a.m. to 11 a.m.

(Q22) Consider combinations of statements as per the options.

Option 1: II and III together

Madan (Basic) = 15000

Madan (Other Allowance) = [Kakade (Total Salary)]/10

Since the relation between Madan's Basic salary and Other allowance is not known, the total salary of Kakade cannot be found.

Hence, option 1 is eliminated.

Option 2: I and III together

Madan (Basic) = 15000

Kakade (Basic) = Madan (Total) + 100

Here, neither the Basic salary nor the Other allowances can be found for Kakade. Hence, the total salary cannot be found.

Hence, option 2 is eliminated.

Option 3: I, II and III together

Madan (Basic) = 15000

Madan (Other Allowance) = [Kakade (Total Salary)]/10

Kakade (Basic) = Madan (Total) + 100

Since the relation between Madan's Basic salary and Other allowance is not known, the total salary of Kakade cannot be found.

Hence, option 3 is eliminated.

Hence, the question cannot be answered even using all the three statements.

Hence, **option 4.**

(Q23) $B < G$; $S > P$

Consider individual statements or combinations of statements as per the options.

Since two options are 'II only' and 'III only', start with them first.

II alone: $G > S$

Hence, $G > S > P$ and $G > B$

Hence, G is the greatest i.e. Gopal is the oldest.

Hence, the question can be answered using statement II alone.

Hence, **option 4.**

(Q24) Consider the position of each letter of MASTER in the alphabet.

M = 13; A = 1; S = 19; T = 20; E = 5; R = 18

The pattern here is: Number = (Position of letter \times 6) + 1

For instance $79 = (13 \times 6) + 1$; $7 = (1 \times 6) + 1$ and so on.

Similarly, for LAUGH:

L = 12; A = 1; U = 21; G = 7; H = 8

Hence, the corresponding numbers are 73, 7, 127, 43, 49.

Hence, the final code is 7371274349.

Answer: **7371274349**

(Q25) 1996 is a leap year.

The calendar of a leap year repeats after every 28 years.

Hence, the year in which person will have their birthday on the same day as 1996 is $1996 + 28 = 2024$

Answer: **2024**

(Q26) The pattern here is:

(Rank of first letter) – (Rank of month in year) – (Rank of last letter)

For instance, J is the 10th letter, January is the 1st month and Y is the 25th letter. Hence, January becomes 10125.

Similarly, J is the 10th letter, June is the 6th month and E is the 5th letter.

Hence, June becomes 10605.

By the same logic, July becomes 10725.

Answer: **10725**

(Q27) The possible triangles are ABD, ABC, ACD, ABE, DBE, ABF, AFE, FED, FCD, BFC, BFD and AFD.

Hence, the total number of triangles possible is 12.

Answer: **12**

(Q28) From the given information, the arrangement will be as shown below:

Mohan Pawan Rohan Sohan

Hence, when the photographer is looking at them from the opposite side, the second person from left is Rohan (coded as 1).

Answer: **1**

Explanation for Q. 29 to Q 35:

There are six seats in two rows, with five people sitting in each row.

South facing row (Row 1): Sadhana, David, Lakshmi, Sonal, Anu

North facing row (Row 2): Lily, Suresh, Deepika, Mahesh and Arvind

R1: _ _ _ _ _

R2: _ _ _ _ _

Now, Mahesh sits third to the right of Deepika. Note that in this case, it means that Mahesh is on the third seat to the right of Deepika. It is not necessary that Mahesh is the third person to the right of Deepika. There could also be a vacant seat between them.

Hence, the possible arrangements for Deepika and Mahesh are:

D _ _ M _ _ or _ D _ _ M _ or _ _ D _ _ M

It is known that neither Mahesh nor Deepika sit at an extreme end. Hence, only the second arrangement given above is valid. This fixes the position of Mahesh and Deepika.

Now, Sonal is opposite Deepika. Also, Mahesh plays chess and the person who likes swimming faces the person who plays chess. Hence, the arrangement becomes:

(Swimming)

R1: _ Sonal _ _ _ _

R2: _ Deepika _ _ Mahesh _

(Chess)

The person who likes baseball is opposite to the person who is third to the right of the person who is opposite Mahesh. The person who likes swimming is opposite Mahesh and Sonal is third to the right of this person.

Since Deepika is opposite Sonal, Deepika likes baseball.

The person who likes baseball faces the person who likes running. So, Sonal likes running.

(Running)	(Swimming)
R1: ___ Sonal ___ ___ ___ ___	
R2: ___ Deepika ___ ___ Mahesh ___	
(Baseball)	(Chess)

There are two seats between Lakshmi and David; such that Lakshmi is at an extreme end. Also, David is third to the right of the person who likes walking.

Since David and Lakshmi are in the south-facing row, the above conditions can only be satisfied if Lakshmi is at the extreme left and David is third to her right. Hence, Lakshmi also becomes the person who likes walking. Also, David likes skating.

	(Running)	(Skating)	(Swimming)	(Walking)	
R1: ___ Sonal	David	___	___	Lakshmi	
R2: ___ Deepika	___	___	Mahesh	___	
(Baseball)			(Chess)		

The people who like kabaddi and running are next to each other. From the arrangement above, the person to the right of Sonal (i.e. at the extreme right of the row) has to like kabaddi. Also, Arvind is opposite this person.

Hence, Arvind is at the extreme left end of row 2.

Also, in row 2, two people sit between Suresh and the vacant seat; such that Suresh is at the extreme end. Hence, Suresh is at the extreme right end. This also fixes the position of the vacant seat.

