

CAT2008 Original Paper With Solutions

SECTION – I (Quant)

This section contains 25 questions.

1. The integers 1, 2....., 40 are written on a black board. The following operation is then repeated 39 times: In each repetition, any two numbers, say a and b , currently on the blackboard are erased and a new number $a + b - 1$ is written. What will be the number left on the board at the end?
 (1) 820 (2) 821 (3) 781
 (4) 819 (5) 780

Solution:

Sum of the terms written on the board initially is $\frac{40(41)}{2} = 820$. In every operation, as two terms a and b are replaced by $a + b - 1$, the sum of the numbers written on the board after the operation decreases by 1. In the same way, after 39 operations the sum decreases by 39 compared with the initial sum. Hence the required answer is $820 - 39 = 781$.
 Choice (3)

2. What are the last two digits of 7^{2008} ?
 (1) 21 (2) 61 (3) 01
 (4) 41 (5) 81

Solution:

To find the last two digits of 7^{2008}

$$7^{2008} = (7^4)^{502} = (2401)^{502} = (2400 + 1)^{502}$$

This expansion, will contain 503 terms, when arranged in descending order of the powers of 2400, will have its first 501 terms with a minimum index of '1' for 2400. So all these terms end with '00', and do not effect the last two digits. Hence the last term i.e., $(1)^{502}$ gives us the last two digits '01'.
 Choice (3)

3. If the roots of the equation $x^3 - ax^2 + bx - c = 0$ are three consecutive integers, then what is the smallest possible value of b ?
 (1) $-\frac{1}{\sqrt{3}}$ (2) -1 (3) 0
 (4) 1 (5) $\frac{1}{\sqrt{3}}$

Solution:

The given equation is $x^3 - ax^2 + bx - c = 0$

If α , β and γ are the 3 roots, then $\alpha\beta + \beta\gamma + \alpha\gamma = b$ (according to the properties of roots)

Now to minimize 'b', such that α , β and γ are consecutive integers, we can take

$\alpha = -1$, $\beta = 0$ and $\gamma = 1$, thereby obtaining the least value of b as '-1' given in the options Choice (2)

4. A shop stores x kg of rice. The first customer buys half this amount plus half a kg of rice. The second customer buys half the remaining amount plus half a kg of rice. Then the third customer also buys half the remaining amount plus half a kg of rice. Thereafter,

no rice is left in the shop. Which of the following best describes the value of x ?
 (1) $2 \leq x \leq 6$ (2) $5 \leq x \leq 8$
 (3) $9 \leq x \leq 12$ (4) $11 \leq x \leq 14$
 (5) $13 \leq x \leq 18$

Solution:

Let the initial quantity be $= x$ kg

After first transaction, left over quantity

$$= x - \left(\frac{x}{2} + \frac{1}{2} \right) = \frac{x}{2} - \frac{1}{2}$$

After second transaction, left over quantity $= \frac{x}{2} - \frac{1}{2}$

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

After third transaction, left over quantity $= \frac{x}{4} - \frac{3}{4}$

$$- \left(\frac{x}{8} - \frac{3}{8} + \frac{1}{2} \right) = \frac{x}{8} - \frac{7}{8}$$

$$\text{Given } \frac{x}{8} - \frac{7}{8} = 0$$

$$\Rightarrow x = 7$$

Choice (2)

Directions for Questions 5 and 6:

Let $f(x) = ax^2 + bx + c$, where a , b and c are certain constants and $a \neq 0$. It is known that $f(5) = -3f(2)$ and that 3 is a root of $f(x) = 0$

5. What is the other root of $f(x) = 0$?
 (1) -7 (2) -4 (3) 2
 (4) 6 (5) Cannot be determined
6. What is the value of $a + b + c$?
 (1) 9 (2) 14 (3) 13
 (4) 37 (5) Cannot be determined

Solutions for questions 5 and 6:

Given that '3' is one of the roots of $f(x)$. Let 'k' be the other root.

$$\therefore f(x) = m[(x - 3)(x - k)] = m[x^2 - (3 + k)x + 3k] = 0$$

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

$$m[25 - (3 + k)5 + 3k] = -3m[4 - (3 + k)2 + 3k]$$

$$\Rightarrow k = -4,$$

hence the other root of $f(x) = 0$,

$$k = -4.$$

$$\therefore f(x) = m[x^2 + x - 12]$$

Since, the value of m cannot be determined from the given information, the values of a , b and c cannot be found out

5. Second root = -4 Choice (2)
6. Value of $a + b + c$ cannot be uniquely determined Choice (5)
7. The number of common terms in the two sequences 17, 21, 25, ..., 417 and 16, 21, 26, ..., 466 is
 (1) 78 (2) 19 (3) 20
 (4) 77 (5) 22

Solution:

Given sequences are 17, 21, 25 ---, 417 and 16, 21, 26, ---, 466. We can observe that 21 is the first common term in the two given arithmetic progressions. As their common differences are 4 and 5, the common difference of the terms common will be LCM (4, 5) i.e. 20.

The common terms between the given sequences are 21, 41, 61, ---- and 401 is the last common term.

Hence, there are $\left(\frac{401-21}{20}\right) + 1$ i.e., 20 terms common terms between these two sequences
Choice (3)

8. How many integers, greater than 999 but not greater than 4000, can be formed with the digits 0, 1, 2, 3 and 4 if repetition of digits is allowed?

- and 4, if repetition of digits is allowed?

(1) 499 (2) 500 (3) 373
 (4) 376 (5) 501

Solution:

Since the required integer (x) is of the form $999 < x \leq 4000$, the integer is a four digit number starting with either 1, 2 or 3. We should also include the integer '4000' in the counting.

Now, the four digit numbers starting with 1, 2 or 3 are

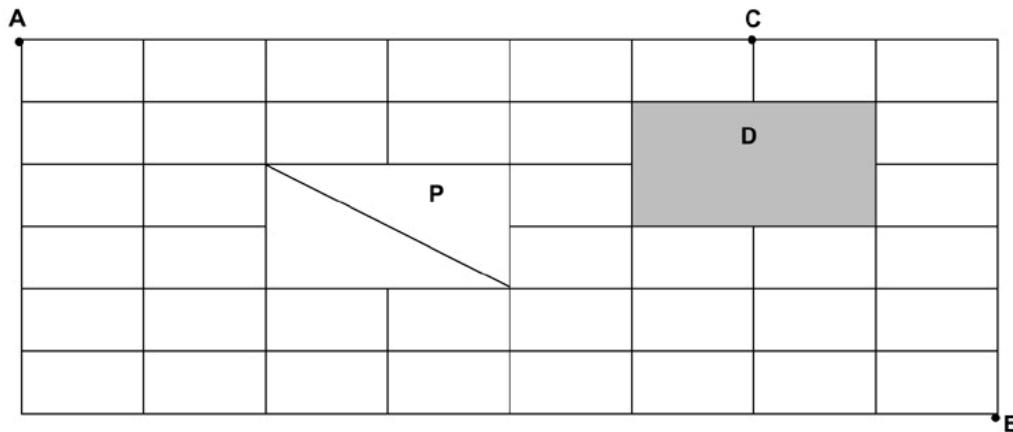
3 \times 5 \times 5 \times 5 \rightarrow 375 in number

Hence, the required answer $375 + 1 = 376$

Choice (4)

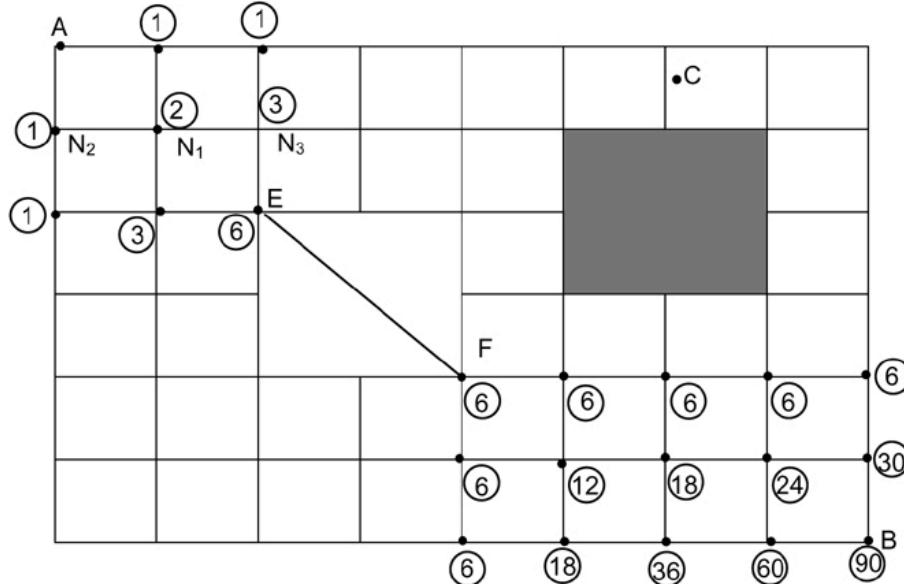
Directions for Questions 9 and 10:

The figure below shows the plan of a town. The streets are at right angles to each other. A rectangular park (P) is situated inside the town with a diagonal road running through it. There is also a prohibited region (D) in the town.



9. Neelam rides her bicycle from her house at A to her office at B, taking the shortest path. Then the number of possible shortest paths that she can choose is.

Solution:



In order to reach B from A, travelling on the shortest possible route, Neelam has to first reach the point E, then cover EF and then reach point B from F. Now, if we observe, node N_1 , the only way to reach is from A, hence only one way to reach N_1 , similarly one way to reach N_2 , whereas to reach N_3 we can either come from N_1 or N_2 , hence to get the number of ways to reach N_3 , we add the number of ways to reach N_1 and N_2 . \therefore Number of ways to reach N_3 is $1 + 1 = 2$.

\therefore To reach any particular node, the number of ways is the sum of the ways to reach the nodes which lead to that particular node. We can similarly fill up the entire grid.

\therefore The number of ways to reach B is 90.

Alternative solution:

$$\text{The number of ways from A to E} = \frac{(2+2)!}{2!2!} = 6$$

$$\text{The number of ways from F to B} = \frac{(4+2)!}{4!2!} = 15$$

$$\therefore \text{Number of ways from A to B is } 6 \times 15 = 90$$

Choice (4)

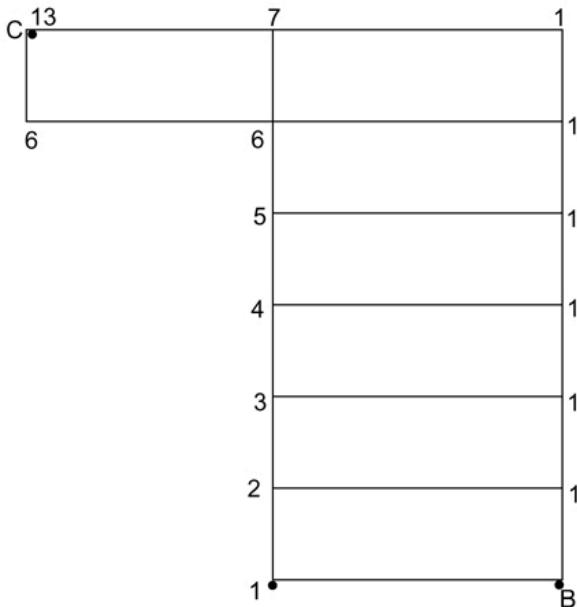
10. Neelam rides her bicycle from her house at A to her club at C, via B taking the shortest path. Then the number of possible shortest paths that she can choose is

- (1) 1170 (2) 630 (3) 792
 (4) 1200 (5) 936

Solution:

Now, we need to find the number of ways to reach from A to C via B. We have already found the number of ways as 90, to reach from A to B. Now we concentrate on the number of ways to reach C from B.

Look at the following grid.



By following a procedure similar to one discussed in the previous answer we get 13 ways to reach from B to C.

Hence the number of ways to reach C via B is $90 \times 13 = 1170$.
 Choice (1)

11. Let $f(x)$ be a function satisfying $f(x)f(y) = f(xy)$ for all real x, y . If $f(2) = 4$, then what is the value of $f\left(\frac{1}{2}\right)$?

