

DETAILED SOLUTION

CAT 2008

1. The initial quantity of rice is x kg.
The first customer buys half the total rice in the store, and another half kg.

∴ Rice purchased by the first customer

$$= \frac{x}{2} + \frac{1}{2} = \frac{x+1}{2}$$

$$\therefore \text{Remaining rice} = x - \left(\frac{x+1}{2}\right) = \frac{x-1}{2}$$

Now, the second customer buys half of this, and another half kg.

∴ Rice purchased by the second customer

$$= \frac{x-1}{4} + \frac{1}{2} = \frac{x+1}{4}$$

$$\therefore \text{Remaining rice} = \frac{x-1}{2} - \left(\frac{x+1}{4}\right) = \frac{x-3}{4}$$

Now, the third customer buys half the remaining rice, and another half kg.

∴ Rice purchased by the third customer

$$= \frac{x-3}{8} + \frac{1}{2} = \frac{x+1}{8}$$

Since after this purchase, there is no rice left in the store, we conclude that:

$$\frac{x-3}{4} + \frac{x+1}{8} = \frac{x-7}{8} = 0$$

$$\therefore x = 7$$

Hence, **option 2**.

2. ∴ 3 is a root of $f(x) = 0$,
∴ $9a + 3b + c = 0$... (i)

Also,

$$f(5) = -3f(2)$$

$$\therefore 25a + 5b + c = -3(4a + 2b + c)$$

$$\therefore 37a + 11b + 4c = 0 \quad \dots \text{(ii)}$$

On solving equations (i) and (ii), we get,

$$a - b = 0$$

$$\therefore a = b$$

We know that sum of the roots of a quadratic equation ($ax^2 + bx + c = 0$) is $-b/a$

$$\therefore 3 + \text{other root} = -1$$

$$\therefore \text{Other root} = -4$$

Hence, **option 2**.

3. The roots at $f(x) = 0$ are 3 and -4
∴ The equation can be written as $(x-3)(x+4) = 0$
Or, $x^2 - x + 12 = 0$

The co-efficient of x^2 is 1 here, but all equations which are multiple of this equation will also have same roots.

For example,

$$10(x^2 - x + 12) = 0 \text{ will also have same roots}$$

∴ $(a + b + c)$ cannot be determined uniquely.

Hence, **option 5**.

4. The first sequence can be written as 17, 17 + 4, 17 + 8, ... , 417 and second sequence can be written as 16, 16 + 5, 16 + 10, ... , 466

The common difference for the first sequence is 4 and that for the second sequence is 5 and both the sequences have 21 as the first common term.

∴ Common terms are 21, 21 + L, 21 + 2L, ...

[Here, L = LCM of 4 and 5 = 20]

∴ Common terms are 21, 21 + 20, 21 + 40, ...

The common terms have a common difference of 20 and first term as 21.

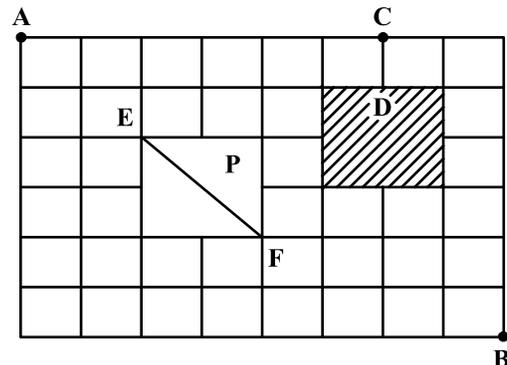
$$\therefore 417 - 21 = 396 \text{ and } 396/20 = 19.8,$$

∴ 19 terms are common, other than 21.

∴ The total number of terms which are common to both the sequences = 19 + 1 = 20

Hence, **option 3**.

- 5.



We can find the number of shortest possible paths from A to E either by trial and error or by using combinations.

Note that to travel from A to E, we have to take 2 roads to the right and 2 roads downwards (in the diagram) in order that we follow the shortest path. In other words, we have to use $2 + 2 = 4$ roads, out of which 2 are towards right and 2 are downwards.

This is equivalent to selecting 2 things (roads towards right) out of 4 things (roads). (The remaining two roads will be downwards.)

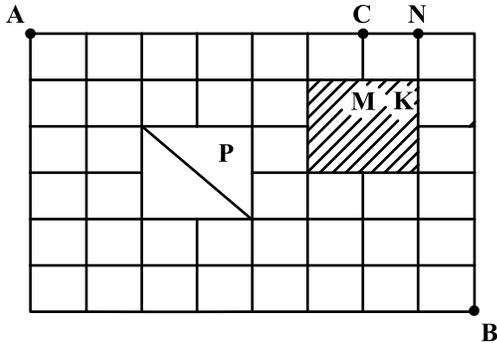
$$\text{The number of ways of doing this is } {}^4C_2 = 4!/(2! \times 2!) = 6$$

∴ From point A to E, there are 6 ways to reach with the minimum distance travelled.

Here E to F is the shortest distance because the third side of a triangle is always less than the sum of the other two sides.

From point F to B, there are ${}^6C_4 = 6!/(4! \times 2!) = 15$ ways to reach with the minimum distance travelled.
 \therefore There are $15 \times 6 = 90$ shortest paths that Neelam can choose.
 Hence, **option 4**.

6.



From point A to B, there are 90 paths possible with the minimum distance travelled.
 We can travel from B to C in two ways
 1. B - K - M - C
 To travel from B to K, we have to take 6 roads, out of which one is towards left and 5 are upwards.
 There are $6!/(5! \times 1!) = 6$ ways to do this. (Refer to the explanation in the first question of this set.)
 2. B - N - C
 To travel from B to N, we have to take 7 roads, out of which one is towards left and 6 are upwards.
 There are $7!/(6! \times 1!) = 7$ ways to do this.
 \therefore There are $6 + 7 = 13$ ways in which we can travel from B to C.
 \therefore Overall there are $90 \times 13 = 1170$ paths possible
 Hence, **option 1**.

7. Let $x = 1$ and $y = 2$

$\therefore f(1) f(2) = f(2)$
 $\therefore f(1) = 1$

Now, let $x = \frac{1}{2}$ and $y = 2$

$\therefore f\left(\frac{1}{2}\right) f(2) = f\left(\frac{1}{2} \times 2\right) = f(1)$

$\therefore 4f\left(\frac{1}{2}\right) = 1$

$\therefore f\left(\frac{1}{2}\right) = \frac{1}{4}$

Hence, **option 2**.

8. Initial sum of the terms of the sequence 1, 2, 3, ..., 40

$$= \frac{40 \times 41}{2} = 820$$

After erasing two numbers a and b , and replacing with $(a + b - 1)$, the new sum of the terms of the sequence

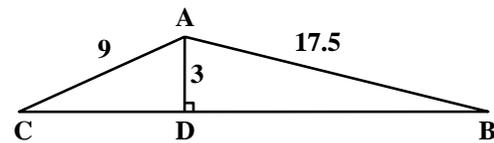
$$= 820 - 1$$

Similarly, after every operation, the sum of the terms of the sequence reduces by 1.
 \therefore The last number left (i.e. final sum) = $820 - 39 = 781$
 Hence, **option 3**.

9. Sum of the digits of multiples of 9 is always 9.

\therefore Seed of any number will be 9 if and only if it is a multiple of 9.
 There are 55 multiples of 9 which are less than 500 (as $500/9 = 55.555$)
 \therefore There are 55 positive integers which will have seed = 9
 Hence, **option 5**.

10.



We know that the area (A) of triangle (ABC) is related to the circumradius (R) and sides of the triangle as follows:

$$R = \frac{AB \times BC \times AC}{4A}$$

Where,

$$\text{Area, } A = \frac{1}{2} \times AD \times BC$$

$$\therefore R = \frac{AB \times BC \times AC}{4 \times \frac{1}{2} \times AD \times BC} = \frac{AB \times AC}{2AD} = \frac{17.5 \times 9}{2 \times 3}$$

$$= 26.25 \text{ cm}$$

Hence, **option 5**.

11. $7^1 = 07$

$$7^2 = 49$$

$$7^3 = 343$$

$$7^4 = 2,401$$

$$7^5 = 16,807$$

$$7^6 = 1,16,649$$

$$7^7 = 8,23,543$$

$$7^8 = 57,64,801$$

As we can see, for every 4th power of 7, the last two digits are 01. Since 2008 is divisible by 4, we can conclude that last two digits of 7^{2008} are 01.
 Hence, **option 3**.

12. If p, q and r are the roots of a cubic equation $ax^3 + bx^2 + cx + d = 0$,

then $pq + pr + qr = c/a$

If a is 1, then $pq + qr + pr = c$

Let the three roots of the given equation be $(n - 1), n$ and $(n + 1)$.

$$\begin{aligned} \therefore (n-1)n + n(n+1) + (n-1)(n+1) &= b \\ \therefore n^2 - n + n^2 + n + n^2 - 1 &= b \\ \therefore 3n^2 - 1 &= b \\ \therefore n^2 \geq 0, \text{ minimum value of } b &\text{ occurs at } n = 0 \\ \therefore \text{Minimum value of } b &= -1 \end{aligned}$$

Hence, **option 2**.

13. We know that for an obtuse triangle of sides a, b and c (where c is the largest side),

$$a^2 + b^2 < c^2$$

We also know that for a triangle, $a + b > c$

These present us with two limiting cases.

Let 8 cm and 15 cm be the shorter sides. The value of the largest side (x) must be greater than

$$\sqrt{8^2 + 15^2} = 17 \text{ cm}$$

The possible integer values of x are 18, 19, 20, 21 and 22 cm.

We cannot consider values from 23 onwards because $8 + 15 = 23$ and this violates the second condition.

Now, consider the case where 15 cm is the measure of the largest side.

The value of the remaining side (x) must be less than

$$\sqrt{15^2 - 8^2} = 12.69 \text{ cm}$$

The possible integer values are 12, 11, 10, 9 and 8 cm.

We cannot consider values less than 8 because

$7 + 8 = 15$ and this violates the second condition.

Thus, we have 10 possible values for x .

Hence, **option 3**.

14. The minimum number that can be formed is 1000 and the maximum number that can be formed is 4000.

As 4000 is the only number in which the first digit is 4, first let us calculate the numbers less than 4000 and then we will add 1 to it.

\therefore First digit can be 1, 2 or 3.

Remaining 3 digits can be any of the 5 digits.

\therefore Total numbers that can be formed, which are less than 4000 = $3 \times 5 \times 5 \times 5 = 375$

\therefore Total numbers that satisfy the given condition

$$= 375 + 1 = 376$$

Hence, **option 4**.