The only seat left now is taken by Lily.

	(Kabaddi)	(Running)	(Skating)	(Swimming)	(Walking)
R1: ___	Sonal	David	___	___	Lakshmi
R2: Arvind	Deepika	Vacant	Lily	Mahesh	Suresh
	(Baseball)			(Chess)	

Now, neither Arvind nor Mahesh face the vacant seat of row 1. From the arrangement above, the vacant seat of row 1 can only be opposite Lily.

Also, Anu is not an immediate neighbour of Lakshmi. Hence, Anu is at the extreme right of row 1. Hence, Sadhana takes the only remaining seat in row 1 i.e. next to Lakshmi.

	(Kabaddi)	(Running)	(Skating)	(Swimming)	(Walking)
R1: Anu	Sonal	David	Vacant	Sadhana	Lakshmi
R2: Arvind	Deepika	Vacant	Lily	Mahesh	Suresh
	(Baseball)			(Chess)	

The three sports/activities left now are cricket, wrestling and boating.

Arvind does not like wrestling or boating. Hence, Arvind like cricket.

Suresh does not like wrestling. Hence, Suresh likes boating and Lily likes wrestling.

Hence, the final arrangement is:

Row I	Anu	Sonal	David		Sadhana	Laxmi
	Kabaddi	Running	Skating	Vacant	Swimming	Walking

Row II	Arvind	Deepika		Lily	Mahesh	Suresh
	Cricket	Baseball	Vacant	Wrestling	Chess	Boating

Q29) Lily likes wrestling.

Hence, **option 3**.

(Q30) Deepika likes baseball.

Hence, option 2.

(Q31) A vacant seat is between David and Sadhana.

Hence, **option 4**.

(Q32) The people sitting to the immediate right of the person facing the vacant seats are Sonal (running) and Lily (wrestling).

Only Sonal is referred to in the options.

Hence, **option 1**.

(Q33) Only the statement in option 1 is false as Sadhana like swimming, not boating.

Hence, **option 1**.

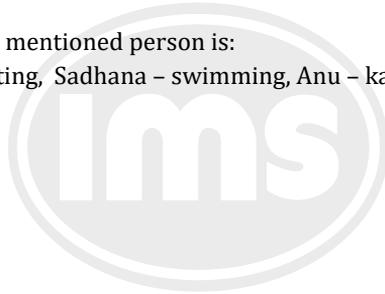
(Q34) David and Lily face the vacant seats.

Hence, **option 2**.

(Q35) The sport liked by each mentioned person is:

Arvind – cricket, Suresh – boating, Sadhana – swimming, Anu – kabaddi

Hence, **option 4**.



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SECTION II

Quantitative, Data Interpretation & Data Sufficiency

(Q36) The given expression is:

$$\left\{ \frac{2^{1/2} \times 3^{1/3} \times 4^{1/4}}{10^{-1/5} \times 5^{3/5}} \div \frac{3^{4/3} \times 5^{-7/5}}{4^{-3/5} \times 6} \right\} \times 2$$

Note that $(x)^{-n}$ is equivalent to $(1/x)^n$

Hence, taking relevant reciprocals, the expression becomes:

$$\begin{aligned} & \left\{ \frac{2^{1/2} \times 3^{1/3} \times 4^{1/4} \times 10^{1/5}}{5^{3/5}} \div \frac{3^{4/3} \times 4^{3/5}}{5^{7/5} \times 6} \right\} \times 2 \\ &= \left\{ \frac{2^{1/2} \times 3^{1/3} \times 4^{1/4} \times 10^{1/5}}{5^{3/5}} \times \frac{5^{7/5} \times 6}{3^{4/3} \times 4^{3/5}} \right\} \times 2 \end{aligned}$$

This can be further split as:

$$\begin{aligned} &= \left\{ \frac{2^{1/2} \times 3^{1/3} \times (2^2)^{1/4} \times 2^{1/5} \times 5^{1/5}}{5^{3/5}} \times \frac{5^{7/5} \times 2 \times 3}{3^{4/3} \times (2^2)^{3/5}} \right\} \times 2 \\ &= \left\{ \frac{2^{1/2} \times 3^{1/3} \times 2^{1/2} \times 2^{1/5} \times 5^{1/5}}{5^{3/5}} \times \frac{5^{7/5} \times 2 \times 3}{3^{4/3} \times 2^{6/5}} \right\} \times 2 \end{aligned}$$

Now, place all the powers of 2 together, all the powers of 3 together and so on.

Hence, the expression becomes:

$$\begin{aligned} & \frac{2^{1/2} \times 2^{1/2} \times 2^{1/5} \times 2 \times 2}{2^{6/5}} \times \frac{3^{1/3} \times 3}{3^{4/3}} \times \frac{5^{1/5} \times 5^{7/5}}{5^{3/5}} \\ &= 2^{\{(1/2)+(1/2)+(1)+(1)+(1/5)-(6/5)\}} \times 3^{\{(1/3)+(1)-(4/3)\}} \times 5^{\{(1/5)+(7/5)-(3/5)\}} \end{aligned}$$

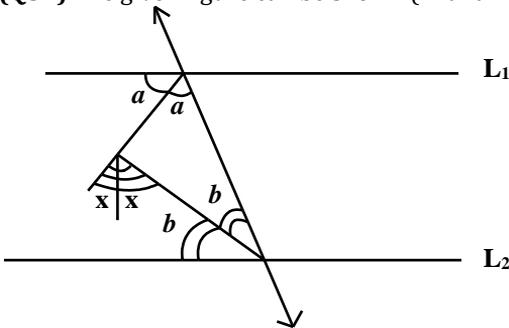
$$= 2^{\{1+1+1-1\}} \times 3^{\{1-1\}} \times 5^{\{1\}}$$

$$= 2^2 \times 3^0 \times 5^1$$

$$= 4 \times 1 \times 5 = 20$$

Hence, **option 2**.