- (1) 0 (2) $\frac{1}{4}$ (3) $\frac{1}{2}$
 (4) 1 (5) Cannot be determined

Solution:

$$\text{Given } f(xy) = f(x)f(y) \text{ for } x, y \in \mathbb{R}$$

$$\text{Now } f(2) = f(2 \times 1) = f(2) \times f(1)$$

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

$$\Rightarrow f(1) = 1 \text{ (As } f(2) \neq 0\text{)}$$

$$\Rightarrow f(1) = 1$$

$$\text{Now } f(1) = f(2) \times f(1/2) = f(2) \times \frac{1}{2}$$

$$\Rightarrow 4 \times f\left(\frac{1}{2}\right) = f(1); 4 \times f\left(\frac{1}{2}\right) = 1$$

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

Choice (2)

12. Suppose, the seed of any positive integer n is defined as follows.

$$\text{seed}(n) = n, \text{ if } n < 10$$

$$= \text{seed}(s(n)), \text{ otherwise,}$$

where $s(n)$ indicates the sum of digits of n .

For example

$$\text{seed}(7) = 7, \text{ seed}(248) = \text{seed}(2+4+8) = \text{seed}(14) = \text{seed}(1+4) = \text{seed}(5) = 5 \text{ etc.}$$

How many positive integers n , such that $n < 500$, will have $\text{seed}(n) = 9$?

- (1) 39 (2) 72 (3) 81
 (4) 108 (5) 55

Solution:

Seed (n) is defined as sum of the digits of n .

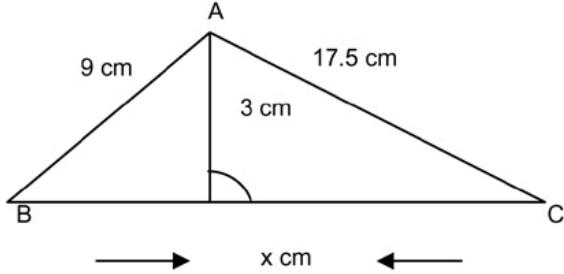
From the given definition, $s(n) = 9$ will be satisfied for all the multiples of 9. In the first 499 natural numbers, we have 495 as the last multiple of 9, which is 55th multiple of 9.
 Choice (5)

13. In a triangle ABC, the lengths of the sides AB and AC equal 17.5 cm and 9 cm respectively. Let D be a point on the line segment BC such that AD is perpendicular to BC. If AD = 3 cm, then what is the radius (in cm) of the circle circumscribing the triangle ABC?

- (1) 17.05 (2) 27.85 (3) 22.45
 (4) 32.25 (5) 26.25

Solution:

In the given triangle $AB = 9 \text{ cm}$, $AC = 17.5 \text{ cm}$ and AD which is perpendicular to BC is equal to 3 cms.



In trigonometry, we have $abc = 4R\Delta$.

where $a = BC$
 $b = AC$
 $c = AB$

R = circumradius of the triangle ABC and Δ is the area of the triangle ABC

$$\text{So, } 9(17.5)x = 4R \left[\frac{1}{2}(3)(x) \right]$$

$$\Rightarrow R = \frac{9(17.5)}{6} = 26.25 \text{ cm} \quad \text{Choice (5)}$$

14. Consider obtuse-angled triangles with sides 8 cm, and x cm. If x is an integer, then how many such triangles exist?

- (1) 5 (2) 21 (3) 10
 (4) 15 (5) 14

Solution:

In any obtuse-angled triangle, the square of longest side will be greater than sum of the squares of the remaining two sides.

Two of the sides are given as 8 cm and 15 cm. Hence x can take the values from 8 cm, 9 cm, ---, 22 cm. Of these for (8, 9, 10, 11, 12) and (18, 19, 20, 21, 22) we get obtuse angled triangles.

Choice (3)

15. Consider a square ABCD with midpoints E, F, G, H of AB, BC, CD and DA respectively. Let L denote the line passing through F and H. Consider points P and Q, on L and inside ABCD, such that the angles APD and BQC both equal 120° . What is the ratio of the area of ABQCDP to the remaining area inside ABCD?

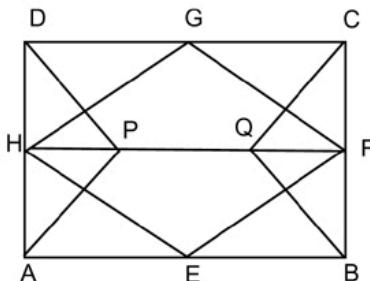
- (1) $\frac{4\sqrt{2}}{3}$ (2) $2 + \sqrt{3}$
 (3) $\frac{10 - 3\sqrt{3}}{9}$ (4) $1 + \frac{1}{\sqrt{3}}$
 (5) $2\sqrt{3} - 1$

Solution:

Given that F and H are the midpoints of BC and AD respectively and $\angle BQC = 120^\circ$.

$\therefore QCF = 30^\circ$

$$\Rightarrow CF = s \text{ and } QF = \frac{s}{\sqrt{3}}$$



Let side of the square ABCD be $2s$ units

$$\therefore \text{Area of triangle CQF} = \frac{1}{2} (CF) (FQ) = \frac{s^2}{2\sqrt{3}}$$

Sum of areas of triangles APD and BQC =

$$4 \left(\frac{s^2}{2\sqrt{3}} \right) = \frac{2s^2}{\sqrt{3}} \text{ as the triangles CQF, BQF, ADH}$$

and DPH are congruent.

$$\text{Now, the required ratio} = \frac{(2s)^2 - (2s^2/\sqrt{3})}{(2s^2/\sqrt{3})} \\ = 2\sqrt{3} - 1 \quad \text{Choice (5)}$$

16. What is the number of distinct terms in the expansion of $(a + b + c)^{20}$?

- (1) 231 (2) 253 (3) 242
 (4) 210 (5) 228

Solution:

$$\text{Given } (a + b + c)^{20}$$

Any term in the expansion of $(a + b + c)^{20}$ is of form $a^p b^q c^r$, such that $p + q + r = 20$, where p, q, r are whole numbers.

Also $p + q + r = 20$

The number of solution for

$x + y + z + \dots + r$ terms = n ,

where $x, y, z, \dots \in W$, is given by $n+r-1C_{r-1}$.

\therefore Number of solutions for $p + q + r = 20$ is $20+3-1C_{3-1}$ i.e., $22C_2 = 231$ Choice (1)

Directions for Questions 17 and 18:

Five horses, Red, White, Grey, Black and Spotted participated in a race. As per the rules of the race, the persons betting on the winning horse get four times the bet amount and those betting on the horse that came in second get thrice the bet amount. Moreover, the bet amount is returned to those betting on the horse that came in third, and the rest lose the bet amount. Raju bets Rs.3000, Rs.2000 and Rs.1000 on Red, White and Black horses respectively and ends up with no profit and no loss.

17. Which of the following cannot be true?

- (1) At least two horses finished before spotted
 (2) Red finished last
 (3) There were three horses between Black and Spotted
 (4) There were three horses between white and Red
 (5) Grey came in second

18. Suppose, in addition, it is known that Grey came in fourth. Then which of the following cannot be true?

- (1) Spotted came in first
 (2) Red finished last
 (3) White came in second
 (4) Black came in second
 (5) There was one horse between Black and White

Solutions for questions 17 and 18:

Raju bets Rs.3000 on Red, Rs.2000 on White, Rs.1000 on Black and he ends up with no profit and no loss.

No profit no loss is possible with the following cases:

Case (a): $3000 + 3(1000)$;

Case (b): $2000 + 4(1000)$;

Case (c): $3(2000) + 0$;

Case (a):

Black horse in 2nd place and red horse in 3rd place.

	Black	Red		
1 st place	2 nd place	3 rd place	4 th place	5 th place

White can be in the 4th or the 5th place.

Case (b):

White horse in 3rd place and black horse in 1st place.

	Black	White	Red	
1 st place	2 nd place	3 rd place	4 th place	5 th place

(or)

	Black	White	Red	
1 st place	2 nd place	3 rd place	4 th place	5 th place

Case (c):

White horse in 2nd place

	White	Black	Red	
1 st place	2 nd place	3 rd place	4 th place	5 th place

(or)

	White	Red	Black	
1 st place	2 nd place	3 rd place	4 th place	5 th place

17. Choice (1) is possible in case (a).

Choice (2) is possible in case b (ii).

Choice (3) is possible in case b (i).

Choice (4) is not possible in any of the cases.

Choice (5) is possible in case b.

Choice (4)

18. If Grey came in 4th position, case a and case b (ii) are possible.

Observing the above cases,

Choice (1) is possible in case a,

Choice (2) is possible in case b (ii).

Choice (3) is not possible.

Choice (4) is possible in case a.

Choice (5) is possible in case b.

Choice (3)

Directions for Questions 19 and 20:

Mark (1) if Q can be answered from A alone but not from B alone.

Mark (2) if Q can be answered from B alone but not from A alone.

Mark (3) if Q can be answered from A alone as well as from B alone.

Mark (4) if Q can be answered A and B together but not from any of them alone.

Mark (5) if Q cannot be answered even from A and B together.

In a single elimination tournament, any player is eliminated with a single loss. The tournament is played in multiple rounds subject to the following rules:

(a) If the number of players, say n , in any round is even, the players are grouped in to $n/2$ pairs. The players in each pair play a match against each other and the winner moves on to the next round.

(b) If the number of players, say n , in any round is odd, then one of them is given a bye, that is, he automatically moves on to the next round. The remaining $(n - 1)$ players are grouped into $(n - 1)/2$ pairs. The players in each pair play a match against each other and the winner moves on to the next round. No player gets more than one bye in the entire tournament.

Thus, if n is even, then $n/2$ players move on to the next round while if n is odd, then $(n + 1)/2$ players move on to the next round. The process is continued till the final round, which obviously is played between two players. The winner in the final round is the champion of the tournament.

19. Q: What is the number of matches played by the champion?

A: The entry list for the tournament consists of 83 players

B: The champion received one bye.

Solution:

For the data given in statement A, the composition of the various rounds can be tabulated as shown below;

Round No.	No. of Players	Pairs of Player	Bye	No. of Matches
1	83	41 × 2	1	41
2.	41 + 1 = 42	21 × 2	0	21
3.	21	10 × 2	1	10
4.	10 + 1 = 11	5 × 2	1	5
5.	5 + 1 = 6	3 × 2	0	3
6.	3	1 × 2	1	1
7.	1 + 1 = 2	1	0	1

Four byes are involved in the tournament. The number of matches played by the winner depends on the number of byes he gets. Hence, the question cannot be answered.

Statement A is not sufficient.

Consider statement B:

Although the number of byes is known, the number of players in the first round is not known. Hence, statement B is not sufficient.

Combining the 2 statements:

As it is known that the winner got only one bye, the number of matches played can be counted.

Choice (4)

20. Q: If the number of players, say n , in the first round was between 65 and 128, then what is the exact value of n ?

A: Exactly one player received a bye in the entire tournament

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

Solution:

It is given that $65 < n < 128$;
 $\Rightarrow (2^6 + 1) < n < 2^7$.

From statement A:

For $65 < n < 128$, there will be exactly one bye for $n = 127, 126, 124, 120, 112, 96$ in the first, second, third, fourth, fifth and sixth rounds respectively. Hence A alone is not sufficient.

Statement B: One player received a bye while moving from the third round to the fourth round.

For values $n = 124$, as well as 123 , there is a bye in the third round. Hence, this statement is not sufficient. Note that when $n = 124$, there is only one bye; when $n = 123$, there is a bye in the 1st as well as 3rd rounds.

Combining the statements:

As the winner had only one bye, and that occurred while moving to the fourth round from the third round, $n = 124$ is the only solution.

Choice (4)

21. Two circles, both of radii 1 cm, intersect such that the circumference of each one passes through the centre of the other. What is the area (in sq.cm) of the intersecting region?