15. Consider $(a + b + c)^{20}$

\therefore The degree of the expression is 20, the degree of each term of the expression after expansion will be 20.

\therefore We have to divide 20 into three parts which can be done by using the distribution rule

$${}^{n+r-1}C_{r-1}$$

Where,

n is number of things to be distributed.

r is number of parts into which the things are to be distributed.

\therefore To divide 20 into 3 parts we have,

$${}^{20+3-1}C_{3-1} = {}^{22}C_2 = \frac{22 \times 21}{2 \times 1} = 11 \times 21 = 231$$

Hence, **option 1**.

Alternatively,

This can be solved without using much knowledge of permutations and combinations as follows,

$$(a + b + c)^1 = a + b + c \text{ [i.e. 3 terms = (1 + 2) terms]}$$

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac \text{ [i.e. 6 terms = (1 + 2 + 3) terms]}$$

$$(a + b + c)^3 = a^3 + b^3 + c^3 + 6abc + 3ab^2 + 3ac^2 + 3a^2b + 3bc^2 + 3a^2c + 3b^2c \text{ [i.e. 10 terms = (1 + 2 + 3 + 4) terms]}$$

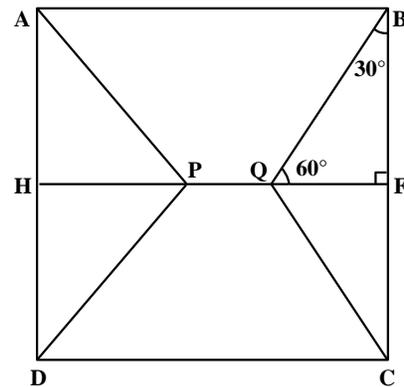
Similarly,

$$(a + b + c)^n \text{ will have } (1 + 2 + 3 + \dots + (n + 1)) \text{ terms}$$

$$\therefore (a + b + c)^{20} \text{ will have } (1 + 2 + 3 + \dots + 21) = 231 \text{ terms}$$

Hence, **option 1**.

- 16.



Let the length of the sides of the square be $2s$.

Consider ΔBQF ,

$$BF = s$$

In $30^\circ-60^\circ-90^\circ$ triangle,

$$QF = \frac{s}{\sqrt{3}}$$

$$\therefore \text{Area of } \Delta BQF = \frac{1}{2} \times s \times \frac{s}{\sqrt{3}}$$

\therefore Area of ΔBQF

$$= \text{Area of square } ABCD$$

$$- 4 \times \text{Area of } \Delta BQF$$

$$= 4s^2 - 4 \left(\frac{1}{2} \times s \times \frac{s}{\sqrt{3}} \right)$$

\therefore Required ratio

$$= \frac{4s^2 - 4 \left(\frac{1}{2} \times s \times \frac{s}{\sqrt{3}} \right)}{4 \left(\frac{1}{2} \times s \times \frac{s}{\sqrt{3}} \right)} = 2\sqrt{3} - 1$$

Hence, **option 5**.

17. Let the three numbers be $(a - 2), (a - 1)$ and a .

$$\therefore (a - 2) + (a - 1)^2 + a^3 = p^2$$

Where p is the sum of the three integers.

$$\text{Now, } a - 2 + a^2 - 2a + 1 + a^3 = p^2$$

$$\therefore a^3 + a^2 - a - 1 = p^2$$

$$\therefore a^2(a + 1) - 1(a + 1) = p^2$$

$$\therefore (a^2 - 1)(a + 1) = p^2$$

$$\therefore (a + 1)^2(a - 1) = p^2$$

For the above condition to be satisfied, $(a - 1)$ must be a perfect square.

The smallest possible value for this is 4, since $(a - 2)$ cannot be zero, giving us $(a - 2) = 3$

The minimum of the three is therefore 3.

Hence, **option 1**.

18. Consider only first term,

$$\begin{aligned} \sqrt{1 + \frac{1}{1^2} + \frac{1}{2^2}} &= \sqrt{1 + 1 + \frac{1}{4}} = \sqrt{\frac{9}{4}} \\ &= \frac{3}{2} = 2 - \frac{1}{2} \end{aligned}$$

Now consider first two terms,

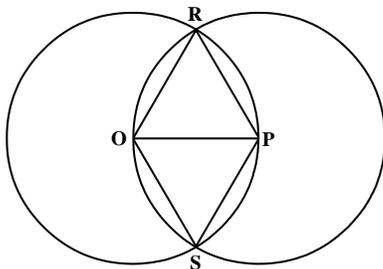
$$\begin{aligned} \sqrt{1 + \frac{1}{1^2} + \frac{1}{2^2}} + \sqrt{1 + \frac{1}{2^2} + \frac{1}{3^2}} \\ &= \frac{3}{2} + \sqrt{1 + \frac{1}{4} + \frac{1}{9}} \\ &= \frac{3}{2} + \sqrt{\frac{49}{36}} = \frac{3}{2} + \frac{7}{6} = \frac{8}{3} = 3 - \frac{1}{3} \end{aligned}$$

Similarly,

$$\begin{aligned} \sqrt{1 + \frac{1}{1^2} + \frac{1}{2^2}} + \sqrt{1 + \frac{1}{2^2} + \frac{1}{3^2}} + \dots \\ + \sqrt{1 + \frac{1}{2007^2} + \frac{1}{2008^2}} = 2008 - \frac{1}{2008} \end{aligned}$$

Hence, **option 1**.

19.



Let O and P be the centres of the circles.

$$OR = OP = PR = 1 \text{ cm}$$

$\therefore \Delta PRO$ is an equilateral triangle.

$$\therefore \angle ROP = 60^\circ$$

$$\therefore \angle ROS = 120^\circ$$

Now, area of the intersecting region

$$= 2(\text{area of sector } O-RPS) - 2(\text{area of } \Delta PRO)$$

$$\text{Area of sector } O - RPS = \frac{120}{360} (\pi) = \frac{\pi}{3}$$

$$\text{Area of sector } \Delta PRO = \frac{\sqrt{3}}{4} (1^2)$$

\therefore Area of the intersecting region

$$= 2\left(\frac{\pi}{3}\right) - 2\left(\frac{\sqrt{3}}{4}\right) = \frac{2\pi}{3} - \frac{\sqrt{3}}{2}$$

Hence, **option 5**.

20. The angles of the triangle formed by A, B and C tell us that ABC is a right-angle triangle, with right-angle at vertex C, 30° at vertex A and 60° at vertex B.

Since $AB = 500$ km, in $30^\circ-60^\circ-90^\circ$ triangle ABC, we get, $AC = 250\sqrt{3}$ km and $BC = 250$ km

The train, travels at 50 km/hr. It will travel from B to C (i.e. 250 km) in 5 hours. Since it leaves at 8:00 a.m., it will reach C at 1:00 p.m.

Now, Rahim must be at C latest by 12:45 p.m. (15 minutes before the train)

Travelling at 70 km/hr, he will take approximately 6.2 hours to travel from A to C. Therefore, he must leave at least by

$$12.75 - 6.2 = 6.55 \text{ hours after mid-night.}$$

This is a little after 6:30 a.m. If he leaves by 6:45 a.m., he will not make it to point C 15 minutes before the train arrives.

Hence, **option 2**.

21. As shown in the figure, ABC is the cross section of a cone of height 10 cm and radius of base 4 cm.

PQRS is the cross section of a cylinder which needs to be fitted inside the cone such that one of the flat faces of the cylinder (represented by RS) coincides with the base of the cone (represented by BC).

$\therefore \Delta ABD$ and ΔPBR are similar triangles.

$$\therefore \frac{10}{4} = \frac{h}{4 - r}$$

$$\therefore h = 10 - 2.5 \times r$$

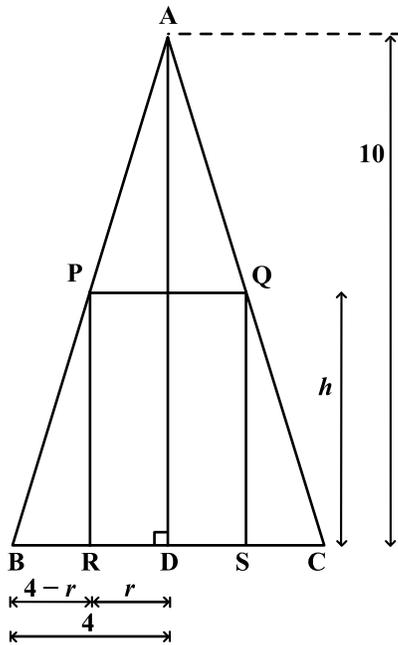
Total surface area of the cylinder = S

$$= 2\pi r \times (h + r) = 2\pi r \times (10 - 2.5 \times r + r) \text{ cm}$$

$$\therefore S = 2\pi \times (10r - 1.5 \times r^2) \text{ cm}^2$$

Differentiating 'S' with respect to 'r', we get,

$$\therefore \frac{ds}{dr} = 2\pi \times (10 - 3r)$$



For maximum surface area, $\frac{ds}{dr}$ must be equated to zero which gives

$$r = \frac{10}{3} \text{ and } h = \frac{5}{3} \text{ cm}$$

\therefore Maximum total surface area of the cylinder

$$= 2\pi \times \frac{10}{3} \times \left(\frac{5}{3} + \frac{10}{3}\right) = \frac{100\pi}{3} \text{ cm}^2$$

Hence, **option 1**.

22. We solve this question by options.

If we consider option 4 to be true, then either the White or Red horse will finish first. It means that the amount Raju receives at the end of the race will be at least Rs. 8000 or Rs. 12000 (depending on which of the two horses finish first). However, his investment at the start of the race was only Rs. 6000. So, his profit could never be zero; in the worst scenario he will at least make Rs. 2000.

\therefore Option (4) cannot be true.

Hence, **option 4**.

23. We solve this question by options.

If we consider option 3 to be true, then White finishes second and one of the Red or Black horses will come in the first or third positions. With White at the second position, the amount Raju receives at the end of the race will be at least Rs. 6000, and from Red or Black he will earn some money. Therefore, the total money Raju receives will be more than Rs. 6000. Since his

investment at the start of the race was only Rs. 6000, his profit could never be zero.

\therefore Option (3) cannot be true.

Hence, **option 3**.

24. **From statement (A) alone:**

The entry list for the tournament consists of 83 players.

In round 1, 1 of the 83 players gets a bye and directly moves on to the next round.

\therefore 42 players move on to round 2.