(Q37) The given figure can be shown (with all the angles marked) as under:



Since L_1 and L_2 are two parallel lines; and $2a$ and $2b$ are interior angles between two parallel lines, they are supplementary.

$$\therefore 2a + 2b = 180^\circ$$

$$\therefore a + b = 90^\circ$$

Now, using the property of exterior angles for the given triangle,

$$2x = a + b = 90^\circ$$

$$\therefore x = 45^\circ$$

Hence, **option 2.**

(Q38) The given question is incorrect. It would have been correct had the expression being compared been $(3\pi v h^3)$ instead of $(3\pi v h^2)$. The solution below has been provided comparing the RHS with $(3\pi v h^3)$.

For a right circular cone:

$$v = \pi r^2 h / 3$$

$$c = \pi r l = \pi r [\sqrt{r^2 + h^2}]$$

$$\text{LHS: } 3\pi v h^3 = 3\pi \times (\pi r^2 h / 3) \times h^3 = \pi^2 r^2 h^4$$

Since each term in the RHS at least has an expression $(c^2 h^2)$, first find this value.

$$c^2 = \pi^2 r^2 (r^2 + h^2) = \pi^2 r^4 + \pi^2 r^2 h^2$$

$$\therefore c^2 h^2 = \pi^2 r^4 h^2 + \pi^2 r^2 h^4$$

$$\text{Now, } 9v^2 = 9 \times (1/9) \times (\pi^2 r^4 h^2) = \pi^2 r^4 h^2$$

$$\therefore c^2 h^2 - 9v^2 = (\pi^2 r^4 h^2 + \pi^2 r^2 h^4) - (\pi^2 r^4 h^2) \\ = \pi^2 r^2 h^4$$

This matches with the LHS.

Hence, **option 2.**

(Q39) If there are n distinct objects of a type, then number of ways to select any number of objects such that atleast one object of that type is definitely selected = $(2^n - 1)$.

Also, if there are n distinct objects of a type, then number of ways to select any number of objects such that no object may be selected = (2^n) .

Here, at least one blue dye (out of four), atleast one green dye (out of five) and any number of red dyes (from zero to three) are to be selected.

$$\therefore \text{Number of ways} = (2^4 - 1) \times (2^5 - 1) \times (2^3)$$

$$= 15 \times 31 \times 8 = 3720$$

Hence, **option 2.**

(Q40) Consider $(a - b)^3 + (b - c)^3 + (c - a)^3$

This is of the form $x^3 + y^3 + z^3$.

It is known that:

$$(x^3 + y^3 + z^3) - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$$

$$\text{Here, } x + y + z = (a - b) + (b - c) + (c - a) = 0$$

$$\therefore (x^3 + y^3 + z^3) - 3xyz = 0$$

$$\text{i.e. } (x^3 + y^3 + z^3) = 3xyz$$

$$\therefore (a - b)^3 + (b - c)^3 + (c - a)^3 = 3(a - b)(b - c)(c - a)$$

Hence, **option 2.**

(Q41) Let S and M be the respective events that Sonal and Meenal are selected.

$$\therefore P(S) = 1/7 \text{ and } P(S') = 6/7$$

$$\text{Similarly, } P(M) = 1/5 \text{ and } P(M') = 4/5$$

\therefore Probability that only one of them is selected = (probability that Sonal is selected while Meenal is not) + (probability that Meenal is selected while Sonal is not)

$$= [P(S) \times P(M')] + [P(M) \times P(S')]$$

$$= [(1/7) \times (4/5)] + [(1/5) \times (6/7)]$$

$$= (4/35) + (6/35)$$

$$= 10/35 \text{ i.e. } 2/7$$

Hence, **option 2.**

(Q42) $\log_{10}(1/110) = \log_{10}(110)^{-1}$

$$= (-1) \times \log_{10}[11 \times 10]$$

$$= (-1) \times [\log_{10}11 + \log_{10}10]$$

Now, $\log_{10}11 = a$... (given)

$$\therefore \text{Required expression} = (-1) \times (a + 1)$$

Hence, **option 4.**

(Q43) Let the price of the fridge be Rs. 100

Since the price of the TV is 150% of the price of the fridge,

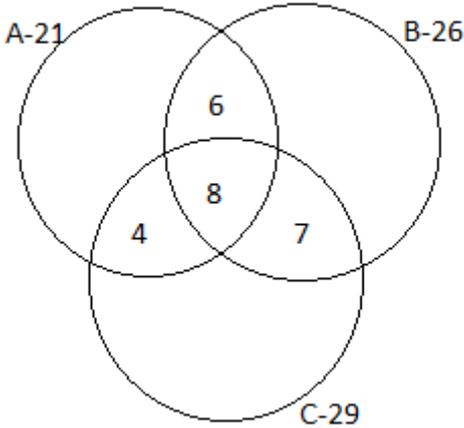
$$TV = 1.5 \times 100 = \text{Rs. } 150$$

Hence, total price of the two objects = $100 + 150 = \text{Rs. } 250$

$$\therefore \text{Required percentage} = (100/250) \times 100 = 40\%$$

Hence, **option 2.**

(Q44) We can draw a Venn diagram as follows:



$$\therefore \text{Students shortlisted only for B} = 26 - (6 + 8 + 7) = 26 - 21 = 5$$

$$\text{Students shortlisted only for C} = 29 - (4 + 8 + 7) = 29 - 19 = 10$$

$$\text{Required ratio} = 5 : 10 = 1 : 2$$

Hence, **option 2.**

(Q45) Let the fixed charge be Rs. f and the variable charge be Rs. v per km.