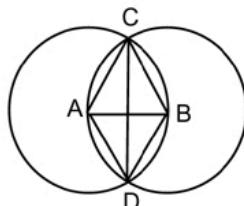
- (1) $\frac{\pi}{3} - \frac{\sqrt{3}}{4}$ (2) $\frac{2\pi}{3} + \frac{\sqrt{3}}{2}$ (3) $\frac{4\pi}{3} - \frac{\sqrt{3}}{2}$
 (4) $\frac{4\pi}{3} + \frac{\sqrt{3}}{2}$ (5) $\frac{2\pi}{3} - \frac{\sqrt{3}}{2}$

Solution:

A and B are the centers of the circles and the two circles intersect at C and D.

$$AC = AD = AB = 1 \text{ cm}$$

$$\angle DAC = 120^\circ$$



Area of segment DCB = Area of sector ACBD – Area of triangle ACD

$$\text{Area of sector ACBD} = (1/3)\pi$$

$$\text{Area of ACD} = \frac{1}{2} \times AC \times AD \times \sin 120^\circ = \frac{1}{2}(1)(1)\frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{4}$$

Now, area of the required region

$$= 2 \left[\frac{\pi}{3} - \frac{\sqrt{3}}{4} \right] = \frac{2\pi}{3} - \frac{\sqrt{3}}{2} \quad \text{Choice (5)}$$

22. Rahim plans to drive from city A to station C, at the speed of 70 km per hour, to catch a train arriving there from B. He must reach C at least 15 minutes before the arrival of the train. The train leaves B, located 500 km south of A, at 8:00 am and travels at a speed of 50 km per hour. It is known that C is located between west and northwest of B, with BC at 60° to AB. Also, C is located between south and southwest of A with AC at 30° to AB. The latest time by which Rahim must leave A and still catch the train is closest to
 (1) 6:15 am
 (2) 6:30 am
 (3) 6:45 am
 (4) 7:00 am
 (5) 7:15 am

Solution:

Since $\angle A = 30^\circ$ and $\angle B = 60^\circ$

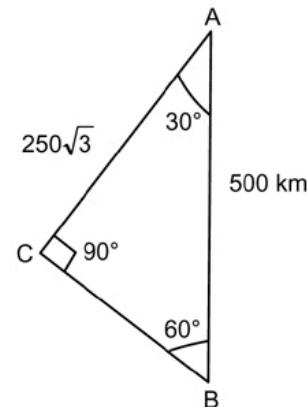
$$\therefore \angle C = 90^\circ$$

$$\therefore BC = 250 \text{ km and } AC = 250\sqrt{3} \text{ km}$$

Time taken by the train to reach from A to C

$$= \frac{250}{5} \text{ i.e. 5 hours.}$$

i.e. at 13.00 train can reach C.



$$\text{Time required by Rahim to reach C} = \frac{250\sqrt{3}}{70} \text{ hours}$$

$$= \frac{433}{70} \text{ hours} = 6 \text{ hours } 12 \text{ minutes (approximately)}$$

The time by which Rahim must start from A

$$= 13:00 - 0:15 - 6:12 = 6:33$$

The required answer = 6.30 a.m. Choice (2)

23. Three consecutive positive integers are raised to the first, second and third powers respectively and then added. The sum so obtained is a perfect square whose square root equals the total of the three original integers. Which of the following best describes the minimum, say m , of these three integers?

- (1) $1 \leq m \leq 3$ (2) $4 \leq m \leq 6$
 (3) $7 \leq m \leq 9$ (4) $10 \leq m \leq 12$
 (5) $13 \leq m \leq 15$

Solution:

Given the positive integers $m, m+1, m+2$.

$$\therefore m + (m+1)^2 + (m+1)^3 = (m+m+1+m+2)^2$$

$$\Rightarrow m + (m+1)^2 + (m+1)^3 = (3m+3)^2$$

$$\Rightarrow m^3 - 2m^2 - 3m = 0$$

$$\Rightarrow m(m^2 - 2m - 3) = 0$$

$$\text{Since } m \neq 0, m^2 - 2m - 3 = 0$$

$$(m-3)(m+1) = 0$$

$$\Rightarrow m = 3 \text{ as } m \neq -1$$

Choice (1)

24. Find the sum

$$\sqrt{1 + \frac{1}{1^2} + \frac{1}{2^2}} + \sqrt{1 + \frac{1}{2^2} + \frac{1}{3^2}} + \dots + \sqrt{1 + \frac{1}{2007^2} + \frac{1}{2008^2}}$$

- (1) $2008 - \frac{1}{2008}$ (2) $2007 - \frac{1}{2007}$
 (3) $2007 - \frac{1}{2008}$ (4) $2008 - \frac{1}{2007}$
 (5) $2008 - \frac{1}{2009}$

Solution:

$$\text{First term is } \sqrt{1+1+\frac{1}{4}} = \frac{3}{2} = 2 - \frac{1}{2}$$

$$\text{Sum of first two terms is } \frac{3}{2} + \sqrt{1+\frac{1}{4}+\frac{1}{9}}$$

$$= \frac{3}{2} + \sqrt{\frac{36+9+4}{36}} = \frac{3}{2} + \frac{7}{6} = \frac{16}{6} = \frac{8}{3} = 3 - \frac{1}{3}$$

$$\text{Sum of first 3 terms is } \frac{8}{3} + \sqrt{1+\frac{1}{9}+\frac{1}{16}}$$

$$\frac{8}{3} + \sqrt{\frac{169}{144}} = \frac{8}{3} + \frac{13}{12} = \frac{45}{12} = \frac{15}{4} = 4 - \frac{1}{4}$$

Similarly, the sum of the given terms is

$$2008 - \frac{1}{2008} \quad \text{Choice (1)}$$

25. Consider a right circular cone of base radius 4 cm and height 10 cm. A cylinder is to be placed inside the cone with one of the flat surfaces resting on the base of the cone. Find the largest possible total surface area (in sq. cm) of the cylinder.

- (1) $\frac{100\pi}{3}$ (2) $\frac{80\pi}{3}$ (3) $\frac{120\pi}{7}$
 (4) $\frac{130\pi}{9}$ (5) $\frac{110\pi}{7}$

Solution:

Consider the given figure.

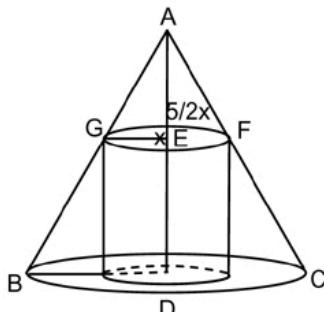
Let the radius of the cylinder be x cm.

Then $EG = x$ cm

Triangles AEG and ADB are similar

$$\therefore \frac{AE}{EG} = \frac{AD}{BD} = \frac{5}{2}$$

$$\therefore AE = \frac{5}{2}x \text{ cm}$$



$$\therefore \text{Height of the cylinder} = ED = \left(10 - \frac{5}{2}x\right) \text{ cm}$$

$$\therefore \text{T.S.A of cylinder} = 2\pi x \left(x + 10 - \frac{5}{2}x\right) \text{ sq cm}$$

$$\text{T.S.A of cylinder} = 2\pi x \left(10 - \frac{3}{2}x\right)$$

$$= 2\pi \left(10x - \frac{3}{2}x^2\right) \text{ sq cm}$$

Maximum value of T.S.A occurs when $\left(10x - \frac{3}{2}x^2\right)$ is maximum.

Maximum value of $\left(10x - \frac{3}{2}x^2\right)$ is $\frac{50}{3}$

(\because Maximum value of $ax^2 + bx + c$, where $a \neq 0$, is $\frac{4ac - b^2}{4a}$)

\therefore Maximum T.S.A. = $\frac{100\pi}{3}$ sq cm. Choice (1)

SECTION – II (DI)

This section contains 25 questions

Directions for Questions 26 to 28: Answer the following questions based on the statements given below:

- (i) There are three houses on each side of the road.
- (ii) These six houses are labelled as P, Q, R, S, T and U.
- (iii) The houses are of different colours, namely, Red, Blue, Green, Orange, Yellow and White.
- (iv) The houses are of different heights.
- (v) T, the tallest house, is exactly opposite to the Red coloured house.
- (vi) The shortest house is exactly opposite to the Green coloured house.
- (vii) U, the Orange coloured house, is located between P and S.
- (viii) R, the Yellow coloured house, is exactly opposite to P.
- (ix) Q, the Green coloured house, is exactly opposite to U.
- (x) P, the White coloured house, is taller than R, but shorter than S and Q.

26. What is the colour of the house diagonally opposite to the Yellow coloured house?

- (1) White (2) Blue (3) Green
 (4) Red (5) None of these

27. Which is the second tallest house?

- (1) P (2) S (3) Q
 (4) R (5) Cannot be determined

28. What is the colour of the tallest house?

- (1) Red (2) Blue (3) Green
 (4) Yellow (5) None of these

Solutions for questions 26 to 28:

The given information can be tabulated as follows

P – White –

Q – Green –

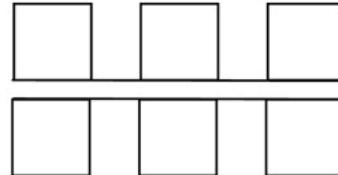
R – Yellow –

S – –

T – – Tallest

U – Orange –

From (v), T is not Red in colour \Rightarrow T is Blue and S is Red
 Let us represent the arrangement in the following diagram.

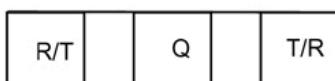


From (viii) U, P and S should be in one line with U between P and S and R, T and Q are in the other line.
 From (ix), Q is opposite U

From (vi), U is the shortest and R and T are on either side of Q

Now we know that T is the tallest and U is the shortest
From (x), P and R are 4th and 5th tallest respectively.

⇒ S and Q are the 2nd and 3rd tallest in any order.



From (viii), we get the final arrangement as follows.
Rank in Height

	White	Orange	Red	
1 – T	P	U	S	
2 – S/Q				
3 – Q/S				
4 – P				
5 – R	R	Q	T	
6 – U	Yellow	Green	Blue	

The positions of (P and S) can be interchanged, same is the case with R and T. One can ignore the above possibility as it makes no difference while answering the questions.

26. The red coloured house is diagonally opposite the yellow coloured house.

Choice (4)

27. The second tallest house is either S or Q.

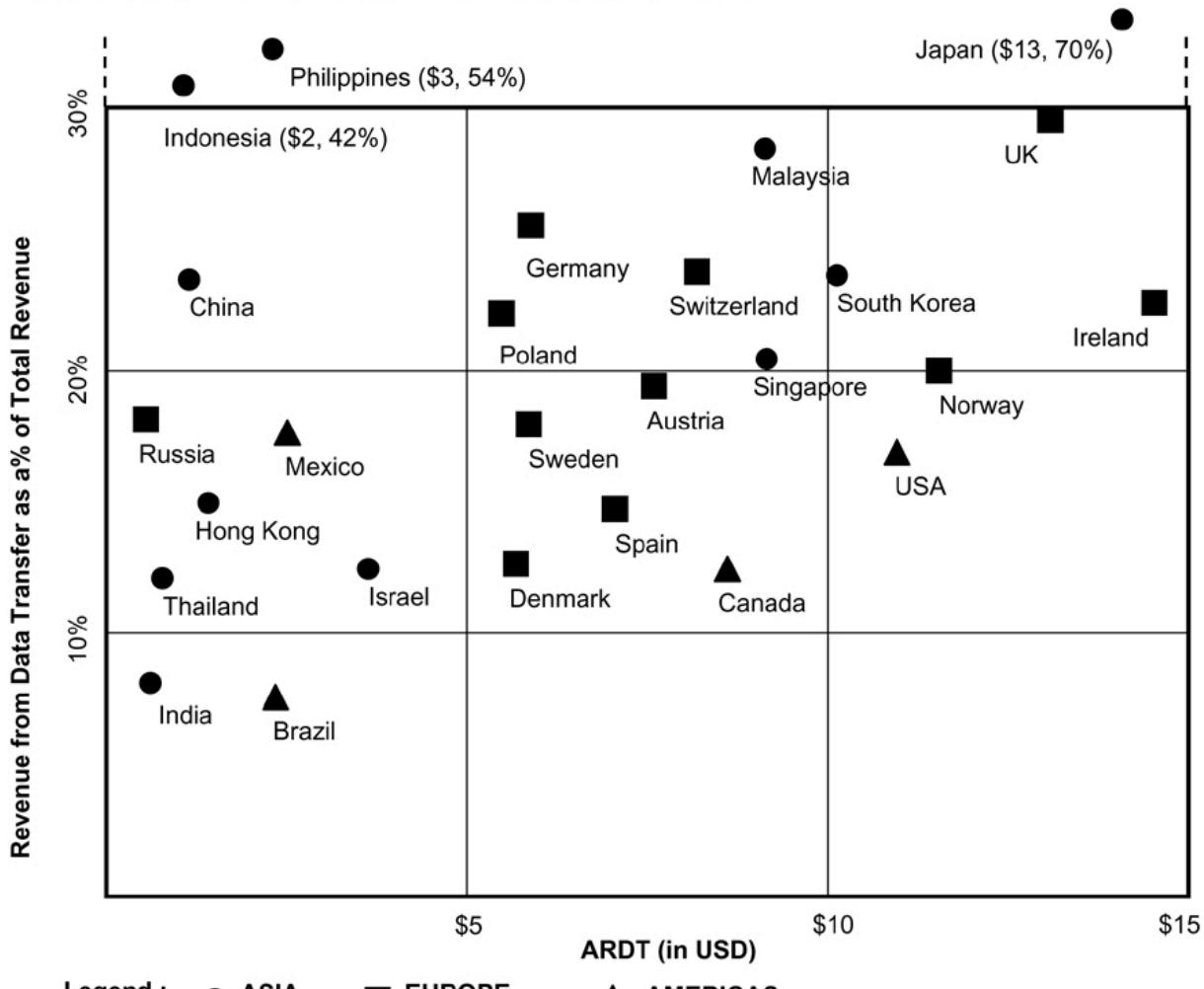
Choice (5)

28. The tallest house is T, which is Blue in colour.

Choice (2)

Directions for Questions 29 to 31: Answer the following questions based on the information given below:

Telecom operators get revenue from transfer of date and voice. Average revenue received from transfer of each unit of data is known as ARDT. In the diagram below, the revenue received from date transfer as percentage of total revenue received and the ARDT in US Dollars (USD) are given for various countries.