Similarly, 21 players move on to round 3, 11 players move on to round 4, 6 players move on to round 5, 3 players move on to round 6, 2 players move on to round 7.

The winner of the tournament would have played one match in each of the rounds; i.e. a total of 7 matches, provided he doesn't get a bye.

However, we are not told whether or not the champion received a bye at some point in the tournament.

\therefore We cannot answer the question on the basis of statement (A) alone.

From statement (B) alone:

The champion received one bye.

From this statement, we cannot find the number of matches played by the champion.

\therefore We cannot answer the question on the basis of statement (B) alone.

From both the statements (A) and (B) together:

The champion must have played 7 matches if he did not receive any bye.

But it is given that the champion has got one bye in the tournament. \therefore He must have played only 6 matches.

\therefore We can answer the question using both the statements (A) and (B) together.

Hence, **option 4**.

25. **From statement (A) alone:**

Exactly 1 player received a bye in the entire tournament. We get many values of n between 65 and 128 that satisfy this condition.

For example, n can have the value 124 in round 1, to follow the pattern, [124-62-31-16-8-4-2-1].

Also, n can have the value 127 in round 1, to follow the pattern, [127-64-32-16-8-4-2-1].

\therefore We cannot answer the question on the basis of statement (A) alone.

From statement (B) alone:

One player received a bye while moving on to the fourth round from the third round.

Here also, we get multiple values of n .

For example, n can have the value 124 in round 1, where 1 player received a bye while moving from

round 3 to round 4 following the pattern, [124-62-31-16-8-4-2-1].

Also, n can have the value 122 in round 1, where 1 player received a bye while moving from round 3 to round 4 following the pattern, [122-61-31-16-8-4-2-1].
 \therefore We cannot answer the question on the basis of statement (B) alone.

From statements (A) and (B) together:

n can only have the value 124 in round 1, where exactly 1 player received a bye while moving from round 3 to round 4 following the pattern [124-62-31-16-8-4-2-1].
 \therefore We can answer the question using both the statements (A) and (B) together.

Hence, **option 4**.

Note: An analysis of how 124 was arrived at when using both conditions together:

Let the number of players in the first round be n . Since only one player gets a bye, and that too when moving from the third to the fourth round, hence we have the following conditions:

1. There will be n players in the first round, where n is even.
2. There will be $n/2$ players in the second round, where $n/2$ is even.
3. There will be $n/4$ players in the third round, where $n/4$ is odd.

4. There will be $\frac{n}{4} + 1 = \frac{n+4}{8}$ players in the fourth

round, where $\frac{n+4}{8}$ should be even

5. All numbers of players in the subsequent rounds should also be even.

From condition 3, we can conclude that:

$$\frac{n+4}{8} = 2k, \text{ where } k \text{ is an integer}$$

Hence, $n = 16k - 4$; so, within the given range, n could be 76 or 92 or 108 or 124.

Writing the pattern for each of the above possible values of n , we have:

76: [76-38-19-10-5-3-2-1]

92: [92-46-23-12-6-3-2-1]

108: [108-54-27-14-7-4-2-1]

124: [124-62-31-16-8-4-2-1]

We see that only 124 satisfies condition 5.

26. Since Aditya didn't get a call from any of the colleges, so for each college, he either didn't clear one of the sectional cut-offs or he didn't clear the aggregate cut-off or both.

If he didn't clear one of the sectional cut-offs, then for that section he scored less marks than the least cut-off among the given cut-offs of all the colleges.

For example, for section A, it is given that the cut-offs for colleges 1, 4 and 5 are 42, 43 and 45 respectively. The least cut-off among them is 42.

So, in order to not clear the sectional cut-off of section A for colleges 1, 4 and 5, he should have scored less than 42.

Similarly,

For colleges 1, 2 and 6, Aditya's Section B marks < 41

For colleges 1, 2, 3 and 5, Aditya's Section C marks < 42

For colleges 4 and 6, Aditya's Section D marks < 44

If he scores less in Section C and D, he would not get calls for any colleges. Also in order to maximise the score we would assume that he got just one less than the cut-off in section C and D and he scored maximum marks (50) in other sections.

\therefore Maximum marks obtained by Aditya such that he doesn't get any calls = $41 + 43 + 50 + 50 = 184$

Hence, **option 3**.

27. Since Bhama got calls from all colleges, she must have cleared each of the 4 sections. This means that for a particular section she scored more marks than the greatest cut-off for that section across the six colleges.

For example, for section A, it is given that the cut-offs for colleges 1, 4 and 5 are 42, 43 and 45 respectively. The greatest cut-off among them is 45.

So, in order to clear the sectional cut-off of section A for all the colleges, she should have scored at least 45.

Since we wish to minimise her marks, we should take her score in section A as 45.

Similarly, in sections B, C and D, she scored 45, 46, and 45 marks respectively.

\therefore Bhama's minimum marks such that she gets calls from all the colleges = $45 + 45 + 46 + 45 = 181$

Hence, **option 2**.

Note: This is already greater than the highest aggregate cut-off of all colleges (which is 180 for college 5). So, she will get calls from all 6 colleges.

28. The aggregate cut-off for each college is given in the common data. In order for Charlie to get minimum marks in one of the sections, he should have got maximum marks (i.e. 50) in the other three sections.

For example, the aggregate cut-off in college 1 is 176. Since, we want minimum marks in a section he should have gotten an aggregate of exactly 176. To minimise one of the sections, assume that he got 50 marks in the 3 sections whose cut-off is given in the common data. Then, Charlie will get a call from college 1 if he gets at least $176 - (50 \times 3) = 26$ marks in section D, provided that the cut-off for this section is also 26.

Now, there is at least one unknown sectional cut-off for each of the colleges, so we can use the same logic as used above for each of the remaining colleges.

For college 2, the minimum marks that Charlie needs to get a call = $175 - 150 = 25$

For college 3, the minimum marks that Charlie needs to get a call = $171 - 150 = 21$

For college 4, the minimum marks that Charlie needs to get a call = $178 - 150 = 28$

For college 5, the minimum marks that Charlie needs to get a call = $180 - 150 = 30$

For college 6, the minimum marks that Charlie needs to get a call = $176 - 150 = 26$

The question states that Charlie only gets a call from 2 of the colleges. So, Charlie got 25 marks.

Hence, **option 3**.

29. The change in growth rate of European subscribers

$$\text{in '07 over '06} = \frac{500 - 380}{380} = \frac{6}{19}$$

The change in growth rate of European subscribers

$$\text{in '05 over '04} = \frac{270 - 180}{180} = \frac{1}{2}$$

∴ The percentage change in growth rate of 2007 (over '06) relative to 2005 (over '04) is,

$$\left[\frac{\left(\frac{1}{2} - \frac{6}{19}\right)}{\left(\frac{1}{2}\right)} \right] \times 100 = \left[\frac{\left(\frac{7}{38}\right)}{\left(\frac{1}{2}\right)} \right] \times 100 = \frac{7}{19} \times 100 = 36.84\%$$

Hence, **option 3**.

30. The estimated subscription revenue in Europe in 2008 = 605 million USD

The % growth rate in the revenue from 2006 to 2007

$$= \frac{500 - 380}{380} \times 100 = \frac{6}{19} \times 100$$

∴ The computed subscription revenue in Europe in 2008

$$= 500 \times \left(1 + \frac{6}{19}\right) = 500 \times \left(\frac{25}{19}\right) = \frac{12500}{19}$$

≈ 658

∴ The difference between the estimated and the computed values = $658 - 605 = 53$

The closest value among the given options is 50.

Hence, **option 1**.

31. Let the number of men subscribers in 2003 be m , and the number of women subscribers in 2003 be w .

It is given that the women subscribers increase at the rate of 10% per year and the men increase at the rate of 5% per year.

$$\begin{aligned} \therefore \text{Number of men subscribers in 2007} &= m(1 + 0.05)^7 \\ &\approx m[1 + {}^7C_1(0.05) + {}^7C_2(0.05)^2 + {}^7C_3(0.05)^3] \end{aligned}$$

$$\approx m \left[1 + 7(0.05) + \left(\frac{7 \times 6}{2}\right) \times (0.05)^2 + \left(\frac{7 \times 6 \times 5}{2 \times 3}\right) \times (0.05)^3 \right]$$

$$\approx m(1 + 0.35 + 0.0525 + 0.0043)$$

$$\approx 1.4m$$

$$\text{Number of women subscribers in 2007} = w(1 + 0.1)^7$$

$$\approx w [1 + {}^7C_1(0.1) + {}^7C_2(0.1)^2 + {}^7C_3(0.1)^3]$$

$$\approx w \left[1 + 7(0.1) + \frac{7 \times 6}{2} (0.1)^2 + \frac{7 \times 6 \times 5}{2 \times 3} (0.1)^3 \right]$$

$$\approx w(1 + 0.7 + 0.21 + 0.035)$$

$$\approx 1.95w$$

Now, it is given that in 2003, men are 60% of the total European subscribers. So, women are 40% of the subscribers. Let the total European subscribers be P .

Then,

$$m = 0.6P \text{ and}$$

$$w = 0.4P$$

∴ The total number of subscribers in 2003

$$= m + w = 0.6P + 0.4P = P$$

And the total number of subscribers in 2007

$$= 1.4m + 1.95w$$

$$= 1.4(0.6P) + 1.95(0.4P)$$

$$= 0.84P + 0.78P = 1.62P$$

∴ Percentage growth of subscribers between '03 and '07

$$= \frac{(1.62)P - P}{P} \times 100 = 62\%$$

Hence, **option 1**.

32. The gap between subscription revenues in US and Europe in 2003 = $420 - 105 = 315$

The gap between subscription revenues in the US and Europe in 2004 = $525 - 180 = 345$

∴ The percentage change in the gap between subscription revenues in the US and Europe in the period **2003-04** is

$$\frac{345 - 315}{315} = \frac{30}{315} = \frac{2}{21}$$

Similarly, the percentage change in the gap between subscription revenues in the US and Europe in the period **2005-06** is

$$\frac{270 - 320}{320} = \frac{-50}{320}$$

Hence, the absolute change is $\frac{5}{32}$

The percentage change in the gap between subscription revenues in the US and Europe in the period **2006-07** is

$$\frac{220 - 270}{270} = \frac{-50}{270}$$

Hence, the absolute change is $\frac{5}{27}$

The percentage change in the gap between subscription revenues in the US and Europe in the period **2008-09** is

$$\frac{110 - 185}{185} = \frac{-75}{185}$$

Hence, the absolute change is $\frac{15}{37}$

The percentage change in the gap between subscription revenues in the US and Europe in the period **2009-10** is

$$\frac{100 - 110}{110} = \frac{-10}{110}$$

Hence, the absolute change is $\frac{1}{11}$

The highest value among $\frac{2}{21}, \frac{6}{33}, \frac{5}{27}, \frac{15}{37}$ and

$\frac{1}{11}$ is clearly $\frac{15}{37}$

∴ The absolute value of change was the highest in the period 2008-09.