Hence, total fare over d km = Rs. $(f + dv)$

$$\text{For 10 km: } f + 10v = 150 \dots \text{(i)}$$

$$\text{For 15 km: } f + 15v = 220 \dots \text{(ii)}$$

Solving (i) and (ii): $v = 14$ and $f = 10$

$$\therefore \text{Total cost while covering 25 km} = f + 25v$$

$$= 10 + 14(25)$$

$$= 10 + 350 = \text{Rs. } 360$$

Hence, **option 3.**

(Q46) The given figure comprises one 'large' semi-circle, one 'medium' semi-circle and two 'small' semi-circles. Note that the terms – large, medium and small – are relative to each other.

$$\text{Radius of the large circle} = 28/2 = 14 \text{ cm}$$

$$\text{Radius of the medium circle} = 14/2 = 7 \text{ cm}$$

$$\text{Radius of the large circle} = 7/2 \text{ cm}$$

$$\therefore \text{Required area} = A(\text{large semi-circle}) + A(\text{medium semi-circle}) - 2A(\text{small semi-circle})$$

$$= [A(\text{large semi-circle}) + A(\text{medium semi-circle})] - A(\text{small circle})$$

$$= \frac{1}{2}\pi(14^2 + 7^2) - \pi(7/2)^2$$

$$= \frac{1}{2}\pi \times 7^2(4 + 1) - \pi \times 7^2 \times \frac{1}{4}$$

$$= \pi \times 7^2(5/2 - \frac{1}{4})$$

$$= \pi \times 49 \times 9/4 = 441/4 \pi = 110.25 \pi \text{ cm}^2$$

Hence, **option 4.**

(Q47) The umbrella is made by stitching together 10 triangles – such that each triangle has the dimensions – $30 \times 60 \times 60$.

$$\therefore \text{Total area of cloth required} = 10 \times \text{area of each triangle}$$

Since two colours are used in each cloth, quantity of cloth of each colour

$$= (10/2) \times \text{area of each triangle} = 5 \times \text{area of each triangle}$$

Consider any one triangle.

$$s = (a + b + c)/2$$

$$= (30 + 60 + 60)/2 = 75$$

$$\text{Area} = \sqrt{[s(s-a)(s-b)(s-c)]}$$

$$= \sqrt{[(75)(75-30)(75-60)(75-60)]}$$

$$= \sqrt{[(75)(45)(15)(15)]}$$

$$= \sqrt{(15 \times 5 \times 15 \times 3 \times 15 \times 15)}$$

$$= 15 \times 15 \times \sqrt{(5 \times 3)}$$

$$= 225\sqrt{15}$$

$$\therefore \text{Required area} = 5 \times 225\sqrt{15}$$

$$= 1125\sqrt{15} \text{ sq.cm}$$

Hence, **option 2.**

(Q48) Here, the base of the logarithm is 'e' instead of 10, as it is a natural logarithm.

$$R_c = m \ln \left(1 + \frac{R_m}{m} \right)$$

$$\therefore \ln \left(1 + \frac{R_m}{m} \right) = \frac{R_c}{m}$$

$$\therefore \left(1 + \frac{R_m}{m} \right) = e^{\frac{R_c}{m}}$$

$$\therefore \frac{R_m}{m} = e^{\frac{R_c}{m}} - 1$$

$$\therefore R_m = m \times \left(e^{\frac{R_c}{m}} - 1 \right)$$

Hence, **option 3.**

(Q49) $O = (a^0 - 4L^0)^6$

Neither a nor L can be zero as 0^0 is undefined.

For any other value, $a^0 = L^0 = 1$

$$\therefore O = [1 - (4)(1)]^6$$

$$= (-3)^6 = 729$$

Hence, the labour output function remains constant irrespective of the amount of labour.

Hence, **option 3.**

(Q50) The average price per litre minus the tax is:

$$(35 + 34 + 35.5 + 37 + 37.5 + 38)/6$$

$$= (217/6)$$

Since the taxes are 125% of the price,

$$\text{Average tax} = 1.25 \times (217/6) = \text{Rs. } 45.21$$

Hence, **option 1.**

(Q51) The number of ways of scrambling the word is the number of words that can be formed by rearranging the letters of the word ASTRONAUT.

ASTRONAUT is a nine-letter word with two As and two Ts in it.

$$\therefore \text{Number of words possible} = 9!/(2! \times 2!)$$

$$= 362880/4 = 90720$$

Hence, **option 4.**

(Q52) The fund is equally divided between securities and equities.

Return on securities = 7.8%

Gain on equities = 1%

Gains per student = average of the gains on securities and equities

$$\text{i.e. Gains per student} = (7.8 + 1) / 2 = 4.4\%$$

Hence, **option 2.**

(Q53) Observe that the angle subtended at the tip of the cone is 60° .

Hence, the height of the cone forms a 30° angle with the slant height of the cone.

Hence, the slant height, radius of cone and height of cone form a 30° - 60° - 90° triangle.