Legend : ● ASIA ■ EUROPE ▲ AMERICAS

29. It was found that the volume of data transfer in India is the same as that of Singapore. Then which of the following statements is true?

- (1) Total revenue is the same in both countries.
- (2) Total revenue in India is about 2 times that of Singapore.
- (3) Total revenue in India is about 4 times that of Singapore.
- (4) Total revenue in Singapore is about 2 times that of India.
- (5) Total revenue in Singapore is about 4 times that of India.

30. It is expected that by 2010, revenue from data transfer as a percentage of total revenue will triple for India and double for Sweden. Assume that in 2010, the total revenue in India is twice that of Sweden and that the volume of data transfer is the same in both the countries. What is the percentage increase of ARDT in India if there is no change in ARDT in Sweden?

- | | |
|--------------------------|----------|
| (1) 400% | (2) 550% |
| (3) 800% | (4) 950% |
| (5) Cannot be determined | |

31. If the total revenue received is the same for the pairs of countries listed in the choices below, choose the pair that has approximately the same volume of data transfer.

- (1) Philippines and Austria
- (2) Canada and Poland
- (3) Germany and USA
- (4) UK and Spain
- (5) Denmark and Mexico

Solutions for questions 29 to 31:

The values given in the graph represent the following:

Revenue from data transfer along y-axis (let this be called as y-value) and ARDT along x-axis. (This be called as x-value)

For the purpose of simplification, they are represented as follows.

$$y\text{-value} = \frac{\text{Revenue from data}}{\text{Total Revenue}} \times 100$$

\Rightarrow Revenue from data

$$= \frac{y\text{-value} \times \text{Total Revenue}}{100} - (i)$$

$$x\text{-value} = \frac{\text{Revenue from data}}{\text{Volume of data}}$$

\Rightarrow Revenue from data = (x-value) (volume of data) - (ii)

29. The given condition is about volume of data transfer. From the above explanation and equations (i) and (ii)

$$\text{Volume of data} = \frac{\text{Revenue from data}}{x\text{-value}}$$

$$= \frac{y\text{-value} \times \text{Total Revenue}}{100}$$

$$= \frac{y\text{-value} \times \text{Total Revenue}}{x\text{-value}}$$

Given, volume of data is same for India as well as Singapore.

$$\left(\frac{y\text{-value} \times \text{Total Revenue}}{x\text{-value} \times 100} \right)_{\text{India}}$$

$$= \left(\frac{y\text{-value} \times \text{Total Revenue}}{x\text{-value} \times 100} \right)_{\text{Singapore}}$$

$$\left(\frac{9 \times \text{Total Revenue}}{1 \times 100} \right)_{\text{India}} =$$

$$\left(\frac{21 \times \text{Total Revenue}}{9 \times 100} \right)_{\text{Singapore}}$$

$$\frac{(\text{Total Revenue})_{\text{Singapore}}}{(\text{Total Revenue})_{\text{India}}} = \frac{9 \times 9}{21 \times 1} \approx 4 \text{ times}$$

Choice (5)

30. Given, volume of data transfer is same for India and Sweden in 2010

$$\left(\frac{y\text{-value} \times \text{Total Revenue}}{x\text{-value}} \right)_{\text{India}}$$

$$= \left(\frac{y\text{-value} \times \text{Total Revenue}}{x\text{-value}} \right)_{\text{Sweden}}$$

Total revenue of Sweden is R and that of India is 2R.

India : y - value : 3 x 9 \approx 27, x - value = ?

Sweden : y - value : 18 x 2 = 36, x - value = 6

$$x\text{-value of India} = \frac{6 \times 27 \times 2R}{36 \times R} = 9$$

$$\therefore \text{Change in x - value} = \frac{9 - 1}{1} \times 100 \approx 800 \%$$

Choice (3)

31. Given total revenue is same for each pair of countries. Now we have to find the pair for which volume of data transfer is the same.

$$\text{Volume of data} = \frac{y\text{-value} \times \text{Total Revenue}}{x\text{-value}}$$

As total revenue of each pair of countries is the same we have to check for the pair for which

$$\left(\frac{y\text{-value}}{x\text{-value}} \right) \text{are equal.}$$

Now, from the choices, we have to select the pair where, higher the y-value the higher is the x-value

Choice (4)

Directions for Questions 32 to 34: Answer the following questions based on the information given below:

For admission to various affiliated colleges, a university conducts a written test with four different sections, each with a maximum of 50 marks. The following table gives the aggregate as well as the sectional cut-off marks fixed by six different colleges affiliated to the university. A student will get admission only if he/she gets marks greater than or equal to the cut-off marks in each of the sections and his/her aggregate marks are at least equal to the aggregate cut-off marks as specified by the college.

	Sectional Cut-off Marks				Aggregate Cut-off Marks
	Section A	Section B	Section C	Section D	
College 1	42	42	42		176
College 2		45	45		175
College 3			46		171
College 4	43			45	178
College 5	45		43		180
College 6		41		44	176

32. Bhama got calls from all colleges. What could be the minimum aggregate marks obtained by her?
 (1) 180 (2) 181 (3) 196
 (4) 176 (5) 184
33. Charlie got calls from two colleges. What could be the minimum marks obtained by him in a section?
 (1) 0 (2) 21 (3) 25 (4) 35 (5) 41
34. Aditya did not get a call from even a single college. What could be the maximum aggregate marks obtained by him?
 (1) 181 (2) 176 (3) 184 (4) 196 (5) 190

Solutions for questions 32 to 34:

There can be a tendency to assume aggregate cut-off marks as the sum of sectional cut off marks. But as no explanation is given regarding aggregate cut-off marks in the data, one should refrain from making any assumptions regarding it.

32. To get call from all colleges with the minimum aggregate marks, Bhama should score the highest cut-off marks in each section, i.e. 45 in section A, 45 in section B, 46 in section C and 45 in section D, for a total of $45 + 45 + 46 + 45 = 181$. Choice (2)
33. If Charlie scores an aggregate of 175 he would get calls from College 2 and College 3. So, he could have scored 50 marks each in section A, B and C and 25 marks in section D. Choice (3)
34. In the cases where there is a blank in the table the colleges do not have any cut offs for those sections. Four colleges have cut offs for section C and the remaining two colleges have cut offs for section D. ∴ If one gets less than the minimum of the cut off marks in section C(42) and less than the minimum of the cut off marks for section D(44), one would not get calls from any of the six colleges. The maximum possible score of a person without even a single call is $50 \text{ (Section A)} + 50 \text{ (Section B)} + 41 \text{ (Section C)} + 43 \text{ (Section D)} = 184$. Choice (3)

Directions for Questions 35 to 38: Answer the following questions based on the information given below:

In a sports event, six teams (A, B, C, D, E and F) are competing against each other. Matches are scheduled in two stages. Each team plays three matches in Stage-I

and two matches in Stage-II. No team plays against the same team more than once in the event. No ties are permitted in any of the matches. The observations after the completion of Stage-I and Stage-II are given below.

Stage-I:

- One team won all the three matches.
- Two teams lost all the matches.
- D lost to A but won against C and F.
- E lost to B but won against C and F.
- B lost at least one match.
- F did not play against the top team of Stage-I.

Stage-II:

- The leader of Stage-I lost the next two matches.
- Of the two teams at the bottom after Stage-I, one team won both matches, while the other lost both matches.
- One more team lost both matches in Stage-II.

35. The two teams that defeated the leader of Stage-I are:
 (1) F & D (2) E & F (3) B & D
 (4) E & D (5) F & D
36. The only team(s) that won both matches in Stage-II is (are):
 (1) B (2) E & F (3) A, E & F
 (4) B, E & F (5) B & F
37. The teams that won exactly two matches in the event are:
 (1) A, D & F (2) D & E (3) E & F
 (4) D, E & F (5) D & F
38. The team(s) with the most wins in the event is (are):
 (1) A (2) A & C (3) F
 (4) E (5) B & E

Solutions for questions 35 to 38:

Stage I:

As A, B, D and E won at least one match, C and F lost all the three matches.

As B, D and E lost at least one match, A won all the three matches.

In stage I, there are a total of 9 matches and a total of 9 wins.

∴ B, D and E won two matches each.

As A (the top team of stage I) did not play against F, A played a match against B, a match against C.

∴ The ninth match is between B and F.
So, the nine matches that have taken place are as follows.

Won	Lost	Won	Lost	Won	Lost
A	D	D	C	D	F
B	E	E	C	E	F
A	B	A	C	B	F

Stage II:

As each team played a total of five matches, in stage II, the matches are takes place between the following pairs of team

A – E, A – F, B – C, B – D, E – D and C – F.

Given that, in stage II, three teams lost all the two matches.

Therefore, the remaining three teams must have won all the two matches.

Given A lost the two matches.

∴ Each of E and F won the two matches.

⇒ C and D lost the two matches.

Therefore B also won the two matches.

35. E and F defeated A (the top team in stage I).

Choice (2)

36. Only B, E and F won the matches in stage II.

Choice (4)

37. D and F won exactly two matches in the event.

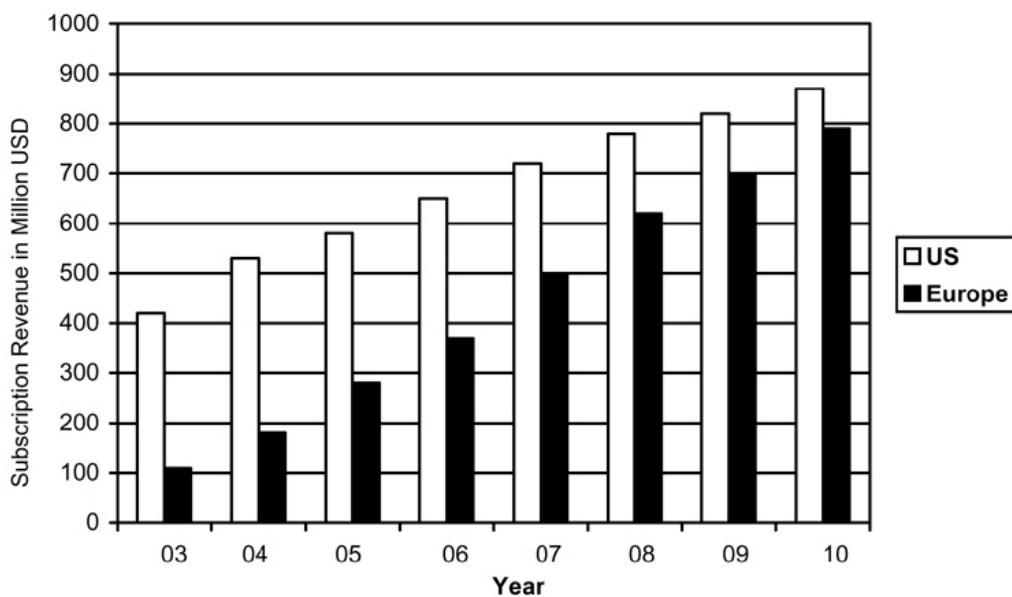
Choice (5)

38. B and E won four matches each, which is the highest.

Choice (5)

Directions for Questions 39 to 42: Answer the following questions based on the information given below:

The bar chart below shows the revenue received, in million US Dollars (USD), from subscribers to a particular Internet service. The data covers the period 2003 to 2007 for the United States (US) and Europe. The bar chart also shows the estimated revenues from subscription to this service for the period 2008 to 2010.



39. The difference between the estimated subscription in Europe in 2008 and what it would have been if it were computed using the percentage growth rate of 2007 (over 2006), is closest to:

(1) 50 (2) 80 (3) 20 (4) 10 (5) 0

Solution:

$$\text{The percentage growth rate in 2007 over 2006} = \frac{500 - 380}{380} \times 100 = 31.5\%$$

Had the percentage growth from 2007 to 2008 been 31.5%, the subscriptions in 2008 would have been

$$500 \times \frac{131.5}{100} = 657.5$$

∴ The required difference = $657.5 - 610 = 50$ (approximately)

5 percent per annum, what is the approximate percentage growth of subscribers between 2003 and 2010 in Europe? That subscriptions prices are volatile and may change each year.