Hence, **option 4**.

- 33.** Let the age of the employee being transferred from the
1. Marketing department to the Finance department be x .
 2. Finance department to the Marketing department be y .
 3. Marketing department to the HR department be z .

Now,

The sum of the ages of all employees in Finance originally was $30 \times 20 = 600$. Later, an employee of x years of age joined the department and one of y years of age left it.

So, the new average age for the Finance department

$$= \frac{600 + x - y}{20} = 31 \text{ (given)}$$

$$\therefore 600 + x - y = 620$$

$$\therefore x - y = 20 \quad \dots \text{(i)}$$

The sum of the ages of all employees in Marketing originally was $35 \times 30 = 1050$.

Later, two employees of x years and z years of age left the department and one of y years of age joined it.

Since 2 employees left and 1 joined, hence the number of employees currently in this department is 29.

So, the new average age for the Marketing department

$$= \frac{1050 - x + y - z}{29} = 35 \text{ (given)}$$

$$\therefore 1050 - x + y - z = 1015$$

$$\therefore x - y + z = 35 \quad \dots \text{(ii)}$$

From equations (i) and (ii), we get,

$$20 + z = 35$$

$$\therefore z = 15$$

The sum of the ages of all employees in HR originally was $45 \times 5 = 225$.

Later, one employee of z years of age joined the department. Also, the number of employees increases by one to 6.

So, the new average age for the HR department

$$= \frac{225 + z}{6} = \frac{225 + 15}{6} = \frac{240}{6} = 40$$

Hence, **option 3**.

- 34.** The average age of the Marketing department is 35 years and that of the HR department is 45 years. So, the employee is being transferred from a department with a lower average age to one with a higher average age, which means that he gets an additional allowance of 10% of basic pay over his current allowance.
- His current allowance = 80% of 8000 = 6400
- Therefore, his new allowance = 6400 + 10% of 6400 = 6400 + 640 = 7040
- After the transfer, his gross pay = 8000 + 7040 = 15040
- Initially, the average gross pay of the HR department = 5000 + 70% of 5000 = 8500
- The new average gross pay of the HR department (i.e. after the transfer of the 40-yr old)

$$= \frac{8500 \times 5 + 15040}{6} = 9590$$

∴ The percentage change in the average gross pay of the HR department

$$= \frac{9590 - 8500}{8500} \times 100 = 12.823\%$$

Hence, **option 3**.

- 35.** Note that in this question, the percentage change in **basic** pay is asked. According to the common data, only the allowances (and hence the gross pay) is affected when a person is transferred. The basic pay of a person remains unaltered.
- ∴ The average basic pay after the transfers have taken place

$$= \frac{(5000 \times 5) + (6000 \times 2) + (8000)}{8}$$

$$= \frac{45000}{8} = 5625$$

∴ The percentage change in the average basic pay of the HR department

$$= \frac{5625 - 5000}{5000} \times 100 = 12.5\%$$

Hence, **option 2**.

36. Firstly, let us try to understand the way the investments of the three traders behave.

Abdul buys shares at 10 am everyday and sells them at a particular price at 3 pm. So his return is determined by the difference in the share price at these two times.

Bikram and Chetan buy shares at equal intervals. But since Chetan buys them in equal amount he would end up buying more when the price is less and less when the price is more.

Whether the prices are continuously rising or continuously falling down or in a fluctuating market, Chetan always has a higher proportion of lower priced shares as compared to Bikram. This increases his profit in a rising market and reduces his loss in a falling market. Therefore Chetan never has return lower than that of Bikram.

We have explained this concept by taking examples. For more depth we have also provided the theoretical explanation. **The theoretical explanation is only for better understanding and may not be suitable in a test environment.**

Consider the scenario when the share price keeps rising throughout the day.

Let the share price at 10 am be Rs. 100, 11 am be Rs. 110, 12 noon be Rs. 140, 1 pm be Rs. 150, 2 pm be Rs. 180, and finally at 3 pm be Rs. 200.

Time of the Day	Share Price (in Rs.)
10 am (open)	100
11 am	110
12 noon	140
1 pm	150
2 pm	180
3 pm (close)	200

Abdul buys shares at Rs. 100 at 10 am and sells them at Rs. 200 at 3 pm.

∴ Abdul's return is 100%.

Let Bikram buy one share at each interval. So, at 10 am, he buys a share for Rs. 100; at 11 am, he buys a share for Rs. 110; at 12 noon, he buys a share for Rs. 140; at 1 pm, he buys a share for Rs. 150; and at 2 pm, he buys a share for $180 \times 1 = \text{Rs. } 180$.

Thus, he buys a total of 5 shares for $100 + 110 + 140 + 150 + 180 = \text{Rs. } 680$

At 3 pm, he sells all 5 shares for $200 \times 5 = \text{Rs. } 1,000$.

Thus, his profit will be $1,000 - 680 = \text{Rs. } 320$

$$\text{Hence, Bikram's return is } \frac{320}{680} \times 100 \approx 47\%$$

Let Chetan invest Rs. 415,800 at each interval. So, at 10 am, he buys $415800/100 = 4158$ shares; at 11 am, he buys $415800/110 = 3780$ shares; at 12 noon, he buys $415800/140 = 2970$ shares; at 1 pm, he buys $415800/150 = 2772$ shares; at 2 pm, he buys $415800/180 = 2310$ shares.

Thus, he buys $4158 + 3780 + 2970 + 2772 + 2310 = 15990$ shares for $415800 \times 5 = \text{Rs. } 2,079,000$. He sells these shares for $200 \times 15990 = \text{Rs. } 3,198,000$. His profit will be $3,198,000 - 2,079,000 = \text{Rs. } 1,119,000$.

$$\begin{aligned} \text{Hence Chetan's returns} &= \frac{1119000}{2079000} \times 100 \\ &= \frac{373}{693} \times 100 \approx 53\% \end{aligned}$$

From the above example, we see that in case of continuously rising share prices,

Abdul's return > Chetan's return > Bikram's return

Thus, Bikram gets the minimum return on a "boom" day.

Hence, **option 1**.

Note: Theoretical Explanation:

Let x_1, x_2, \dots, x_6 be the share prices at 10 am, 11 am, 12 noon, 1 pm, 2 pm and 3 pm respectively.

For Abdul:

Abdul buys shares at Rs. x_1 and sells them at Rs. x_6 .

$$\therefore \text{Abdul's returns} = \frac{x_6 - x_1}{x_1}$$

For Bikram:

Let Bikram have bought n shares at each hourly interval.

His investment amount = $nx_1 + nx_2 + nx_3 + nx_4 + nx_5$
 $= n(x_1 + x_2 + x_3 + x_4 + x_5)$

$$= n \times \sum_{i=1}^5 x_i$$

At 3 pm, he sells his shares for $(5n \times x_6)$

Hence, his profit/loss = $(n \times 5x_6) - n \times \sum_{i=1}^5 x_i$

$$= n \times \left(5x_6 - \sum_{i=1}^5 x_i \right)$$

$$\therefore \text{Bikram's returns} = \frac{n \times (5x_6 - \sum_{i=1}^5 x_i)}{n \times \sum_{i=1}^5 x_i}$$

$$= \frac{5x_6}{\sum_{i=1}^5 x_i} - 1 = \frac{x_6}{\frac{\sum_{i=1}^5 x_i}{5}} - 1$$

Hence, Bikram's returns

$$= \frac{x_6}{(\text{Arithmetic Mean of } x_1, x_2, \dots, x_5)} - 1$$

For Chetan:

Let Chetan invest Rs. P at each hourly interval.

His investment amount = $5P$

Since he invests Rs. P at each interval, he buys:

$\frac{P}{x_1}$ shares at 10am; $\frac{P}{x_2}$ at 11am; and so on until 2pm.

At 3 pm, he sells each share at x_6 . So, for all his shares, he receives,

$$\text{Rs. } \left(\frac{P}{x_1} + \frac{P}{x_2} + \frac{P}{x_3} + \frac{P}{x_4} + \frac{P}{x_5} \right) \times x_6$$

$$= Px_6 \times \left(\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \frac{1}{x_4} + \frac{1}{x_5} \right)$$

Hence, his profit/loss =

$$= Px_6 \times \left(\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \frac{1}{x_4} + \frac{1}{x_5} \right) - 5P$$

$$= P \times \left[x_6 \times \left(\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \frac{1}{x_4} + \frac{1}{x_5} \right) - 5 \right]$$

\therefore Chetan's returns =

$$= \frac{P \left[x_6 \left(\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \frac{1}{x_4} + \frac{1}{x_5} \right) - 5 \right]}{5P}$$

$$= \frac{x_6 \left(\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \frac{1}{x_4} + \frac{1}{x_5} \right) - 5}{5}$$

$$= \frac{x_6 \left(\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \frac{1}{x_4} + \frac{1}{x_5} \right)}{5} - 1$$

$$= \frac{x_6}{5} - 1$$

$$= \frac{x_6}{\left(\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \frac{1}{x_4} + \frac{1}{x_5} \right)} - 1$$

\therefore Chetan's returns =

$$\frac{x_6}{(\text{Harmonic Mean of } x_1, x_2, \dots, x_5)} - 1$$

Now, let's compare Bikram's and Chetan's returns. Since Arithmetic Mean is always greater than or equal to the Harmonic Mean, Chetan's returns will be greater than or equal to Bikram's.

37. Since Chetan's return is always higher than or equal to that of Bikram, the trader with the maximum return would be either Abdul or Chetan.

If it is a continuously rising market then Abdul would end up having the highest gain as seen in the example above.

But there might be a scenario when the share price of XYZ would go down after 10 AM and rise in the end at 3 PM to a higher value.

In such a case, if Chetan gets the shares at lower prices than what the price was at 10 AM he would end up making more profit and hence higher return.

Time of the Day	Share Price (in Rs.)
10 am (open)	100
11 am	110
12 noon	140
1 pm	150
2 pm	180
3 pm (close)	200

Here, Abdul's returns remain unaltered as 100%.

Let Chetan always buy shares worth Rs. 100.

So he would end up buying $1 + 10 + 10 + 10 + 10 = 41$ shares.