Let the radius of the cone be r cm.

$$\therefore \tan 30 = r/h$$

$$\therefore r = 30 \times (1/\sqrt{3})$$

$$= (3 \times 10) \times (1/\sqrt{3}) = 10\sqrt{3} \text{ cm}$$

$$\therefore \text{Volume of the cone} = (1/3) \times \pi r^2 h$$

$$= (1/3) \times \pi \times (10\sqrt{3})^2 \times (30)$$

$$= (1/3) \times \pi \times 100 \times 3 \times 30$$

$$= 3000\pi \text{ cm}^3$$

Hence, **option 1.**

Note: The data on the cylinder is redundant in this case.

(Q54) Nisha bought at least two units of each product.

The cost of one set formed by taking one unit of each product = $5 + 2 + 1 = \text{Rs. } 8$

Since Nisha bought more than one unit of each product, she would have bought at least two sets.

Total cost of two sets = Rs. 16 and number of units bought = 6

Balance amount with Nisha = Rs.20 – Rs.16 = Rs. 4

The shopkeeper gave Nisha 3 units of the product costing Re. 1 each which will cost Rs. 3

Now the balance amount with Nisha = Rs.4 – Rs.3 = Rs. 1

From this amount Nisha can get one more unit of the product costing Re. 1 each.

$$\therefore \text{Total units} = 6 + 1 + 3 = 10$$

Hence, **option 4.**

(Q55) Conventionally, the longer side of the rectangle is considered the length.

Hence, let the length be $7x$ units and breadth be $2x$ units.

Perimeter = 360 units

$$\therefore 2(7x + 2x) = 360$$

$$\therefore 18x = 360 \text{ i.e. } x = 20$$

$$\therefore \text{Length} = 7x = 140 \text{ units and Breadth} = 2x = 40 \text{ units}$$

Hence, **option 1.**

(Q56) Let the original price of sugar be Rs. 100 and original consumption be 100 gms.

$$\therefore \text{Total expense on sugar} = 100 \times 100 = \text{Rs. } 10,000$$

New price of sugar = $1.2 \times 100 = \text{Rs. } 120$ and new total expense = $1.05 \times 10000 = \text{Rs. } 10,500$

$$\therefore \text{New consumption} = 10500/120 = 87.5 \text{ gms}$$

$$\therefore \text{Decrease in consumption} = 100 - 87.5 = 12.5 \text{ gms}$$

$$\therefore \% \text{ decrease in consumption} = (12.5/100) \times 100 = 12.5\%$$

Hence, **option 2.**

(Q57) For a period of two years: C.I. – S.I. = $P \times (r/100)^2$

Here, $r = 5\%$ and C.I. – S.I. = Rs. 50

$$\therefore P \times (5/100)^2 = 50$$

$$\therefore P = 50 \times 20^2 = \text{Rs. } 20,000$$

$$\therefore \text{Amount at } 5\% \text{ C.I. at the end of 3 years} = P[1 + (r/100)]^3$$

$$= 20000 \times [1 + (5/100)]^3$$

$$= 20000 \times (21/20)^3$$

$$= \text{Rs. } 23152.5$$

Hence, **option 4.**

(Q58) The given expression is: $\log (\tan 1)^\circ + \log (\tan 2)^\circ + \dots \log (\tan 89)^\circ$

The value of $\log (x^\circ) = 0 \times \log (x) = 0$

Hence, the value of each term in the above expression is 0.

Hence, the value of the overall expression is 0.

Hence, **option 3.**

(Q59) Let the original multiplication be $25a$.

Hence, the actual multiplication taken by Sumit is $34a$.

The extra value obtained due to this mistake = 405

$$\therefore 34a - 25a = 405$$

$$\therefore 9a = 405 \text{ i.e. } a = 45$$

$$\therefore \text{Value actually obtained by Sumit} = 34a = 1530$$

Hence, **option 1.**

(Q60) The word CUSTOM is a six-letter word with no letters repeated.

Now, the first letter is fixed i.e. M.

Hence, number of words formed using remaining five letters = $5! = 120$

Hence, **option 3.**

(Q61) All books in a group have to be together.

The group of 5 Marathi books can be arranged amongst themselves in $5!$ ways.

Similarly, the groups of English and Tamil books can be arranged amongst themselves in $3!$ ways each.

Also, the three groups – Marathi, English, Tamil – can be arranged amongst themselves in $3!$ ways.

$$\therefore \text{Total ways} = 5! \times 3! \times 3! \times 3!$$

$$= 120 \times 6 \times 6 \times 6 = 25920$$

Hence, **option 1.**

(Q62) For the same distance, speed and time are inversely proportional.

$$S \text{ (excluding halts)} : S \text{ (with halts)} = 50 : 40 = 5 : 4$$

$$\therefore T \text{ (excluding halts)} : T \text{ (with halts)} = 4 : 5$$

Hence, if the time taken along with halts is an hour i.e. 60 minutes, then the time without halts would be $(4/5) \times 60 = 48$ minutes

$$\therefore \text{Halt time per hour} = 60 - 48 = 12 \text{ minutes}$$

Hence, **option 1.**

(Q63) Number of days required to finish the work when A and B are working together

$$= (10 \times 15)/(10 + 15) = 150 / 25 = 6 \text{ days}$$

$$\text{Fraction of work finished in 4 days} = 4/6 = 2/3$$

$$\text{Fraction of work left} = 1 - 2/3 = 1/3$$

Hence, **option 4.**

(Q64) 20% of $x = y$

$$y\% \text{ of } 20 = 20\% \text{ of } y$$

$$= 20\% \text{ of } 20\% \text{ of } x$$

$$= 4\% \text{ of } x$$

Hence, **option 4.**

(Q65) In a race of 4 km (or 4000 m), Anu wins by 600 m over Binu.