(1) 62 (2) 15 (3) 78 (4) 84 (5) 50

Solution:

Let the total number of subscribers in Europe in 2003 be 100.

The number of men and women in the different years are

Year	2003	2004	2005	2006	2007	2008	2009	2010
Men	60	63	66.15	69.5	73	76.65	80.5	84.5
Women	40	44	48.4	53.25	58.5	64.5	71	78
Total	100							162.5

∴ The percentage growth = 62 Choice (1)

40. In 2003, sixty percent of subscribers in Europe were men. Given that women subscribers increase at the rate of 10 percent per annum and men at the rate of

- 41.** Consider the annual percent change in the gap between subscription revenue in the US and Europe. What is the year in which the absolute value of this change is the highest?
 (1) 03-04 (2) 05-06 (3) 06-07
 (4) 08-09 (5) 09-10

Solution:

The percentage change in the gap between the subscription revenues in US and Europe in the different years are

Year	2003	2004	2005	2006	2007	2008	2009	2010
Gap in million USD	300	330	320	270	210	180	110	100
Absolute percentage change	—	10	3	15	26	14	39	9

The absolute value of this change was the highest in
Choice (4)

- 42.** While the subscription in Europe has been given growing steadily towards that of the US, the growth rate in Europe seems to be declining. Which of the following is closest to the percent change in growth rate of 2007 (over 2006) relative to the growth rate of 2005 (over 2004)?
 (1) 17 (2) 20 (3) 35 (4) 60 (5) 100

Solution:

$$\text{The growth rate in 2005 (over 2004)} = \frac{270 - 180}{180} \times 100 = 50\%$$

$$\text{The growth rate in 2007 (over 2006)} = \frac{500 - 375}{375} \times 100 = 33\%$$

$$\text{The required percentage} = \frac{50 - 33}{50} \times 100 = 35 \text{ (approximately)}$$

Choice (3)

Directions for Questions 43 to 47: Answer the following questions based on the information given below:

Abdul, Bikram and Chetan are three professional traders who trade in shares of a company XYZ Ltd. Abdul follows the strategy of buying at the opening of the day at 10 am and selling the whole lot at the close of the day at 3 pm. Bikram follows the strategy of buying at hourly intervals: 10 am, 11 am, 12 noon, 1 pm and 2 pm, and selling the whole lot at the close of the day. Further, he buys an equal number of shares in each purchase. Chetan follows a similar pattern as Bikram but his strategy is somewhat different. Chetan's total investment amount is divided equally among his purchases. The profit or loss made by each investor is the difference between the sale value at the close of the day less the investment in purchase. The "return" for each investor is defined as the ratio of the profit or loss to the investment amount expressed as a percentage.

- 43.** On a day of fluctuating market prices, the share price of XYZ Ltd, ends with a gain, i.e. it is higher at the close of the day compared to the opening value. Which trader got the maximum return on that day?
 (1) Bikram (2) Chetan
 (3) Abdul (4) Bikram or Chetan
 (5) Cannot be determined

- 44.** Which one of the following statements is always true?
 (1) Abdul will not be the one with the minimum return
 (2) Return for Chetan will be higher than that of Bikram
 (3) Return for Bikram will be higher than that of Chetan
 (4) Return for Chetan cannot be higher than that of Abdul
 (5) None of the above

- 45.** On a 'boom' day the share price of XYZ Ltd. keeps rising throughout the day and peaks at the close of the day. Which trader got the minimum return on that day?
 (1) Bikram (2) Chetan
 (3) Abdul (4) Abdul or Chetan
 (5) Cannot be determined

Solutions for questions 43 to 47:

The trading pattern followed by each of the three traders is as follows:

Abdul		Bikram		Chetan	
Buy	Sell	Buy	Sell	Buy	Sell
10 am	3 pm	10 am, 11 am, 12 noon, 1 pm, 2 pm	3 pm	10 am, 11 am, 12 noon, 1 pm, 2 pm	3 pm

- 43.** As the direction of the market is not known, the profits of Bikram and Chetan depends upon the prices at which they bought the shares, i.e., if they buy at prices less than that bought by Abdul, their profits will be more. If not, the profit of Abdul will be more than that of the other two. Hence, answer cannot be determined.
Choice (5)

- 44.** As Abdul buys all his shares at a single point of time, whereas each of the other two persons buy once every hour. As the direction of movement of share prices is not given, we cannot compare the returns of Abdul with any of the other two persons. But if we compare the buying strategies of Bikram and Chetan are follows:

Bikram: Bikram buys the same number of shares everytime, irrespective of the price.

Chetan: Chetan spends the same amount every time, his buying depends on price of share. The more the price of the share, the less the number of shares he buys. As his strategy is based on the prices, whenever the prices are changing, Chetan's returns will be more than Bikram. But, if there is no change in the price of the share, the returns of Bikram and Chetan will be the same.

Hence, no conclusion can be made. Choice (5)

- 45.** Given on a boom day, the share price keeps rising, hence it will be least in the morning. Hence, Abdul who bought all his shares at this price will get the maximum profit. Among the remaining two, Bikram got the same number of shares at every time i.e., he bought the same number of shares even at higher prices, whereas Chetan spent the same amount hence he bought less shares when prices are high and more shares when prices are less. Hence, Chetan's returns are more than Bikram's. Bikram will have the least returns.
Choice (1)

Additional data:

One day, two other traders, Dane and Emily joined Abdul, Bikram and Chetan for trading in the shares of XYZ Ltd. Dane followed a strategy of buying equal numbers of shares at 10 am, 11 am, and 12 noon, and selling the same numbers at 1 pm, 2 pm, and 3 pm. Emily, on the other hand, followed the strategy of buying shares using all her money at 10 am and selling all of them at 12 noon and again buying the shares for all the money at 1pm and again selling all of them at the close of the day at 3 pm. At the close of the day the following was observed:

- (i) Abdul lost money in the transactions.
- (ii) Both Dane and Emily made profits
- (iii) There was an increase in share price during the closing hour compared to the price at 2 pm
- (iv) Share price at 12 noon was lower than the opening price.

46. Share price was at its highest at

- (1) 10 am
- (2) 11 am
- (3) 12 noon
- (4) 1 pm
- (5) Cannot be determined

47. Which of the following is necessarily false?

- (1) Share price was at its lowest at 2 pm.
- (2) Share price was at its lowest at 11 am.
- (3) Share price at 1 pm was higher than the share price at 2 pm
- (4) Share price at 1 pm was higher than the share price at 12 noon
- (5) None of the above

Additional data for solutions 46 and 47:

Let the prices of shares at different timings be as follows.

Time	10 am	11 am	12 noon	1 pm	2 pm	3 pm
Price	a	b	c	d	e	F

We will look at the additional information given:

The number of shares bought by Abdul at 10 am is the same as the number of shares he sold at 3 pm. Also it is given that Abdul lost money. Hence, ignoring the actual number of shares that he bought/sold, we can conclude that the share price at 3 pm must be less than that at 10 am.

$$\Rightarrow a > f \text{ ---- (i)}$$

Similarly, the number of shares bought/sold by Emily in each instance is the same and it is given that she made a profit. Hence, we can conclude that $(c + f) > (a + d)$ --- (ii)
Also, using similar reasoning in case of Dane, we conclude that

$$(d + e + f) > (a + b + c) \text{ ---- (iii)}$$

It is given that the price increased from 2 pm to 3 pm

$$\Rightarrow e < f \text{ ---- (iv)}$$

It is given that price at 12 noon was lower than the opening price $\Rightarrow c < a$ ---- (v)

From (i) and (ii), we can conclude that $c > d$ ---- (vi)

From (i), (iii) and (vi), we can conclude that $e > b -$ (vii)

Hence, $a > f > e > b$ and $a > c > d$ ----- (viii)

$$\Rightarrow a \text{ is the highest}$$

47. The share price was at its highest at 10 am.

Choice (1)

48. As $e > b$, choice (1) is necessarily false and as $d < c$, choice (4) is also necessarily false.

Choice (1) and Choice (4)

Directions for Questions 48 to 50: Answer the following questions based on the information given below:

There are 100 employees in an organization across five departments. The following table gives the department-wise distribution of average age, average basic pay and allowances. The gross pay of an employee is the sum of his/her basic pay and allowances.

Department	Number of Employees	Average Age (Years)	Average Basic Pay(Rs.)	Allowances (% of Basic Pay)
HR	5	45	5000	70
Marketing	30	35	6000	80
Finance	20	30	6500	60
Business Development	35	42	7500	75
Maintenance	10	35	5500	50

There are limited numbers of employees considered for transfer/promotion across departments. Whenever a person is transferred/promoted from a department of lower average age to a department of higher average age, he/she will get an additional allowance of 10% of basic pay over and above his/her current/allowance. There will not be any change in pay structure if a person is transferred/promoted from a department with higher average age to a department with lower average age.

Questions below are independent of each other.

48. What is the approximate percentage change in the average gross pay of the HR department due to transfer of a 40-year old person with basic pay of Rs.8000 from the marketing department?

- (1) 9%
- (2) 11%
- (3) 13%
- (4) 15%
- (5) 17%

Solution:

The gross pay of the person transferred from the HR department
 $= 8000 \text{ (basic pay)} + 90\% \text{ of } 8000 = 8000 + 7200$
 $= 15200$

The gross pay of all the 5 employees originally in the HR department $= (5000 + 70\% \text{ of } 500 \text{ i.e. } 3500)5$
 $= 42500$

The gross pay after the transfer $= 42500 + 15200$
 $= 57700$

$$\text{The average gross pay} = \frac{57700}{6} \approx 9600$$

$$\text{The percentage increase} = \frac{9600 - 8500}{8500} \times 100 = 13\%$$

Choice (3)

49. There was a mutual transfer of an employee between Marketing and Finance departments and transfer of one employee from Marketing to HR. As a result, the average age of Finance department increased by one year and that of Marketing department remained the same. What is the new average age of HR department?

- (1) 30 (2) 35 (3) 40
 (4) 45 (5) Cannot be determined

Solution:

As after the transfer the average age of the Finance department increased by one year, it means that the among the employees who had a mutual transfer, the age of the employee of the marketing department who was transferred was 20 years more than that of the employee of the finance department. After the transfer of the employee from the marketing department to the HR department, the average age of employees in the marketing department remained the same as 35 which means that the employee who was transferred to the HR department was of age 20 years less than the average age i.e., 35 years (to compensate for the mutually transferred employee from the finance department who was 20 years younger).

\therefore As the age of the employee who was transferred to the HR department was only 15 ($35 - 20$) the average age of all the employees now in the HR department

$$= \frac{45 \times 5 + 15 \times 1}{6} = \frac{240}{6} = 40$$

Choice (3)

50. If two employees (each with a basic pay of Rs.6000) are transferred from Maintenance department to HR department and one person (with a basic pay of Rs.8000) was transferred from Marketing department to HR department, what will be the percentage change in average basic pay of HR department?

- (1) 10.5% (2) 12.5% (3) 15%
 (4) 30% (5) 40%

Solution:

The total basic pay $= 5000 \times 5 + 6000 \times 2 + 8000 \times 1 = 45000$

$$\text{The average basic pay} = \frac{45000}{8} = 5625$$

The percentage increase =

$$\frac{5625 - 5000}{5000} \times 100 = \frac{625}{5000} \times 100 = 12.5\%$$

Choice (2)

SECTION – III (RC & Verbal)

This section contains 40 questions.

Directions for Questions 51 to 54: In each of the following questions there are sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are correct in terms of grammar and usage (including spelling, punctuation and logical consistency). Then, choose the **most appropriate** option.

51. A. In 1849, a poor Bavarian immigrant named Levi Strauss

- B. landed in San Francisco, California
 C. at the invitation of his brother-in-law David Stern
 D. owner of dry goods business
 E. This dry goods business would later became known as Levi Strauss & Company.
 (1) B only (2) B and C
 (3) A and B (4) A only
 (5) A, B, and D

Solution:

Statement A is incorrect because the word 'immigrant' is spelt wrongly.

Statement B has no error.

Statement C is incorrect because it needs a comma before and after 'David Stern'.

Statement D is incorrect because the indefinite article 'a' should precede the noun phrase 'dry goods business'. 'Business' (meaning a person's trade) is a countable noun and needs a determiner. Because the phrase is indefinite and it starts with a vowel sound, 'a' should precede it.