When he sells the same at Rs. 200 he gets Rs. 8,200 for the same.

\therefore Chetan's profit = $8200 - 500 = 7700$

$$\therefore \text{Chetan's return} = \frac{7700}{500} > 100\%$$

\therefore We cannot say for sure who would have higher returns.

Hence, **option 5.**

38. From the explanation seen till now we can rule out options 1, 3 and 4.

Now, option 2 is only partially correct. We have seen that Chetan's return would be higher than or equal to that of Bikram. It would be equal to Bikram's return in the scenario when the share price remains at a constant value throughout the day.

\therefore Option 2 is not always true.

Hence, **option 5.**

39. Let x_1, x_2, \dots, x_6 be the share prices at 10 am, 11 am, 12 noon, 1 pm, 2 pm and 3 pm respectively.

Now, since Abdul lost money in the transaction,

$$x_1 > x_6$$

Also, it is given that,

$$x_1 > x_3, \text{ and } x_6 > x_5$$

Combining the above, we have,

$$x_1 > x_6 > x_5$$

$$\text{and } x_1 > x_3,$$

Also, let the money Emily invests at 10 am be Rs. P .

Then,

Her investment = Rs. P

$$\text{And the number of shares she buys} = \frac{P}{x_1}$$

So, after selling these shares at 12 noon, she will get

$$\text{Rs. } \frac{P}{x_1} \times x_3$$

Now, she invests this money at 1 pm, and the number

$$\text{of shares she buys } \frac{P x_3}{x_1 x_4}.$$

So after selling these shares at 3pm, she gets

$$\text{Rs. } \frac{P x_3}{x_1 x_4} \times x_6$$

$$\text{So her returns} = \frac{\frac{P x_3 x_6}{x_1 x_4} - P}{P} = \frac{x_3 x_6}{x_1 x_4} - 1$$

Since she made profit, her returns > 0;

$$\text{i. e. } \frac{x_3 x_6}{x_1 x_4} - 1 > 0 \text{ or } \frac{x_3 x_6}{x_1 x_4} > 1$$

Now, we know that $x_1 > x_6$; so $\frac{x_1}{x_6}$ cannot be > 1.

$$\therefore \frac{x_3}{x_4} \text{ has to be } > 1; \text{ i. e. } x_3 > x_4$$

\therefore The share price at 12 noon is greater than that at 1 pm.

Hence, option 4 is definitely false.

Also, since in the first half, Emily invests at 10 am and sells at 12 noon, and we know that the share price at 10 am was greater than at 12 noon; hence she must have suffered a loss during this transaction. However, she makes a net profit in the end. So, she must have made profit during the second part of the transaction; i.e. the share price at 1 pm must have been less than that at 3 pm.

i.e. $x_4 < x_6$,

Also, let Dane buy n shares at 10 am, 11 am and 12 noon.

Hence, her investment = $n(x_1 + x_2 + x_3)$

And she sells these at 1 pm, 2 pm and 3 pm for

$n(x_4 + x_5 + x_6)$

$$\begin{aligned} \therefore \text{Her returns} &= \frac{n(x_4 + x_5 + x_6) - n(x_1 + x_2 + x_3)}{n(x_1 + x_2 + x_3)} \\ &= \frac{(x_4 + x_5 + x_6)}{(x_1 + x_2 + x_3)} - 1 \end{aligned}$$

Since she made profit, her returns are greater than 0;

$$\text{i. e. } \frac{(x_4 + x_5 + x_6)}{(x_1 + x_2 + x_3)} - 1 > 0 \text{ or } \frac{(x_4 + x_5 + x_6)}{(x_1 + x_2 + x_3)} > 1$$

Hence, $(x_4 + x_5 + x_6) > (x_1 + x_2 + x_3)$

Since, $x_1 > x_6$ and $x_3 > x_4$, hence $x_5 > x_2$

So far, we have,

$x_1 > x_6 > x_5 > x_2, x_4 < x_6$ and $x_1 > x_3 > x_4$

Now from Dane's investment, we know that,

$$(x_4 + x_5 + x_6) - (x_1 + x_2 + x_3) > 0 \quad \dots (i)$$

Keeping in mind the relationships between the share prices, we have

$$x_6 = x_1 - b$$

$$x_4 = x_1 - b - c$$

$$x_3 = x_1 - b - c + a$$

$$x_5 = x_1 - d, \text{ where } a, b, c \text{ and } d \text{ are all positive.}$$

Substituting the above in equation (i), we have,

$$(x_1 - b - c + x_1 - d + x_1 - b) - (x_1 + x_2 + x_1 - b - c + a) > 0$$

$$\therefore x_1 - x_2 > b + d + a \text{ (which is } > 0, \text{ since all the variables are positive)}$$

$$\text{i. e. } x_1 > x_2$$

$$\therefore x_2 < x_1 - b - a - d$$

$\therefore x_2$ is definitely less than x_6 and x_5 .

\therefore Although we don't know when the share price is at its lowest, we do know that $x_5 > x_2$.

$\therefore x_5$, i.e. the share price at 2 pm is not the lowest.

Hence, option 1 is also definitely false.

Thus, there are two options which are correct for this question. This is an ambiguity and therefore, we are not indicating any option as correct.

40. From the solution of the first question of the set, we can see that,

$$x_1 > x_6 > x_5 > x_2, x_4 < x_6 \text{ and } x_1 > x_3 > x_4$$

$\therefore x_1$, i.e. the share price at 10 am, is the highest.

Hence, **option 1**.

41. We have to arrange six houses on opposite sides of a road.

From condition (vii), we can say that P, U and S lie on one side of the road as follows:

P		
U (Orange)		
S		

From condition (viii) and (ix) we can further complete the arrangement as follows. We have also used the colour of the house P from statement (x).

P (White)		R (Yellow)
U (Orange)		Q (Green)
S		

The only left house is definitely T. From conditions (v) and we can complete the arrangement as follows.

P (White)		R (Yellow)
U (Orange)		Q (Green)
S (Red)		T (Blue, First tallest)

From condition (vi) it can be deduced that U is the shortest house. Also from the last condition it can be deduced that P is the fourth tallest, R is the fifth tallest and S and Q are second and third tallest not in that order.

Filling all this data we can see the arrangement as follows:

P (White, Fourth Tallest)	R (Yellow, Fifth Tallest)
U (Orange, Shortest)	Q (Green, Second/Third Tallest)
S (Red, Second/Third Tallest)	T (Blue, First tallest)

The colour of the tallest house (T) is Blue.

Hence, **option 2**.

42. The house diagonally opposite to the Yellow coloured house is S which has red colour.

Hence, **option 4**.

43. The second tallest house can be either S or Q. We cannot determine for sure which of them is the second tallest.

Hence, **option 5**.

44. Let the bold letters denote the teams that have lost.

From condition 3 of stage I,

D lost to A.

D won against C.

D won against F.

These can be represented as:

D – A

D -- C

D -- **F**

Similarly, condition 4 of stage I can be represented as:

E -- B

E -- C

E -- **F**

Since D and E have participated in three matches in stage I, they would not be involved in any other match in stage I.

From the above representations it is clear that all other teams except A have lost at least one match.

∴ From condition 1, of stage I, only A has won all the three matches in stage I.

Also, A will participate in 2 more matches as every team participates in 3 matches in stage I.

∴ A will win in 2 of the remaining 3 matches.

Also A is the top team as it wins all matches in stage I.

From condition 6 of stage I,

F did not play against A.

∴ A won against B and C which can be represented as:

B -- A

A -- **C**

The only 2 teams which have not won even a single match so far is C and F.

From statement 6 of stage I, F loses in the remaining match against B, which can be represented as:

F -- B

Stage I can be represented as:

D -- A **B** -- A

D -- **C** A -- **C**

D -- **F** **F** -- B

E -- B

E -- **C**

E -- **F**

From condition 1 of stage II,

A lost both matches in stage II.

Also, since no team plays against the same team more than once in the event, A plays matches against E and F.

A -- E

A -- F

Since one of the two teams at the bottom after stage I won both matches in stage II, F is the team which has won both the matches in stage II.

Also C lost both matches in stage II.

F -- **C**

B -- **C**

The last condition states that one more team lost both matches in stage II.

∴ D lost both matches in stage II.

D -- B

D -- E

Stage II can be represented as:

A -- E

A -- F

F -- **C**

B -- **C**

D -- B

D -- E

Now, we can calculate the number of times each team has won.

Team	Stage I	Stage II	Total
A	3	0	3
B	2	2	4
C	0	0	0
D	2	0	2
E	2	2	4
F	0	2	2

It can be observed from the above table that B and E have most wins in the event.

Hence, **option 5**.

45. E and F defeated A.

Hence, **option 2**.

46. B, E and F are the three teams that won both matches in stage II.

Hence, **option 4**.

47. From the table it is clear that the teams that won exactly two matches in the event are D and F.

Hence, **option 5**.

48. From the given data we get that,

Percentage of revenue from Data Transfer

$$\times \text{Total revenue} = \text{ARDT} \times \text{Volume}$$

It is given that the total revenue received is the same for the pairs of countries in the choices.

\therefore We need to consider the ratio (% of revenue from Data Transfer/ARDT) for the countries in the given choices

The countries for which this ratio is same would lie on a straight line drawn from the origin.

Consider the choices given. From observation one can see that the UK and Spain lie on a straight line drawn from the origin, whereas all other pairs are not on a straight line.

Hence, **option 4**.

49. Let the total revenue for India be USD x and for Singapore be USD y .

$$\frac{\text{Percentage of revenue from Data Transfer}}{100}$$

$$\times \text{Total revenue} = \text{ARDT} \times \text{Volume}$$

From the diagram we can deduce the following values for the quantities.

Percentage of revenue from Data Transfer for India = 9

Percentage of revenue from Data Transfer for Singapore = 20.5

ARDT for India = USD 1

ARDT for Singapore = USD 9

It is given that the volume of data transfer in India is the same as that in Singapore

$$\therefore \frac{0.09}{1} \times x = \frac{0.205}{9} \times y$$

$$\therefore y = 3.95x$$

$$\therefore y \text{ is about 4 times } x$$

Hence, **option 5**.

50. By 2010, Percentage of revenue from transfer of data will triple for India and double for Sweden.

\therefore Percentage of revenue from data transfer for India and Sweden will be 27% and 36% respectively.

Let the total revenue in Sweden in 2010 be R .

\therefore The total revenue in India in 2010 will be $2R$.

It is given that the total volume of data transfer is the same for both the countries.