Hence, when Anu completed 4000 m, Binu has only completed $(4000 - 600) = 3400$ m

Since Anu and Binu complete these distances in the same time, their speed is directly proportional to the distance covered.

$$\therefore A : B = 4000 : 3400 = 20 : 17$$

Now, Binu can give a startup of 200 m to Caira in a 4 km race i.e. Binu can allow Caira to run only 3800 m in the same time that Binu herself needs to run 4000 m.

Again, speed is proportional to distance covered.

$$\therefore B : C = 4000 : 3800 = 20 : 19$$

$$\therefore A : B : C = (20 \times 20) : (17 \times 20) : (19 \times 17)$$

$$= 400 : 340 : 323$$

Hence, when A runs 400 m, Caira runs 323 m i.e. A can give Caira a startup of $400 - 323 = 77$ m in a 400 m race.

Hence, startup that can be given in a 4000 m race = $77 \times (4000/400) = 770$ m

Hence, **option 3.**

(Q66) Total surface area of wooden box = $2(lb + bh + lh)$

Since a margin of 5% of the total surface area is required, total wood required for each type of box = $1.05 \times 2(lb + bh + lh)$

∴ Cost of wood for 250 boxes of a type at Rs. 4 per sq.cm
 $= 250 \times 4 \times 1.05 \times 2 \times (lb + bh + lh)$
 $= 2100 \times (lb + bh + lh)$
∴ Overall total cost = cost for smaller box + cost for larger box
 $= 2100 \times [(15)(12) + (12)(5) + (5)(15)] + 2100 \times [(25)(20) + (20)(5) + (5)(25)]$
 $= 2100 \times [180 + 60 + 75] + 2100 \times [500 + 100 + 125]$
 $= 2100 \times (315 + 725)$
 $= 2100 \times 1040 = \text{Rs. } 21,84,000$
Answer: 2184000

(Q67) The given expression is:

$$\frac{[4^2 \times 2^{n+1}] - [4 \times 2^n]}{[4^2 \times 2^{n+2}] - [2 \times 2^{n+2}]}$$

This can be expressed as:

$$\frac{[4^2 \times 2^n \times 2^1] - [4 \times 2^n]}{[4^2 \times 2^n \times 2^2] - [2 \times 2^n \times 2^2]}$$

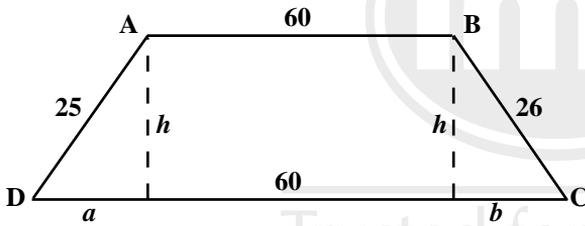
$$= \frac{[4 \times 2^n]\{[4 \times 2] - 1\}}{[4 \times 2^n]\{[4 \times 4] - 2\}}$$

$$= (8 - 1)/(16 - 2)$$

$$= 7/14 = 0.5$$

Answer: 0.5

(Q68) The trapezium with the relevant sides is as shown below:



The height of the trapezium forms a rectangle on the two parallel sides.

Let the two parts of the longer parallel side – that are not included in the rectangle – be a and b cm respectively.

$$\therefore a + b + 60 = 77$$

$$\therefore a + b = 17 \dots \text{(i)}$$

Let the height of the trapezium be h cm.

Hence, applying the Pythagoras Theorem to the two triangles:

$$h^2 = 25^2 - a^2 \text{ and } h^2 = 26^2 - b^2$$

$$\therefore 25^2 - a^2 = 26^2 - b^2$$

$$\therefore b^2 - a^2 = 26^2 - 25^2$$

$$\therefore (b - a)(b + a) = (26 - 25)(26 + 25)$$

$$\therefore 17(b - a) = (1)(51) = 51$$

$$\therefore (b - a) = 51/17 = 3 \dots \text{(ii)}$$

Solving (i) and (ii): $b = 10$ and $a = 7$

$$\therefore h^2 = 25^2 - 7^2$$

$$= 625 - 49 = 576$$

$$\therefore h = 24 \text{ (as height has to be positive)}$$

$$\therefore \text{Area of trapezium} = (1/2) \times (60 + 77) \times 24$$

$$= 137 \times 12 = 1644 \text{ sq.cm}$$

Answer: 1644

(Q69) $(p + q)^3 - (p - q)^3 - 6q(p^2 - q^2)$
 $= [p^3 + 3p^2q + 3pq^2 + q^3] - [p^3 - 3p^2q + 3pq^2 - q^3] - 6p^2q + 6q^3$
 $= 6p^2q + 2q^3 - 6p^2q + 6q^3$
 $= 8q^3$
 $= 8(1)^3 = 8$
Answer: **8**

(Q70) The value of M, X, V and I as per Roman numerals is 1000, 10, 5 and 1 respectively.
Hence, MMXVIII = 1000 + 1000 + 10 + 5 + 1 + 1 + 1 = 2018
Answer: **2018**



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SECTION III

General English: Reading Comprehension, Verbal Reasoning, Verbal Ability

(Q71) The words 'bemuse', 'confuse' and 'bewilder' are synonyms – broadly meaning “to take away clarity from something” or “make something less easy to understand”.

To 'reuse' means to “use something again”.

Hence, **option 2**.

(Q72) An 'epicurean' is a “person devoted to enjoyment, specifically derived from good food and drink”. 'Gourmet' and "Gastronomist" are synonyms and both mean “connoisseur of good food”.