Statement E is incorrect too. The verb phrase 'would later became' is erroneous. After a modal auxiliary like will, would, might etc., the verb should be in its root form. Hence, the correct phrase is 'would later become'.

The only correct statement is B. Hence the answer is (1), 'B only'.
 Choice (1)

52. A. In response to the allegations and condemnation pouring in,

- B. Nike implemented comprehensive changes in their labour policy.
 C. Perhaps sensing the rising tide of global labour concerns,
 D. from the public would become a prominent media issue,
 E. Nike sought to be a industry leader in employee relations.

- (1) D and E (2) D only (3) A and E
 (4) A and D (5) B,C and E

Solution:

Statement A is a correct sentence.

Statement B is erroneous. The possessive adjective 'their' is a plural one, whereas the noun it refers to is Nike, a singular noun. There's no reason for it to be treated plurally. Hence, the correct singular possessive adjective is 'its'.

Statement C is erroneous too. The comma after 'concerns' is redundant. And, we need the relative pronoun 'that' after 'sensing'. The correct sentence should read: Perhaps sensing that the rising tide of global labour concerns.....

Statement D has no error.

Statement E is erroneous because the definite article 'the' should precede 'industry leader' or, tolerantly, the indefinite article 'a' before 'industry' should be 'an'. The word 'industry' is pronounced with a vowel sound at the beginning. Hence the 'an'. So, statements A and D are error free.

The answer is thus (4).

Choice (4)

53. A. Charges and countercharges mean nothing
B. to the few million who have lost their home.
C. The nightmare is far from over, for the government
D. is still unable to reach hundreds who are marooned.
E. The death count have just begun.
(1) A only (2) C only (3) A and C
(4) A, C and D (5) D only

Solution:

Statement A is correct.

Statement B has an error. The noun 'home' should be in the plural form as we are referring to the homes of the few million (people).

Statement C is error free.

Statement D is correct.

Statement E is incorrect. There's a problem of concord (subject–verb agreement) here. The subject 'the death count' is singular, and hence requires a singular verb 'has', and not, 'have'.

The correct statements are A, C and D. Hence, the answer is (4). Choice (4)

54. A. I did not know what to make of you.
B. Because you'd lived in India, I associate you more with my parents than with me.
C. And yet you were unlike my cousins in Calcutta, who seem so innocent and obedient when I visited them.
D. You were not curious above me in the least.
E. Although you did make effort to meet me.
(1) A only (2) A and B (3) A and E
(4) D only (5) A and D

Solution:

Statement A is correct.

Statement B is erroneous. The error materialises when you view the sentence as a part of the paragraph. The paragraph is in the past tense. Hence, the main verb 'associate' should be in the past, i.e., 'associated'. It is only then that the verb phrase 'had lived' is justified.

Statement C is obviously incongruous. 'When I visited' in the second part of the statement is clearly in the past tense, hence the verb 'seem', referring to the same time, should be 'seemed'.

Statement D is correct.

Statement E is erroneous. The noun 'effort' is in the singular form and is countable.

It, thus, requires an indefinite article 'an' before it for the sake of grammatical determination. Also, the conjunction 'although' is a subordinate conjunction,

and we cannot begin a sentence with a subordinate conjunction. We need to replace it with the adverb equivalent 'however' or 'nevertheless'. Thus, only statements A and D are correct. Hence the answer is 5. Choice (5)

Directions for Questions 55 to 58: In each question, there are five sentences. Each sentence has a pair of words that are italicized and highlighted. From the italicized and highlighted words, select the most appropriate words (A or B) to form correct sentences. The sentences are followed by options that indicate the words, which may be selected to correctly complete the set of sentences. From the options given, choose the **most appropriate** one.

55. Anita wore a beautiful **broach** (A)/**brooch** (B) on the lapel of her jacket.

If you want to complain the amenities in your neighbourhood, please meet your **councilor** (A)/**counselor** (B).

I would like you **advice** (A)/**advise** (B) on which job I should choose

The last scene provided a **climatic** (A)/**climactic** (B) ending to the film.

Jeans that **flair** (A)/**flare** (B) at the bottom are in fashion these days.

- (1) BABAA (2) BABAB (3) BAAAB
(4) ABABA (5) BAABA

Solution:

The correct option is 3: BAAAB. In the first sentence the correct word is 'brooch' (B) which means a 'piece of jewellery with a pin on the back of it, that can be fastened to your clothes'. In the context this word goes well with 'beautiful and jacket'. 'Broach' on the other hand is a verb and refers to 'beginning to talk about a subject that is difficult to discuss, especially because it is embarrassing'.

In the second sentence the appropriate word is 'councillor' (A) since the context points at complaints about amenities. A 'councillor' is a member of a council (council = a group of people elected to govern an area such as city or country). On the other hand, a 'counsellor' also deals with problems. However, these problems would relate to a person's relationships.

In the third sentence the appropriate word is 'advice' (A) (noun form). Here the person would like to get 'something', i.e., advice. 'Advise' on the other hand is its verb form. Eg: 'please advise me.....'

In the fourth sentence the appropriate word is 'climactic' (A) which means 'very exciting, most important'. Here the context reflects the 'ending of a film' which was interesting. 'Climactic' on the other hand deals with changes in the climate or with climate.

The appropriate word in the fifth blank is 'flare' (B) which means 'a shape that becomes gradually wider' (something like a bell bottom). The other word 'flair' means the ability to do something well. Hence the correct option is 3. (BAAAB). Choice (3)

56. The cake had lots of **currents** (A)/**currants** (B) and nuts in it.

If you engage in such **exceptional** (A)/**exceptionable** (B) behaviour, I will be forced to punish you.

He has the same capacity as an adult to **consent(A)/assent(B)** to surgical treatment.

The minister is **obliged(A)/compelled (B)** to report regularly to a parliamentary board.

His analysis of the situation is far too **sanguine(A)/genuine(B)**

- (1) BBABA (2) BBAAA (3) BBBBA
(4) ABBBA (5) BABAB

Solution:

In sentence one, the correct word is 'currants' (B) which means 'small dried grape used in cakes'. The context talks about cakes, hence B is the correct option. 'Currents' means the movement of water in seas or rivers.

In sentence two, the correct option is 'exceptionable' (B) which means something that is intolerable. 'Exceptional' means 'unusually good'. The context reflects punishment, hence 'B' is appropriate.

In sentence three, the correct word is 'consent' (A) which means permission to do something or agreement about something. Here the context talks about 'surgical treatment' for which one has to consent. 'Assent' on the other hand is an 'official agreement'. The context does not reflect anything official and is about a person, indicated by "he". Hence A is the correct option.

In sentence four, the correct word is 'obliged' (A) which is used when somebody is required to do something by law because it is a duty; here the minister should report regularly to the parliamentary board as it is his duty. 'Compelled' on the other hand means to force somebody to do something. The context reflects the duty of a minister and not compulsion.

In the last sentence the correct word is 'sanguine', which means cheerful and confident about the future. 'Genuine' means exactly what something appears to be. The context is about the 'analysis of a situation', hence 'sanguine' is appropriate. The correct option is 2(BBAAA). Choice (2)

57. She managed to bite back the **ironic(A)/caustic(B)** retort on the tip of her tongue.

He gave an impassioned and **valid(A)/cogent (B)** plea for judicial reform.

I am not **adverse(A)/averse(B)** to helping out

The **coupe(A)/ coup(B)** broke away as the train climbed the hill.

They heard the bells **peeling(A)/pealing(B)** far and wide.

- (1) BBABA (2) BBBAB (3) BAABB
(4) ABAA (5) BBBBA

Solution:

In the first sentence the correct word is 'caustic' (B) which means 'critical and bitter in a sarcastic way'. 'Ironic' means 'showing that you really mean the opposite of what you are saying'. Here we need to concentrate on 'retort'. She 'managed to bite back'. The context thus reflects something more intense, and should take 'caustic'.

In the second sentence the correct word is 'cogent' (B) which means 'strongly and clearly expressed in a way that influences what people believe' or 'convincing'. The context reflects a 'plea' and it was impassioned. The person was able to 'convince', hence cogent is appropriate. 'Valid' means a thing

that is legally and officially acceptable. In the third sentence the correct option is 'averse' (B) which means 'not liking or not wanting to do something'. 'Adverse' means 'negative and unpleasant'. The context is about somebody wanting or not wanting to do something, hence 'averse' is appropriate.

In sentence 4 the correct word is 'coupé' which is a type of railway carriage. 'Coup' means a sudden, illegal and often violent change of government. The context talks about a 'train', hence the correct word is 'coupé'. In the last sentence the correct word is 'pealing' (B) since bells are mentioned. It means the loud ringing sound of a bell or bells. 'Peeling' means to take the skin off a fruit. The correct option is 2 (BBBAB). Choice (2)

58. We were not successful in **defusing(A)/diffusing(B)** the Guru's ideas.

The students **baited(A)/bated(B)** the instructor with irrelevant questions.

The **hoard(A)/horde(B)** rushed into the campus.

The prisoner's **interment(A)/internment(B)** came to an end with his early release.

The hockey team could not deal with his **unsociable(A)/unsocial(B)** tendencies

- (1) BABBA (2) BBABB (3) BABAA
(4) ABBAB (5) AABBA

Solution:

In the first sentence, the correct word is 'diffusing' (B), which means to spread something. Here it is used figuratively, i.e. to 'spread ideas'. 'Defusing' means 'to stop a possibly dangerous or difficult situation from developing'. The correct word is 'diffusing' (normally used for liquids and gases).

In the second sentence the correct word is 'baited' (A) which means 'to deliberately try to make somebody angry'. 'Bated' means 'feeling very anxious or excited'. The sentence contains 'irrelevant questions', hence 'baited' is the appropriate word. In the third sentence the correct word is 'horde' (B) which means a large crowd of people. 'Hoard' means 'a collection of money, things etc'. Since the sentence speaks about a "campus" and someone rushing, 'horde' is the right word.

In the fourth sentence the correct word is 'internment' (B), which means 'to put somebody in a prison during war, although not charged with crime'. 'Interment' means 'the act of burying a dead person'.

In the last sentence, the correct option is (A), 'unsociable', which means 'not enjoying the company of others'. 'Unsocial' means outside the normal times of working'. The sentence talks about the team's inability to "deal with his tendencies" (or behaviour). A team requires everyone to be friendly and the person here was otherwise. The correct option is 1, BABBA. Choice (1)

Directions for Questions 59 to 62: In each of the questions, a word has been used in sentences in five different ways. Choose the option corresponding to the sentence in which the usage of the word is **incorrect or inappropriate**.

59. Run

- (1) I must run fast to catch up with him
(2) Our team scored a goal against the run of play
(3) You can't run over him like that

- (4) The newly released book is enjoying a popular run.
(5) This film is a run-of-the-mill production

Solution:

The correct option is 3. The first sentence means that the person has to move fast to reach the person ahead, and is correct. The second sentence 'against the run of play' means 'against the trend or against what was going on', i.e., here the team scored a goal when no one was expecting it to happen. The fourth sentence means that the 'book was enjoying success for a period of time' and is correct. In the fifth sentence, 'run-of-the-mill' refers to 'something ordinary', and is appropriate. Sentence 3 is erroneous. 'Run over' means 'to read through or practice something quickly'. It is also used when someone is knocked down or driven over by a vehicle. None of these suit the context. The appropriate phrase would be 'run (him) down' which means to 'criticize somebody in an unkind way'. The correct option is 3.

Choice (3)

60. Round

- (1) The police fired a round of tear gas shells
(2) The shop is located round the corner
(3) We took a ride on the merry-go-round.
(4) The doctor is on a hospital round.
(5) I shall proceed further only after you come round to admitting it.

Solution:

Sentence one is correct. 'A round....' means a single shot or a determined sequence of shots and is generally used in association with guns. Sentence 2 is correct. 'Round the corner' means 'not too far away'. The third sentence is also correct; 'merry-go-round' is a round platform with model horses, cars etc. that turns around and is used by children to play. The fifth sentence is correct. 'Come round' means 'to be converted to another person's opinion'. Sentence 4 is erroneous. We do not say that the doctor is on round. It should be 'on rounds'. The correct option is 4.