\therefore We can write the following solution for Sweden,

$$0.36 \times R = 6 \times \text{Volume} \quad \dots \text{ (i)}$$

Similarly, for India,

$$0.27 \times 2R = \text{ARDT} \times \text{Volume} \quad \dots \text{ (ii)}$$

Dividing (i) by (ii) we get,

$$\text{ARDT (for India in 2010)} = \text{USD } 9$$

$$\text{ARDT for India now is USD } 1.$$

\therefore The increase of ARDT in India is 800%.

Hence, **option 3**.

51. Anita wore a "brooch", a pin or a clasp. "Broach" is used in several ways (e.g., 'broach a subject'; 'introduce a

new topic') but none in context of jewellery or something to be worn.

The second word is "councillor" which means 'a person specially designated or selected to act in an advisory, administrative, or legislative capacity' as against a "counsellor" meaning 'a person who counsels or advises' which is more generic.

"Advice" is used as a noun whereas "advise" is used as a verb. In the third sentence, 'I would like your advice/advise...' we need a noun. Therefore, "Advice" is the right word.

The fourth word refers to the end of the "film", the 'climax'. "Climactic" is the adjective form of 'climax' and the word for the fourth sentence. "Climatic" pertains 'to climate'.

"Flair" is 'a natural talent, aptitude, ability or knack'. The word to be used here is "flare", which means, 'to spread gradually outward as the bottom of a pair of trousers or a wide skirt'.

Therefore, the correct sequence is BAAAB.

Hence, the correct answer is **option 3**.

52. "Currant" is 'a type of raisin or an edible nut'.

"Current", a more common word, means 'a steady, smooth, onward movement'. Thus the first word is "currants". (The cake had lots of currants...)

"Exceptional" is a positive word, which means, 'outstanding, excellent'.

"Exceptionable" (the second word) means, 'objectionable and hence liable to be punished.'

For the third word, both "consent" and "assent" mean 'to agree'. However, "assent" is more in tune with 'yielding to something' or 'conceding' whereas "consent" is more about 'permitting or approving'. Therefore the appropriate word here is "consent" as an adult would "consent" or 'give permission'.

In the fourth sentence, a minister is not "compelled" (forced) but "obliged" (necessitated or required) to report regularly. While oblige may have a connotation of force as well, compel clearly means 'forced to'. Therefore, "obliged" is a more appropriate word here.

When we say something is "genuine", it is not more or less, it is 'simply and completely authentic'.

Therefore, 'far too' will apply to the adjective "sanguine" which means 'far too optimistic' or 'confident'.

Therefore, the correct sequence is BBAAA.

Hence, the correct answer is **option 2**.

53. A "retort" can be "ironic", but only after it is uttered or said. Here, a more appropriate word would be "caustic" or 'sarcastic'.

"Cogent" is 'convincing' or 'well-argued' and has a better ring to it than just "valid". It is a more appropriate word than "valid" in this context.

The third word is “averse” meaning ‘unwilling or unenthusiastic’. “Adverse” means ‘unfavourable’ and it is usually used with words like weather (adverse weather, conditions etc.).

“Coupé” is the ‘end compartment in a railroad car’. Contextually, ‘a “coupé” gets detached while a train is climbing up the hill’ fits in.

“Coup” is a ‘clever action or accomplishment’ and is irrelevant in this context.

A peal is ‘a ringing of a set of bells. (Alternate usage: ‘she broke into peals of laughter’). Thus, the word required is ‘pealing’ as it deals with bells.

“peel” means to ‘to strip or cut away the skin or bark from’, eg. Peeling away the skin made it easier to cut the fruit.

Therefore, the correct sequence is BBBAB.

Hence, the correct answer is **option 2**.

54. “Defusing” or de-fusing is ‘to resolve or cool (a situation)’.

“Diffusing” is ‘spreading’ (Guru’s ideas) and the appropriate word for the first sentence.

To “bait” is ‘to trap or to tease’. The students were asking irrelevant questions to tease or torment the instructor.

“Bate” is to ‘lessen’ or ‘restrain’.

“Horde”, the third word, refers to ‘a mass or group’.

“Hoard” is ‘to stockpile’.

“Internment” is ‘imprisonment’ and is the fourth word.

“Interment” is ‘burial’.

“Unsocial” is ‘having or showing a lack of desire for the company of others.’

“Unsociable” goes a step further. It means, ‘not sociable; having, showing, or marked by a disinclination to friendly social relations; withdrawn.’ A team “could not deal” with someone - is a bit extreme. So, here, “unsociable” is more appropriate. Another way to arrive at the appropriate word here is by elimination. If you were able to figure out most of the other words, “unsocial” would have been in one of the eliminated options.

Therefore, the correct sequence is BABBA.

Hence, the correct answer is **option 1**.

55. Statement A is incorrect because the word immigrant has been mis-spelt as “imigrant” (with an ‘m’ missing). Options 3, 4 and 5 can be eliminated.

We are left with only options 1(B only) and 2(B and C). Statement C should have a comma at the end, after “David Stern”.

Statement B is correct.

Statement D should be ‘an owner of a dry goods business’.

Statement E can be corrected in at least two different ways. “This dry goods business would later be known

as ...” Or, “This dry goods business later became known as ...”(Omit ‘would’).

Hence, the correct answer is **option 1**.

56. The sentence takes off correctly in statement A. Statement B is incorrect because there is a pronoun agreement error. It should be, “Nike implemented comprehensive changes” in **its** (not their) labour policy. The possessive pronoun ‘its’ should replace ‘their’ as it refers to the antecedent “Nike” which is singular. Statement C does not require the comma given at the end of the line. The sentence (C and D) can be rephrased as, ‘Perhaps sensing **that** the rising tide of global labour concerns from the public would become a prominent media issue.’ It can be seen from this sentence that part D can be left unaltered and can be taken as correct. The word ‘industry’ begins with a vowel sound and hence the article ‘an’ should be used and not ‘a’. Hence, the correct answer is **option 4**.
57. Statements A and C are correct. A million people (in B) would have lost their homes - not “home”. Therefore, statement B is incorrect. Statement D should have “unable to reach the hundreds”. Therefore, it is incorrect. Statement E is incorrect. There is a subject-verb agreement error here. In place of “The death count have just begun”, it should be, “The death count has just begun.” ‘Death count’, a singular subject, should take a singular verb (has). Hence, the correct answer is **option 3**.
58. Statement B has tense inconsistency. ‘Lived’ is in past tense, hence, ‘associate’ in the same sentence should be ‘associated’ (in simple past as well). Statement C again has tense inconsistency. The word ‘seem’ should become ‘seemed’ to go with ‘were’ and ‘visited’ in the same sentence. Statement E is incorrect and we need to rephrase it. We may either change ‘effort’ to ‘efforts’ or change it to ‘an effort’. Statements A and D are correct. Hence, the correct answer is **option 5**.
59. The statement condemns the way the genocides have been described and states the description to be sinister. The word for the first blank has to be synonymous to sinister. Options 1 and 2 with ‘innovative’ and ‘enchanting’ can be eliminated as they do not give any negative connotations. Option 4 too can be eliminated as ‘exigent’ has more to do with ‘demanding and urgent’ than something terrible.

In option 5, "tragic" does not fit in the context with 'mis-described' and 'hand-washing rhetoric'.

'disingenuous' - 'insincere', 'deceitful', 'hypocritical' fits contextually with the word "manner" which follows the blank. In the second blank, a contrasting word to "perpetrators" is required. 'Victims' is a better fit compared to the words in all the other options.

Hence, the correct answer is **option 3**.

60. The first blank can have any of the three words mentioned in the options - 'scrutinizers', 'observers', 'students'.

'Scrutinizer' means 'one who examines or observes with great care; inspects critically'.

'Observer' means 'a person who watches, views or notes for a scientific, official, or other special purpose.'

'Student' means 'an individual formally engaged in learning, especially one enrolled in a school or college; pupil'

Out of these three, the part of the sentence prior to the first blank clearly suggests that the people involved in the exercise were experts in the subject under consideration. This eliminates the possibility of 'students' fitting into the first blank, and thus option 5.

The second blank has four possible alternatives.

'Believe' means 'to have confidence in the truth, the existence or the reliability of something'.

'Agree' means 'to have the same views'.

'Suggest' means 'to mention or introduce'.

'Concede' means 'to make concessions, yield'.

The verb prior to the second blank denotes that the action is not voluntary but performed under duress.

It is not possible to *be forced* to place confidence in something. Therefore, it is difficult to be forced to 'believe' in something. This eliminates option 1.

The first part of the sentence makes it clear that contrary evidence was being gathered. If evidence opposite in nature or character is being gathered then it cannot be said that the ancient astronomers had the same view.

This removes 'agree' from further consideration as fitting into the second blank. This eliminates option 2.

The very element of force or compulsion eliminates 'suggest' as an appropriate fit for the second blank.

Therefore, option 3 is eliminated.

Both 'observers' and 'concede' fit in correctly.

Hence, the correct answer is **option 4**.

61. The first word needs to be related to something that is 'inborn', because it is an endowment or gift. Two words come close to mean that- 'congenital' and 'genetic'.

'Congenital', may be 'innate' or 'inherited' or caused by the "environment".

"Genetic," means 'pertaining to origins'.

However, the "effect of the environment" is more related to general teaching or 'education' than to

'pedagogy'. 'Pedagogy' is 'the function or work of a teacher' or 'science of teaching; education; instructional methods'.

Hence, the correct answer is **option 2**.

62. The first blank can have 'institutions', 'departments', 'organs' or 'tenets'. 'Aspects', compared to other options can be eliminated.

The second blank has the key to the answer. The phrase 'suited by' can be best followed by 'fixated', to make the sense complete- minds which were suited by 'fixation' or a preoccupation with one subject, issue, an obsession "to an earlier kind of world". Also, 'fixation' flows perfectly with the idea of 'an earlier kind of world'.

Hence, the correct answer is **option 1**.

63. Option 1 uses the verb 'run' appropriately with "fast" as an adverb qualifying it.

The phrase, 'against the run of play' is used in sports to describe an event or action against the flow of the game. For example, if Soccer team A has all the possession, all the chances and dictates the game, and team B has one chance and scores from it, then that goal is against the run of play. The term is used correctly in option 2.

Option 3 is inappropriate. A person cannot "run over" someone in the context of a road mishap. A person can be "run over" by a vehicle. A person can 'run after' (chase) someone, 'run with', 'run up to' or 'run around' someone.

In option 4, a book can have a "popular run", if a great number of copies of that book are getting sold.

In option 5, "run-of-the-mill production" is an 'average' or 'mediocre' or 'banal', 'commonplace' production that is not interesting. The usage here is correct.