Something 'hideous' is something that is “ugly” or “unpleasant”.

Hence, **option 4**.

(Q73) The phrase “desire for” is used when someone is expressing a wish for or interest in something or someone e.g. desire for wealth or desire for his company.

The phrase “desire of” is used when the person or object is being wished for by someone e.g. “desire of the team”.

Here, the young man is saying that he is not interested in riches. Hence, the correct usage will be “he had no desire for riches”.

Hence, **option 2**.

(Q74) The word 'jewellery' is used either in the singular form to indicate one piece (e.g. ring, necklace etc) or in the plural form to denote a collection of jewellery items.

Hence, “all her jewellery” is correct usage.

Hence, **option 3**.

Note: Jewellery is also spelt as Jewelry in American English.

(Q75) When you are speaking about that something that did not happen, the appropriate usage of the verb is in the past perfect tense (if I had known) rather than the present conditional tense (if I would have known).

Here, the person did not know that Harish was ill. Hence, the correct usage is “I wish I had known”, followed by “I would have done ...”.

Hence, **option 2**.

(Q76) Mea Culpa is a Latin phrase and it means “because of my” or “through my fault”. Hence, it is an acceptance of fault or blame.

Hence, **option 4**.

(Q77) “Still”, when used as an adjective, means “silent or not making a sound or stationary at a place”. The phrase “still waters run deep” implies that waters that are not moving or flowing can be very deep. This is also used in the context of a person who does not say too much or does not react explicitly. Hence, “Still waters run deep” uses “still” as an adjective.

Hence, 2-a is a valid pair. This eliminates options 1 and 4.

Observe statement c.

The good news makes me “do something”. The verb “do something” is replaced by “still my fears” which means “quieten” or “subside”. Hence, “still my fears” uses “still” as a verb.

Hence, 3-c is a valid pair. This eliminates option 2.

Hence, **option 3**.

Note: Though you need not check the other two combinations, you can verify as under.

A “still” also means a static picture or a single photo from a camera. This is a noun—form usage.

Hence, “stills for a magazine” is noun form usage and 1-b is a valid pair.

“Still” in the adverb form means “up to and even now”. Hence, “still love me when ...” means “love me till that time” i.e. adverb usage. Hence, 4-d is a valid pair.

(Q78) As a noun, “well” is used to denote a “hole or cylindrical structure (mostly below ground level) that contains water and from which this water can be drawn.

Hence, 3-a is the correct combination for the noun usage.

This eliminates options 2, 3 and 4.

Hence, **option 1**.

Note: The other usage of well, as given in the question is as shown.

To “well up” is to “come out suddenly” or to “overflow”.

Hence, “tears welled up” is correct verb usage i.e. 1-b.

“Well deserved victory” describes the nature of the victory and is hence, the correct adjective usage i.e. 2-d.

The children behaved “well” implies that the children behaved in “a certain manner”. Hence, this is the correct adverb form usage i.e. 4-c.

(Q79) ‘Turmoil’ is a state of ‘great confusion’. Hence, while turmoil and confusion demonstrate the same emotion, turmoil does it to a much larger extent compared to confusion.

‘Metamorphosis’ is a specific type of ‘transformation’ – a biological process in which a younger version of a living organism evolves into an adult form.

An ‘assassination’ is a specific type of ‘murder’ – in which a prominent person is killed, usually for political, ideological or financial reasons.

‘Chaos’ implies ‘complete disorder and confusion’. Thus, chaos and disorder are synonymous, but chaos is an enhanced level of disorder. Hence, this pair shares the same relationship with the given pair.

Hence, **option 4**.

(Q80) The correct conjunction to indicate that you need to wait for something to occur so that you complete some action is “till”. For instance, wait till I return or play till sunset.

Hence, the correct usage here is “wait till your friends come”.

The correct usage for “for” would have been – wait for your friends to come.

Hence, **option 3**.

(Q81) The structure of the sentence here is “Do this or you will face certain consequences”. In such a case, “or” and “else” can be used interchangeably. For instance, eat carefully else you will fall ill.

Hence, the correct usage is “study hard else you will not pass the exam”.

Hence, **option 2**.

(Q82) To ‘usurp’ is to ‘take away something (especially a place or position) by force.

The only word in the options that conveys a similar meaning is ‘encroach’, which means ‘illegally occupy someone’s land or property’ or ‘go beyond a certain limit’.

Thus, both words convey the idea of capturing something illegally and by force.

To ‘abdicate’ implies ‘to leave a throne or position’ or ‘let go of responsibilities’.

To ‘capitulate’ is to ‘yield’ or ‘surrender’.

To ‘adjudge’ is to ‘award something in favour of someone’ or ‘declare something to be true’.

Hence, **option 4**.

(Q83) ‘Flagrant’ implies ‘something that is wrong in an obvious, evident or blatant manner’.

Hence, flagrant and blatant are synonymous.

The other words are not related to flagrant in any way.

Something that is ‘sweet-smelling’ is called ‘fragrant’.

‘Meek’ implies ‘timid’ and ‘flagship’ means the ‘main product or brand associated with something’.

Hence, **option 3**.

(Q84) ‘Ostentatious’ means something that is ‘flashy, showy, flamboyant or done in a manner that draws attention to itself’.

On the other hand, ‘modest’ means ‘humble, unpretentious and someone who shies away from credit’. Hence, ‘modest’ is the appropriate antonym.

‘Pretentious’ and ‘flamboyant’ are both synonyms of ‘ostentatious’.