Choice (4)

61. Buckle

- (1) After the long hike our knees were beginning to buckle.
(2) The horse suddenly broke into a buckle.
(3) The accused did not buckle under police interrogation.
(4) Sometimes, an earthquake can make a bridge buckle.
(5) People should learn to buckle up as soon as they get into a car

Solution:

Sentence 1 is correct. It means 'bend and give way under pressure'. Sentence 3 is correct. The above explanation holds good; i.e., the accused did not 'give way under the pressure of police interrogation'. Sentence 4 is also correct for the same reason. Sentence 5 is correct; here, to 'buckle up' means to 'fasten the seat belt'. Sentence 2 is erroneous as it should be 'gallop'; the use of buckle here is inappropriate. The correct option is 2.

Choice (2)

62. File

- (1) You will find the paper in the file under C.
(2) I need to file an insurance claim.
(3) The cadets were marching in a single file.
(4) File your nails before you apply nail polish.
(5) When the parade was on, a soldier broke the file.

Solution:

Sentence one is correct. Here 'file' refers to 'a folder for keeping loose papers together'. Sentence 2 is correct. 'File' is used in its verb form here which means 'to present something so that it can be officially recorded and dealt with'. Sentence 3 is correct. Here 'file' refers to 'a line of people or things, one behind the other'. Sentence 4 is correct which means 'to cut or shape something or make something smooth using a file'. Sentence 5 is erroneous. The use of 'file' here is inappropriate. The idiom is 'to break rank', not 'break a file'. The correct option is 5.

Choice (5)

Directions for Questions 63 to 66: Each of the following questions has a sentence with two blanks. Given below each question are five pairs of words. Choose the pair that **best** completes the sentence.

63. The genocides in Bosnia and Rwanda, apart from being mis-described in the most sinister and _____ manner as 'ethnic cleansing', were also blamed, in further hand-washing rhetoric, on something dark and interior to _____ and perpetrators alike.

- (1) innovative; communicator
(2) enchanting; leaders
(3) disingenuous; victims
(4) exigent; exploiters
(5) tragic; sufferers

Solution:

The introductory idea in the sentence is that the genocides were wrongly represented as 'ethnic cleansing' – this representation is sinister. We are now looking for a word that can complement 'sinister' (because 'sinister' is connected to the absent word using 'and', suggesting continuity in idea) – 'tragic' and 'disingenuous' (meaning dishonest) qualify. The other choices convey positive qualities.

In the second blank, the presence of the word 'perpetrators' qualifies 'victims' as the answer, as the sentence contrasts the two words ('perpetrator' and 'victim' are direct antonyms as opposed to 'perpetrator' and 'sufferer').

Choice (3)

64. As navigators, calendar makers, and other _____ of the night sky accumulated evidence to the contrary, ancient astronomers were forced _____ that certain bodies might move in circles about points, which in turn moved in circles about the earth.

- (1) scrutinizers; believe
(2) observers; agree
(3) scrutinizers; suggest
(4) observers; concede
(5) students; conclude

Solution:

All the choices provided for the first blank can satisfactorily fill the blank. However, the second part of the sentence describes how the ancient astronomers were forced to change their opinion in the face of contradictory evidence. When someone is compelled to accept defeat, 'concede' is the best word that can be used.

Choice (4)

- 65.** Every human being, after the first few days of his life, is a product of two factors: on the one hand, there is his _____ endowment; and on the other hand, there is the effect of environment, including _____.

- (1) constitutional; weather
- (2) congenital; education
- (3) personal; climate
- (4) economic; learning
- (5) genetic; pedagogy

Solution:

The presence of the phrases 'on the one hand' and 'on the other hand' tells us that the two factors are being contrasted against each other. The word in the first blank has to be connected with something that is present at the time of birth – thus 'congenital' and 'genetic' qualify. However, the "effect of the environment" qualifies 'education'. 'Education' here refers to general teaching (or learning acquired by a person), as opposed to 'pedagogy' that refers to 'the profession, science, or theory of teaching' in a formal manner.

Choice (2)

- 66.** Exhaustion of natural resources, destruction of individual initiative by governments, control over men's minds by central _____ of education and propaganda are some of the major evils which appear to be on the increase as a result of the impact of science upon minds suited by _____ to an earlier kind of world.

- (1) tenets; fixation
- (2) aspects; inhibitions
- (3) institutions; inhibitions
- (4) organs; tradition
- (5) departments; repulsion

Solution:

Choices 3 and 4 for the first blank can tentatively fill it. However, only 'tradition' fits the second blank as we are told that the minds under discussion are "suited to an earlier kind of world".

Choice (4)

Directions for Questions 67 to 70: Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the sentence that completes the paragraph in the **most appropriate way**.

- 67.** Most people at their first consultation take a furtive look at the surgeon's hands in the hope of reassurance. Prospective patients look for delicacy, sensitivity, steadiness, perhaps unblemished pallor.

On this basis, Hendry Perowne loses a number of cases each year. Generally, he knows it's about to happen before the patient does: the downward glance repeated, the prepared questions beginning to falter, the overemphatic thanks during the retreat to the door.

- (1) Other people do not communicate due to their poor observation.
- (2) Other patients don't like what they see but are ignorant of their right to go elsewhere.
- (3) But Perowne himself is not concerned.
- (4) But others will take their place, he thought.
- (5) These hands are steady enough, but they are large.

Solution:

The paragraph is about what indications patients look for in a doctor, with particular reference to his hands. Hence, the last sentence must be about this. The theme is about what the patients do when they notice a doctor's hands. So 1 & 4 are ruled out. What Perowne thinks is sequential, but will belong early in the next para, not here. Hence, 3 & 4 are eliminated. On testing through reading, 2 uses the same kind of language as the para, continues the idea of the previous sentence and is in keeping with the theme sentence.

Choice (2)

- 68.** Trade protectionism, disguised as concern for the climate, is raising its head. Citing competitiveness concerns, powerful industrialized countries are holding out threats of a levy on imports of energy-intensive products from developing countries that refuse to accept their demands. The actual source of protectionist sentiment in the OECD countries is, of course, their current lacklustre economic performance, combined with the challenges posed by the rapid economic rise of China and India - in that order.

- (1) Climate change is evoked to bring trade protectionism through the back door.
- (2) OECD countries are taking refuge in climate change issues to erect trade barriers against these two countries.
- (3) Climate change concerns have come as a convenient stick to beat the rising trade power of China and India.
- (4) Defenders of the global economic status quo are posing as climate change champions.
- (5) Today's climate change champions are the perpetrators of global economic inequity.

Solution:

The passage is about OECD countries using climate change as a means to practise trade protectionism. The reason is their lacklustre economic performance coupled with the rise of China and India. Choices 1 and 3 merely repeat what has been stated in the passage. Choice 2 is incorrect because the passage does not suggest that the trade barrier is only against China and India. Choice 5 is a direct accusation which is not in keeping with the tone of the para. 4 summarizes the idea in the para while drawing a conclusion in keeping with the critical tone of the para.

Choice (4)

69. Mattancherry is Indian Jewry's most famous settlement. Its pretty streets of pastel coloured houses, connected by first-floor passages and home to the last twelve saree-and sarong-wearing, white-skinned Indian Jews are visited by thousands of tourists each year. Its synagogue, built in 1568, with a floor of blue-and-white Chinese tiles, a carpet given by Haile Selassie and the frosty Yohen selling tickets at the door, stands as an image of religious tolerance.

- (1) Mattancherry represents, therefore, the perfect picture of peaceful co-existence.
- (2) India's Jews have almost never suffered discrimination, except for European colonizers and each other.
- (3) Jews in India were always tolerant.
- (4) Religious tolerance has always been only a façade and nothing more.
- (5) The pretty pastel streets are, thus, very popular with the tourists.

Solution:

The focus of the passage is on the Jews in India, their peaceful existence and about their 'pastel coloured' lives, different from what Jews have faced elsewhere. In other words, it is not about the town, but about the lives of Jews. Hence only option 2 or 3 which focuses on Jews can conclude the para. Choice 3 is ruled out because it is not about Jews being tolerant (since they are the minority). Choice 4 is ruled out because the para does not show tolerance as a façade. Choice 5 focuses on tourists, which is not the main idea. Hence choice 2.

Choice (2)

Directions for Questions 71 to 75: The passage given below is followed by a set of five questions. Choose the **most appropriate** answer to each question.

Number of words in this passage : 751

When I was little, children were bought two kinds of ice cream, sold from those white wagons with canopies made of silvery metal: either the two-cent cone or the four-cent ice-cream pie. The two-cent cone was very small, in fact it could fit comfortably into a child's hand, and it was made by taking the ice-cream from its container with a special scoop and piling it on the cone. Granny always suggested I eat only a part of the cone, then throw away the pointed end, because it had been touched by the vendor's hand (thought that was the best part, nice and crunchy, and it was regularly eaten in secret, after a pretence of discarding it).

The four-cent pie was made by a special little machine, also silvery, which pressed two disks of sweet biscuit against a cylindrical section of ice cream. First you had to thrust your tongue into the gap between the biscuits until it touched the central nucleus of ice cream; then, gradually, you ate the whole thing, the biscuit surfaces softening as they became soaked in creamy nectar. Granny had no advice to give here: in theory the pies had been touched only by the machine; in practice, the vendor had held them in his hand while giving them to us, but it was impossible to isolate the contaminated area.

I was fascinated, however, by some of my peers, whose parents bought them not a four-cent pie but two two-cent cones. These privileged children 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. This liturgy seemed to me so sumptuously enviable, that many times I asked to be allowed to celebrate it. In vain. My elders were inflexible; a four-cent ice, yes; but two two-cent ones, absolutely no.

As anyone can see, neither mathematics nor economy nor dietetics justified this refusal. Nor did hygiene, assuming that in due course the tips of both cones were discarded. The pathetic and obviously mendacious, justification was that a body 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.

Today, citizen and victim of a consumer society, a civilization of excess and waste (which the society of the thirties was not), I realize that those dear and now departed elders were right. Two two-cent cones instead of one at four cents did

70. Given the cultural and intellectual interconnections, the question of what is 'Western' and what is 'Eastern' (or 'Indian') is often hard to decide, and the issue can be discussed only in more dialectical terms. The diagnosis of a thought as 'purely Western' or 'purely Indian' can be very illusory.

- (1) Thoughts are not the kind of things that can be easily categorized.
- (2) Though 'occidentalism' and 'orientalism' as dichotomous concepts have found many adherents.
- (3) 'East is East and West is West' has been a discredited notion for a long time now.
- (4) Compartmentalizing thoughts is often desirable.
- (5) The origin of a thought is not the kind of thing to which 'purity' happens easily.

Solution:

The given para says that since there is a cultural and intellectual interconnection between the East and the West, nothing can be called purely Western or purely Indian. Choice 2 can be ruled out because it merely continues the idea and does not conclude it. Choice 4 runs counter to the idea expressed. Choice 3 also does not conclude the para as it introduces an idea far broader than what is being discussed in the para. Choices 1 and 5 appear possible and of the two, choice 5 is better because the word 'purity' in quotes links to purely in the previous sentence. Further, more than categorization, it is the origin that is shrouded in mystery.

Choice (5)

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 to 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 check-in with a fake Gucci bag bought from a street peddler on the beach at Rimini.

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 the detergent to the bonus bangle sheathed, with the magazine it accompanies, in a plastic envelope. Like the parents of those ambidextrous gluttons I so envied, the consumer civilization pretends to give more, but actually gives, for four cents, what is worth four cents. You will throwaway the old transistor radio to purchase the new one, that boasts an alarm clock as well, but some inexplicable defect in the mechanism will guarantee that the radio lasts only a year. The new cheap car will have leather seats, double side mirrors adjustable from inside, and a paneled dashboard, but it will not last nearly so long as the glorious old Fiat 500, which, even when it broke down, could be started again with a kick.

The morality of the old days made Spartans of us all, while today's morality wants all of us to be Sybarites.

- 71.** Which of the following cannot be inferred from the passage?

- (1) Today's society is more extravagant than the society of the 1930s.
- (2) The act of eating two ice cream cones is akin to a ceremonial process.
- (3) Elders rightly suggested that a boy turning eyes from one cone to the other was more likely to fall
- (4) Despite seeming to promise more, the consumer civilization gives away exactly what the thing is worth.
- (5) The consumer civilization attempts to spoil children and adults alike.

Solution:

The question is which 'cannot' be inferred from the passage. According to the first sentence of the fifth paragraph – "Today, citizen and victim of a consumer society, a civilization of excess and waste ..." – option 1 can be inferred. Option 2 can be inferred from "liturgy" in para three. The examples given in the second part of the sixth para suggests that option four is true: "the consumer civilization pretends to give more, but actually gives for 4 cents, what is worth four cents". According to the first sentence of para six, option 5 is true. The third and the fourth sentences of para four, "the pathetic and obviously mendacious justification...", clearly show that the reason stated in option 3 is not what can be inferred from the passage. Choice (3)

- 72.** In the passage, the phrase "little parvenus" refers to

- (1) naughty midgets.
- (2) old hags.
- (3) arrogant people.
- (4) young upstarts.
- (5) foolish kids.