Hence, the correct answer is **option 3**.

64. In option 1, "firing a round of tear gas shells" means 'a single discharge by one firearm' and the word 'round' is correctly used.

The phrase, 'round the corner' in option 2 means, 'nearby, a short distance away'.

In option 3, the usage is correct. "Merry-go-around" is a 'carrousel in amusement parks, carnivals, etc. A merry-go-round is a revolving, circular platform with wooden horses or other animals, benches, etc., on which people may sit or ride, usually to the accompaniment of mechanical or recorded music.'

In option 4, the usage "on a hospital round" is correct. This is used to signify that the doctor is surveying the wards checking on patients.

"Come round" in the fifth option means 'to change one's opinion, decision, especially to agree with another's.' A better option would have been to come

around to admitting it meaning to change one's position or opinion.

Hence, the correct answer is **option 5**.

65. "Beginning to buckle" in option 1 indicates that their knees were ready to collapse or that they were extremely tired.

"Buckle" is inappropriately used in option 2. The horse can break into a trot or a gallop. It may buck or it may even break into somebody's garden, but not "into a buckle".

Option 3 uses "buckle" in the sense of 'collapse' or 'surrender'.

In option 4, "buckle" again refers to 'bend' or 'collapse', even 'break'.

"To buckle up", in option 5, means 'to fasten one's belt, seat belt, or buckles'.

Hence, the correct answer is **option 2**.

66. "File" can be defined as 'a folder, cabinet, or other container in which papers, letters, etc., are arranged in convenient order for storage or reference.' Another definition is 'a collection of papers, records, etc., arranged in convenient order'. Option 1 uses the word in this sense.

In option 2, "to file" means 'to apply'. The usage is correct.

In option 3, "file" refers to 'a line of persons or things arranged one behind another'. Marching in a single file is similar to marching in a single column.

A "file" can even be a tool with ridges to smoothen or even out rough surfaces. Option 4 uses this meaning.

There is no phrase or idiom "broke the file" as mentioned in option 5. A soldier can break 'rank' but not a "file".

Hence, the correct answer is **option 5**.

67. The main sentence of the paragraph that decides the ending is "On this basis, Henry Perowne loses a number of cases each year." Option 1 moves away from the core of the paragraph - losing patients.

Option 5 does not complete the paragraph and leaves one wanting for more data to explain the importance of hands being large.

Option 4 loses out on the sentence structure and style. There is no logical continuity to the paragraph.

Option 3 provides a logical finish to the paragraph by showing that in spite of the losing patients, Perowne is not concerned.

Option 2 brings in a disconnect to the idea from the paragraph. It states that other patients' observations are also negative and those who stay with Perowne do so out of ignorance of available alternatives. This is not in continuation of the main idea expressed in the paragraph.

Hence, the correct answer is **option 3**.

68. Option 1 has already been mentioned in the first statement of the paragraph. This does not make it an effective paragraph ending.

Option 2 mentions only OECD countries while the paragraph mentions "powerful industrialized countries" of which the OECD countries are only a part. Furthermore, the option is again a repetition of ideas presented in the paragraph.

The focus of option 3 is on 'China' and 'India', while the focus of the paragraph is not.

Option 5 brings in 'global economic inequity' which is an opinion not expressed or implied in the passage.

Option 4 addresses the gist of the paragraph. Powerful countries, including the OECD countries are posing as climate change champions due to their lacklustre economic performance as compared to China and India which are growing rapidly. 'Climate change champions' in this option completes the paragraph, and addresses the point raised in the first sentence.

Hence, the correct answer is **option 4**.

69. The paragraph starts with a location (as a backdrop) and moves on to describe things associated with the location. While various things are described about the location, we are looking for a sentence that completes the ideas stated in the paragraph. The paragraph juxtaposes various disparate ideas and cultures together: note the saree and sarong, the Indian Jews, and the image of religious tolerance.

Option 2 is a disconnect from the main idea of the paragraph - it talks about religious discrimination which is not an idea found in the paragraph.

Option 1 is about Matancherry, which the whole paragraph is about. It brings together the ideas in the paragraph to a logical, cohesive whole.

Option 5, with 'thus' for pretty pastel streets is disconnected. No reason is provided in the paragraph for pastel streets being popular.

It is the majority community which has to show tolerance towards a minority group, not the other way round. The paragraph clearly states "home to the last twelve..." indicating the Indian Jews to be very few in numbers. Option 3 can be eliminated.

Option 4 is contrary to the data provided in the passage.

Hence, the correct answer is **option 1**.

70. The essence of the paragraph is the difficulty in differentiating between "Western" and "Eastern" thoughts.

The paragraph starts with a difference between "Western" and "Eastern" and moves on to "thoughts".

The logical completion of the paragraph needs to be in that vein.

Option 2 is logically inconsistent due to the word “dichotomous” between “occidentalism” and “orientalism” whereas the paragraph states that this dichotomy is “illusory”.

Option 3 moves back again to the broad idea of “Western” and “Eastern”.

Option 4 is contrary to the paragraph.

Option 5 completes the paragraph logically. The usage of the words, ‘thought’ and ‘purity’ (pure) in a slightly different manner makes it the ideal choice as it resonates with the paragraph in that “given the intellectual and intellectual interconnections” that exist today the origin of a thought can no longer be classified as purely “Western” or purely “Indian.” Therefore the origin of a thought cannot be pure in terms of origin.

Both, options 1 and 5, state the idea of thoughts not being easily classified. However, option 5 continues the idea of purity mentioned in the final part of the paragraph whereas option 1 does not. In this context, 1 is generic and 5 is specific.

Hence, the correct answer is **option 5**.

71. The passage states, “For these reasons some cognitive scientists have described language as a *psychological faculty*, a mental organ, a neural system, and a computational module. *But I prefer the admittedly quaint term “instinct”*.” Combine this extract with “Thinking of language as an *instinct inverts the popular wisdom*” and we arrive at option 5 as the correct answer option.

Option 1: While the passage mentions ‘cultural artifact’, it does not relate it to popular wisdom. Hence, option 1 is incorrect.

Option 2 is mentioned in the passage but there is no data to suggest that it is not popular wisdom.

Option 3 is incorrect because the author has criticized the common view that children learn language as they grow, he instead says that children are born with it.

Option 4 is mentioned in the passage and does not invert popular wisdom in any way.

Hence, the correct answer is **option 5**.

72. The analogy describes an action which is a critical activity to the species, such that it is instinctive and not something that develops over time. The analogy emphasises the fact that language is instinctive, and not something that is learnt.

Options 3, 4 and 5 about a donkey carrying the load, a horse running the derby and a pet dog protecting property, are not instinctive and basic actions attributed to those animals. They have to be trained to perform these functions.

Option 1 is about ‘learning’, whereas the original example is about instinctively ‘knowing’.

Hence, the correct answer is **option 2**.

73. At the end of the second paragraph, “a knack for communicating information about who did what to whom by modulating the *sounds we make when we exhale*”. This ability is unique to humans as mentioned in the passage.

This resonates with option 2.

Option 1, 3 and 4 are negated as the author has not mentioned or implied in any way that non-humans cannot use symbols, cannot communicate information or do not use sound as a means of communication.

Therefore, option 5 - all of the above - is incorrect.

Hence, the correct answer is **option 2**.

74. The passage states, “The complexity of language, from the scientist’s point of view, is part of our *biological birthright*; it is not something that parents teach their children or something that must be elaborated in school”. This implies that children are born with an instinctive skill for language and that it cannot be taught.

Option 2 is about learning as they grow and not about instinctively knowing language.

Option 3 is close, but the question is related to ‘complexity’ of language. The author is silent on whether language is amenable to teaching or not.

Option 4 is irrelevant as there is no comparison between the language skills of teachers/ parents and their children.

Option 5 contradicts the passage. “Semiotics” is the study of symbols and signs and the passage states that children are not good at semiotics.

Hence, the correct answer is **option 1**.

75. Option 4 succinctly summarizes the crux of the author’s arguments. The author is trying to propound the ‘instinctive’ nature of language. He mentions it is unique to “*Homo sapiens*” but that is not the crux of the passage making option 1 unsuitable as a summary.

Option 2 focuses on a non critical aspect of language which deals with ‘learning’ or ‘teaching’, which is true yet not central to the discussion.

Option 3 is incorrect as it focuses on ancillary aspects.

Option 5 has no base in the paragraph, and is a radical statement.

Hence, the correct answer is **option 4**.

76. Option 1: The passage mentions that society is slowly moving from a Spartan (rigorously self-disciplined or self-restrained) existence to that of a Sybarites’ (a person devoted to pleasure and luxury) one. As a result today’s society is more extravagant than the society of the 1930s.

Option 2: The passage depicts the procedure of eating two ice-cream cones with a ceremonial air. The passage states, “...*advanced proudly* with one cone in their right hand and one in their left; and *expertly*

moving their head from side to side, they licked first one, then the other”.

Option 4: The author has plainly said in the passage that in present times things given are what they are worth even if they appear to be more. The passage states, “the consumer civilization pretends to give more, but actually gives, for four cents, what is worth four cents”.

Option 5: The last two paragraphs of the passage give various examples of how the consumer civilization attempts to spoil children and adults alike. Hence, option 5 is eliminated.

Option 3 cannot be inferred from the passage. Rather the italicised words in the passage suggest the opposite: “The *pathetic, and obviously mendacious*, justification was that a boy concerned with turning his eyes from one cone to the other was more inclined to stumble over stones, steps, or cracks in the pavement. *I dimly sensed that there was another secret justification*, cruelly pedagogical, but I was unable to grasp it”.

Hence, the correct answer is **option 3**.

77. “Parvenus” means ‘a person who has suddenly risen to a higher social and economic class and has not yet gained social acceptance by others in that class’. The appropriate reference is to ‘young upstarts’.

The author points out the extravagance of today’s society. The author mentions in the passage, “*Two two-cent cones instead of one at four cents did not signify squandering, economically speaking, but symbolically they surely did. It was for this precise reason that I yearned for them: because two ice creams suggested excess.* And this was precisely why they were denied me: because they looked indecent, an insult to poverty, a display of fictitious privilege, a boast of wealth. Only spoiled children ate two cones at once, those children who in fairy tales were rightly punished, as Pinocchio was when he rejected the skin and the stalk. And parents who encouraged this weakness, appropriate to little *parvenus*, were bringing up their children in the foolish theatre of “I’d like to but I can’t.” They were preparing them to turn up at tourist-class cheek-in with a fake Gucci bag bought from a street peddler on the beach at Rimini”.