‘Obtrusive’ means ‘prominent; but in an intrusive way’.

Hence, **option 1**.

(Q85) From direct to indirect speech, the present perfect tense changes to past perfect tense. Here, the gender of the speaker is not known but all the options refer to a male. Hence, "I have won the race!" becomes "He said that he had won the race". Hence, **option 1**.

(Q86) The word 'please' implies that she requested the boys. Also, because the original sentence is in the past tense, the indirect speech will also be in the past tense. Hence, the correct representation is "She requested the boys to wait there till she got back". Hence, **option 3**.

(Q87) The word 'totaly' is wrongly spelt in part 3. It should have been written as 'totally'. All the other parts are correct. Hence, **option 3**.

(Q88) Part 1 has the error. The adverb 'to' is not used to link the verb "made me" and the corresponding action "do something". Hence, the correct usage is "He made me wait." Hence, **option 1**.

(Q89) The correct usage is 'so severe' as it is used to show the relative severity of weather through examples. The word 'such' would have gone with 'severity'. For instance, 'the severity of the weather was such that'. Hence, **option 2**.

(Q90) When a person wants to indicate movement through a medium e.g. train, ship, cart etc, the correct preposition is 'by'. Hence, the correct usage is "coming by train". Hence, **option 2**.

(Q91) Since the time of the day has to appear last, the structure of the affirmative sentence has to be - "We did something at a certain place at a certain time of the day". Hence, the correct arrangement here is - "We met her again at the hospital last evening" i.e. 657319842. Answer: **657319842**

(Q92) For nouns ending in "is", the plural form ends in "es". Hence, 'axis' becomes 'axes' in the plural form and "crisis" becomes 'crises'. Hence, the roll number of the student who gave the correct answer is 101. Answer: **101**

(Q93) The process described in the question is known as ARBITRATION. This is written on board 1. Answer: **1**

(Q94) Past participles are formed from verbs and can be used to form verb tenses. The past participle form typically ends in 'ed', 'd', 't', 'en or 'n'. The past participle form of 'wear' will be 'worn'. Hence, Shamu would have chosen 3 as the correct code. Answer: **3** (The actual test however did not have an appropriate choice owing to a typographical error)

(Q95) The correct proverb is 'A swarm in May is worth a load of hay; a swarm in June is worth a silver spoon; but a swarm in July is not worth a fly'. It is a medieval saying which means that later in the year, bees will have little time to collect pollen.

Hence, friend 3 is correct.

Answer: 3

(Q96) The whole passage talks about how Google surreptitiously keeps collecting a user's location details even when the user has set his settings to the contrary. However, the passage does give Google some benefit of doubt by mentioning how it clearly asks the user's permission to use his/her location. Hence, "Google being upfront about asking for location" means that it is candid and open about seeking the location.

Hence, **option 3**.

(Q97) The passage clearly mentions that when Location History is turned off, Google will not 'remember' where you are or add that location to your timeline. However, it will definitely store the time-stamped location data without asking or informing the user. This supports option 1. Options 2 and 3 contradict the passage. Option 4 is a misjudgement as the author is only pointing a privacy risk in Google's policies.

Hence, **option 1**.

(Q98) The passage explicitly states that the privacy issue affects 2 billion Android users and hundreds of millions of iPhone users.

Hence, **option 2**.

(Q99) The passage points out a hidden aspect of Google's location tracking mechanisms. It shows how location data is still collected if the 'Web and App Activity' is turned on, even if 'Location History' is turned off.

Hence, turning off Location History does not affect other location markers used by Google.

Hence, **option 3**.

(Q100) The gist of the passage is that Google is intrusive and tracks you incessantly with, or without, your knowledge or consent. Option 3 best captures this.

Option 1 captures only a very small part of the passage and misses out on tracking.

Option 2 is irrelevant to the passage.

Option 4 is not only irrelevant but also contradicts the overall mood of the passage.

Hence, **option 3**.

(Q101) The passage describes Frederic Bastiat as the 'rarest of rare creatures' because he was a Frenchman who advocated and promoted a free market economy. The passage later says that the French pursue protectionism in trade. Hence, Bastiat went against the stereotype and is hence, dubbed 'rarest of rare creatures'.

Hence, **option 2**.

(Q102) Since the passage mentions John Lennon's song, it can be safely assumed for the sake of the passage that John Lennon was a singer.

Hence, **option 3**.

Note: Please do not assume previously known information about John Lennon (or anybody else for that matter) to be true, unless mentioned or alluded to.

(Q103) The passage explicitly mentions that the better and more useful way to deal with poverty is to exploit the full infrastructure of capitalism.

Hence, **option 4**.

(Q104) The word 'arcane' means something that is 'difficult to comprehend or understand' or something 'technical that can be understood by very few people'.

Hence, in the context of the passage, the correct meaning is 'incomprehensible'.

Hence, **option 3**.

(Q105) As per the passage, India wants higher tariffs for agriculture (to protect its agricultural sector) and greater liberalisation for services.

Hence, **option 4**.

(Q106) option 1
(Q107) option 2
(Q108) option 1
(Q109) option 1
(Q110) option 2
(Q111) option 1
(Q112) option 1
(Q113) option 1
(Q114) option 1
(Q115) option 1
(Q116) option 1
(Q117) option 1
(Q118) option 1
(Q119) option 1
(Q120) option 4
(Q121) option 1
(Q122) option 1
(Q123) option 1
(Q124) option 1
(Q125) option 4
(Q126) 2
(Q127) 6
(Q128) 133
(Q129) 68
(Q130) 2



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