The author refers to the parents as ‘parvenus’ or upstarts who muscle their way into a world where they are uninvited.

Hence, the correct answer is **option 4**.

78. The passage states “*Two two-cent cones instead of one at four cents did not signify squandering, economically speaking, but symbolically they surely did. It was for this precise reason that I yearned for them*”.

Intemperance means ‘excessive indulgence of appetite’.

Hence, the correct answer is **option 2**.

79. The passage does not hint at instances of immorality or amorality. This eliminates options 1 and 3.

Option 4 is incorrect because though moralistic risks have been mentioned they have been said to be at odds with morality. There are no indications of them having risen.

Option 5 is incorrect. There is no mention of purists in the passage. Therefore, the popularity of the purist’s view of morality cannot be established.

Option 2: The passage states, “*Nowadays the moralist risks seeming at odds with morality*, in a world where the consumer civilization now wants even adults to be spoiled, and promises them always something more, from the wristwatch in the box of detergent to the bonus bangle sheathed, with the magazine it accompanies, in a plastic envelope”. The second half of the sentences points to the changes norms/mores in society, and this is our indicator that option 2 is correct.

Hence, the correct answer is **option 2**.

80. The passage talks about how the issue of whether a single cone or two cones should be purchased was not economical but that of morality. The author infers from his elder’s behaviour that that was the only justification.

The meanings of the options are:

Didactic means ‘teaching or intending to teach a moral lesson’.

Dietetic means ‘pertaining to diet or to regulation of the use of food’.

Dialectic means ‘pertaining to, or of the nature of logical argumentation’.

Diatonic means ‘pertaining to the tones, intervals, or harmonies of such scales’.

Diastolic means ‘indicating the arterial pressure during the interval between heartbeats’.

Hence, the correct answer is **option 1**.

81. Option 1 is incorrect because of the word planned. The passage states, “...many of the concepts of modern art, by contrast, have resulted from the *almost accidental* meetings of groups of talented individuals at certain times and certain places. The ideas generated by these *chance* meetings...” This is specified in option 3.

Neither options 2 or 4 have been mentioned in the passage.

Option 5 contradicts the passage. The passage states, “A scientific discipline develops systematically once its bare tenets have been established, named and categorized as conventions. Many of the concepts of modern art, by *contrast*, have resulted from the almost accidental meeting of groups of talented individuals at certain times and certain places.” This implies that the concepts of modern art have not been the product of systematic conventions. Moreover the following

extract, "Certainly one can understand that artists are wary of being pigeon-holed" as well as "There is good reason to accept the ideas codified by artists and critics, over the past sixty years or so, as having attained the status of independent existence" indicates that the concepts of modern art have not been the product of codification.

Option 3 is explicitly mentioned in the passage, "...many of the concepts of modern art, by contrast, have resulted from the *almost accidental* meetings of groups of talented individuals at certain times and certain places. The ideas generated by these *chance* meetings..."

Hence, the correct answer is **option 3**.

82. Option 4 is literally correct. But the word "fossil" in this case has been used to draw an analogy between the physical world and "dead" art. Therefore the interpretation of the word "fossil" in this instance is incorrect.

Option 5 can be implied from, "As an art movement slips into temporal perspective, it ceases to be a living organism - becoming, rather, a fossil. This is not to say it becomes useless or uninteresting. Just as a scientist can reconstruct the life of a prehistoric environment from the messages codified into the structure of a fossil, so can an artist decipher whole webs of intellectual and creative possibility from the recorded structure of a 'dead' art movement."

Hence, the correct answer is **option 5**.

83. Option 2 is incorrect. The passage states, "Not all movements were exclusively concerned with innovation" - implying that some artistic movements were concerned with innovation. However, there is no mention of the status of innovation with regard to science. Hence, there is no data for comparison.

Option 3 is incorrect. While it is mentioned that groups of artists, painters and thinkers collaborated together to develop concepts of modern art, the passage is silent on the case of the scientific world.

Option 4 is incorrect because 'the dissemination of ideas' is only referred to in the case of Art and not to science.

Option 5 applies only to Art and not to Science.

Option 1 can be obtained from "It is almost tempting to see a pattern emerging within the art field - or alternatively imposed upon it a posteriori - similar to that which exists under the umbrella of science where the general term covers a *whole range of separate, though interconnecting, activities. Any parallelism is however - in this instance at least - misleading.*" The last sentence shows that the author of the passage feels that the analogy is misleading - leading to erroneous conclusions.

Hence, the correct answer is **option 1**.

84. Options 1, 2 and 3 are tangential - while mentioned in the passage they do not address the question stem.

In option 5, the phrase, 'efficient technology' makes it incorrect because this has not been mentioned in the passage as a cause for the range of concepts and ideologies in the art of the twentieth century.

Option 4 can be inferred from, "Briefly, then, the concepts of modern art are of many different (often fundamentally different) kinds and resulted from the exposures of painters, sculptors and thinkers to the more complex phenomena of the twentieth century, including our ever increasing knowledge of the thought and products of earlier centuries. Different groups of artists would collaborate in trying to make sense of rapidly changing world of visual and spiritual experience".

Here "*visual*" and "*spiritual*" are synonymous with 'perceptual' and 'transcendental'.

Hence, the correct answer is **option 4**.

85. The question refers to the end of the passage, "As T.S Eliot observed, no one starts anything from scratch; however consciously you may try to live in the present, you are still involved with a nexus of behaviour patterns bequeathed from the past. The original and creative person is not someone who ignores these patterns, but someone who is able to translate and develop them so that they confirm more exactly to his - and our - present needs".

Option 1 is incorrect. The second sentence means that original 'creative processes' exist although the artist may be "involved with a nexus of behaviour patterns bequeathed from the past".

Options 2 and 3 do not maintain the tone of the passage, and hence are eliminated in favour of option 5.

Option 4 contradicts the passage. The passage mentions that the 'originality' of ideas and concepts developed by artists owe genesis to behaviour patterns bequeathed from the past.

Option 5 can be inferred from the above extract.

Hence, the correct answer is **option 5**.

86. The question asks for the factor best denoting the case of Rwanda and Haiti.

From the second paragraph, "...one strand consisted of population growth outstripping available resources: a dilemma similar to the one foreseen by Thomas Malthus in 1798 and being played out today in Rwanda, Haiti, and elsewhere. As the archaeologist David Webster succinctly puts it, 'Too many farmers grew too many crops on too much of the landscape.' Compounding that mismatch between population and resources was the second strand: the effects of deforestation and hillside erosion, which caused a

decrease in the amount of useable farmland at a time when more rather than less farmland was needed, and possibly exacerbated by an anthropogenic drought resulting from deforestation, by soil nutrient depletion and other soil problems, and by the struggle to prevent bracken ferns from overrunning the fields”.

The keywords are the words ‘limited’, ‘land ’and ‘resources’. The second strand continues in the same vein and says that land and resources were limited. Combining the two, option 1 is the right answer option. Option 2 talks about “land resources” but does not mention other resources which were also scarce.

Options 3 states ‘ethnic groups fighting with each other’. There is no mention of fighting in the second paragraph.

Option 4 mentions ‘ethnic groups competing for political power’. There is no mention of this in the second paragraph.

Option 5 states ‘ethnic groups were fighting for their identity’ which is not related to the Rwandan and Haitian context.

Hence, the correct answer is **option 1**.

- 87.** This was essentially a vocabulary question - you need to know or guess the meaning of Anthropogenic. Anthropogenic means ‘caused or produced by humans’. From the second paragraph, “...*anthropogenic* drought resulting from deforestation, by soil nutrient depletion and other soil problems, and by the struggle to prevent bracken ferns from overrunning the fields.”

Option 1 is incorrect because lack of rain cannot be attributed to human intervention.

Options 2 and 3 are incorrect because they are reasons to the causes of the drought and why the drought was anthropogenic.

Option 4 means the same as anthropogenic. Deforestation and soil nutrient depletion can only be caused by humans.

Option 5 is incorrect because a drought caused by climate changes cannot be said to be caused by humans.

Hence, the correct answer is **option 4**.

- 88.** This is a direct question.

Option 1 is the fifth strand in the passage, but there is nothing to indicate that had a different impact compared to earlier droughts.

Option 2 has no supporting data in the passage.

Option 4 contradicts the third paragraph, “Maya warfare, already endemic, peaked *just before* the collapse”.

Option 5 is incorrect because “the third strand consisted of increased fighting, as more and more people fought over fewer resources.” This implies that environmental degradation had nothing to do with this particular drought.

The third paragraph mentions “at the time of *previous droughts*, there were *still uninhabited* parts of the *Maya landscape*, and people at a site affected by drought could save themselves by moving to another site. However, by the time of the Classic collapse the *landscape was now full*, there was no useful *unoccupied land in the vicinity on which to begin anew*, and the whole population could not be accommodated in the few areas that continued to have reliable water supplies.” From this, option 3 is correct.

Hence, the correct answer is **option 3**.

- 89.** Option 1: the passage does not talk about Copan inhabitants destroying the records.

The first paragraph mentions that “detailed archaeological studies are available for some Maya sites” which contradicts options 2. Further, since there is no other evidence in the passage, we have no ground for option 3.

Option 5 is mentioned in the third paragraph; however, it does not explain the reasons for Maya collapse.

The passage mentions five possible strands for the Maya collapse. The passage states, “I acknowledge, however, that *Maya archaeologists still disagree vigorously* among themselves - in part, because *the different strands evidently varied in importance* among different parts of the Maya realm; because detailed archaeological studies are available for only some Maya sites; and because it remains puzzling why most of the Maya heartland remained nearly empty of population and failed to recover after the collapse and after re-growth of forests”. The summary of this paragraph is option 4.

Hence, the correct answer is **option 4**.

- 90.** The second paragraph states, “...population growth outstripping available resources”. This led to deforestation and soil erosion which ultimately led to environmental degradation. This eliminates option 1.

The last paragraph states “...the *Maya peak population numbers* were followed swiftly by political and *social collapse*”. This eliminates option 2.

Option 3 is also mentioned in the passage. The third paragraph states “the third strand consisted of increased fighting, as more and more people fought over fewer resources. *Maya warfare, already endemic, peaked just before the collapse*.”

Option 4 has been cited as one of the factors. In the third paragraph, “bringing matters to a head was the strand of climate change.”

Option 5 is not mentioned in the passage. The fourth paragraph does state “short-term concerns of the *kings* and the *nobles*” but option 5 talks about the ‘Maya population’.

Hence, the correct answer is **option 5**.