Solution:

The word 'parvenu' means, usually, a person of recent wealth, who pretends to a status that is not his due, in other words, an upstart or "show off". The children with two ice creams, one in each hand, are not truly 'parvenus'. The usage is satirical, indicating some one who seeks to make others 'envy' him, like the future 'fake Gucci bag' bearer. Choice (4)

- 73.** The author pined for two two-cent instead of one four-cent pie because

- (1) it made dietetic sense.
- (2) it suggested intemperance.

- (3) it was more fun.
- (4) it had a visual appeal.
- (5) he was a glutton.

Solution:

Refer to paragraph 5, 2nd sentence: "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**". Clearly, option 2 is the correct answer. Choice (2)

- 74.** What does the author mean by "nowadays the moralist risks seeming at odds with morality"?

- (1) The moralists of yesterday have become immoral today.
- (2) The concept of morality has changed over the years.
- (3) Consumerism is amoral.
- (4) The risks associated with immorality have gone up.
- (5) The purist's view of morality is fast becoming popular.

Solution:

Refer to the first sentence of para six. Nowadays the moralist risks seeming at odds with morality...." The author compares the morality of a consumerist today with the morality of his childhood where children were to be protected from excess and greed, even of a symbolic nature. Hence, the moralist of yesteryears would be at odds with the morality of today. This obviously implies that the concept of morality has changed. Choice (2)

- 75.** According to the author, the justification for refusal to let him eat two cones was plausibly

- (1) didactic.
- (2) dietetic.
- (3) dialectic.
- (4) diatonic.
- (5) diastolic.

Solution:

The stated reason given by the adults for refusing 2 two-cent ice creams was obviously a lie ("pathetic and obviously mendacious" – refer para 4, line 2). He sensed a secret justification, cruelly pedagogical (related to teaching). Hence the justification was didactic (related to moralistic teaching).

Choice (1)

Directions for Questions 76 to 80: The passage given below is followed by a set of five questions. Choose the **most appropriate** answer to each question.

Number of words in this passage : 634

Language is not a cultural artifact that we learn the way we learn to tell time or how the federal government works. Instead, it is a distinct piece of the biological makeup of our brains. Language is a complex, specialized skill, which develops in the child spontaneously, without conscious effort or formal instruction, is deployed without awareness of its underlying logic, is qualitatively the same in every individual, and is distinct from more general abilities to process information or behave intelligently. 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". It conveys the idea that people know how to talk in more or less the sense that spiders know how to spin webs. Web-spinning was not invented by some unsung spider genius and does not depend on having had the right education or on having an aptitude for architecture or the construction trades. Rather, spiders spin spider webs because they have spider brains, which give them the urge to spin and the competence to succeed. Although there are differences between webs and words, I will encourage you to see language in this way, for it helps to make sense of the phenomena we will explore.

Thinking of language as an instinct inverts the popular wisdom, especially as it has been passed down in the canon of the humanities and social sciences. Language is no more a cultural invention than is upright posture. It is not a manifestation of a general capacity to use symbols: a three-year-old, we shall see, is a grammatical genius, but is quite incompetent at the visual arts, religious iconography, traffic signs, and the other staples of the semiotics curriculum. Though language is a magnificent ability unique to *Homo sapiens* among living species, it does not call for sequestering the study of humans from the domain of biology, for a magnificent ability unique to a particular living species is far from unique in the animal kingdom. Some kinds of bats home in on flying insects using Doppler sonar. Some kinds of migratory birds navigate thousands of miles by calibrating the positions of the constellations against the time of day and year. In nature's talent show, we are simply a species of primate with our own act, a knack for communicating information about who did what to whom by modulating the sounds we make when we exhale.

Once you begin to look at language not as the ineffable essence of human uniqueness but as a biological adaptation to communicate information, it is no longer as tempting to see language as an insidious shaper of thought, and, we shall see, it is not. Moreover, seeing language as one of nature's engineering marvels – an organ with "that perfection of structure and co-adaptation which justly excites our admiration," in Darwin's words – given us a new respect for your ordinary Joe and the much-maligned English language (or any language). 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 – as Oscar Wilde said, "Education is an admirable thing, but it is well to remember from time to time that nothing that is worth knowing can be taught." A preschooler's tacit knowledge of grammar is more sophisticated than the thickest style manual or the most state-of-the-art computer language system, and the same applies to all healthy human beings, even the notorious syntax-fracturing professional athlete and the, you know, like, inarticulate teenage skateboarder. Finally, since language is the product of a well-engineered biological instinct, we shall see that it is not the nutty barrel of monkeys that entertainer-columnists make it out to be.

76. According to the passage, which of the following does not stem from popular wisdom on language?

- (1) Language is cultural artifact.
- (2) Language is a cultural invention.
- (3) Language is learnt as we grow.
- (4) Language is unique to *Homo sapiens*.
- (5) Language is a psychological faculty.

Solution:

"Language is not a cultural artifact" (paragraph 1, line 1), language is not a cultural invention (paragraph 2, line 2). Para 1, line 3: "Language is a complex, specialized skill, which develops in a child spontaneously (not learnt, hence option 3 is wrong)...etc. For these reasons, some cognitive scientists have described **language as a psychological faculty**. Hence option 5 is right.

Choice (5)

77. Which of the following can be used to replace the "spiders know how to spin webs" analogy as used by the author?

- (1) A kitten learning to jump over a wall
- (2) Bees collecting nectar
- (3) A donkey carrying a load
- (4) A horse running a Derby
- (5) A pet dog protecting its owner's property

Solution:

'Spiders knowing how to spin webs' is attributed to their instinct (lines 8 - 13 of para 1). All spiders can spin webs, without being taught formally. So we are looking for a similar untrained instinct. Only the collection of nectar by bees fits the bill. Choice (2)

78. According to the passage, which of the following is unique to human beings?

- (1) Ability to use symbols while communicating with one another.
- (2) Ability to communicate with each other through voice modulation.
- (3) Ability to communicate information to other members of the species.
- (4) Ability to use sound as means of communication.
- (5) All of the above.

Solution:

"In nature's talent show, we are simply a species of primate with our own act, a knack for communicating information about who did what to whom by modulating the sounds we make when we exhale". The uniqueness lies in **communicating through voice modulation**. Other species may have the

ability to communicate, to use symbols (para 2, line 3), and even communicate and process information (para 1, line 5), but communication through voice modulation is unique. Choice (2)

79. According to the passage, complexity of language cannot be taught by parents or at school to children because
- (1) children instinctively know language.
 - (2) children learn the language on their own.
 - (3) language is not amenable to teaching.
 - (4) children know language better than their teachers or parents.
 - (5) children are born with the knowledge of semiotics.

Solution:

Line 3 of paragraph 1 says that "language. . . develops in the child spontaneously, without conscious effort (self-learning) or formal instruction (being taught)". Thus children do not learn language

on their own but simply possess it instinctually. Hence, they cannot be taught (language).

Choice (1)

80. Which of the following best summarizes the passage?
- (1) Language is unique to *Homo sapiens*.
 - (2) Language is neither learnt nor taught.
 - (3) Language is not a cultural invention or artifact as it is made out.
 - (4) Language is instinctive ability of human beings.
 - (5) Language is use of symbols unique to human beings.

Solution:

While choices 2 and 3 have been mentioned in the paragraph, those are not the central ideas of the passage. The central idea is that language is an instinctive ability of human beings. Hence choice 4. Choice 5 is refuted in para 2, line 3.

Choice (4)

Directions for Questions 81 to 85: The passage given below is followed by a set of five questions. Choose the **most appropriate** answer to each question.

Number of words in this passage : 684

To summarize the Classic Maya collapse, we can tentatively identify five strands. 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.

With those caveats, it appears to me that 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 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 third strand consisted of increased fighting, as more and more people fought over fewer resources. Maya warfare, already endemic, peaked just before the collapse. That is not surprising when one reflects that at least five million people, perhaps many more, were crammed into an area smaller than the US state of Colorado (104,000 square miles). That warfare would have decreased further the amount of land available for agriculture, by creating no-man's lands between principalities where it was now unsafe to farm. Bringing matters to a head was the strand of climate change. The drought at the time of the Classic collapse was not the first drought that the Maya had lived through, but it was the most severe. 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.

As our fifth strand, we have to wonder why the kings and nobles failed to recognize and solve these seemingly obvious problems undermining their society. Their attention was evidently focused on their short-term concerns of enriching themselves, waging wars, erecting monuments, competing with each other, and extracting enough food from the peasants to support all those activities. Like most leaders throughout human history, the Maya kings and nobles did not heed long-term problems, insofar as they perceived them.

Finally, while we still have some other past societies to consider before we switch our attention to the modern world, we must already be struck by some parallels between the Maya and the past societies. As on Mangareva, the Maya environmental and population problems led to increasing warfare and civil strife. Similarly, on Easter Island and Chaco Canyon, the Maya peak population numbers were followed swiftly by political and social collapse. Paralleling the eventual extension of agriculture from Easter Island's coastal lowlands to its uplands, and from the Mimbres floodplain to the hills, Copan's inhabitants also expanded from the floodplain to the more fragile hill slopes, leaving them with a larger population to feed when the agricultural boom in the hills went bust. Like Easter Island chiefs erecting ever larger statues, eventually crowned by pukao, and like Anasazi elite treating themselves to necklaces of 2,000 turquoise beads, Maya kings sought to outdo each other with more and more impressive temples, covered with thicker and thicker plaster – reminiscent in turn of the extravagant conspicuous consumption by modern American CEOs. The passivity of Easter chiefs and Maya kings in the face of the real big threats to their societies completes our list of disquieting parallels.

81. According to the passage, which of the following best represents the factor that has been cited by the author in the context of Rwanda and Haiti?

- (1) Various ethnic groups competing for land and other resources
- (2) Various ethnic groups competing for limited land resources
- (3) Various ethnic groups fighting with each other
- (4) Various ethnic groups competing for political power
- (5) Various ethnic groups fighting for their identity

Solution:

Refer to para 2 where Rwanda and Haiti are mentioned. This has reference to the first strand, that is, population growth outstripping available resources. Since land is the only resource mentioned in this context and is limited in availability for agriculture, choice 2 is better than choice 1.

Choice (2)

82. By an anthropogenic drought, the author means

- (1) a drought caused by lack of rains
- (2) a drought caused due to deforestation
- (3) a drought caused by failure to prevent bracken ferns from overrunning the fields
- (4) a drought caused by actions of human beings
- (5) a drought caused by climate changes

Solution:

- 'Anthropogenic' means 'originating in human activity'. Hence 'anthropogenic drought' means a drought caused by the actions of human beings.

Choice (4)

83. According to the passage, the drought at the time of Maya collapse had a different impact compared to the droughts earlier because

- (1) the Maya kings continued to be extravagant when common people were suffering.
- (2) it happened at the time of collapse of leadership among Mayas.
- (3) it happened when the Maya population had occupied all available land suited for agriculture.
- (4) it was followed by internecine warfare among Mayans.
- (5) irreversible environmental degradation led to this drought.

Directions for Questions 86 to 90: The passage given below is followed by a set of five questions. Choose the **most appropriate** answer to each question.

Number of words in this passage : 611

A remarkable aspect of art of the present century is the range of concepts and ideologies which it embodies. 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. 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 meetings of groups of talented individuals at certain times and certain places. The ideas generated by these chance meetings had twofold consequence. Firstly, a corpus of work would be produced which, in great part, remains as a concrete record of the events. Secondly, the ideas would themselves be disseminated through many different channels of communication – seeds that often bore fruit in contexts far removed from their generation. Not all movements were exclusively concerned with innovation. Surrealism, for instance, claimed to embody a kind of insight which can be present in the art of any period. This claim has been generally accepted so that a sixteenth century painting by Spranger or a mysterious photograph by Atget can legitimately be discussed in surrealist terms. Briefly, then, the concepts of modern art are of many different (often fundamentally different) kinds of 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 a rapidly changing

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Solution:

Refer to the last 6 lines of para 3 which discusses the drought at the time of the classic collapse. At the time of earlier droughts there were uninhabited lands to which people could move but now the landscape was full and there was no useful unoccupied land in the vicinity. Choice (3)

84. According to the author, why is it difficult to explain the reasons for Maya collapse?

- (1) Copan inhabitants destroyed all records of that period.
- (2) The constant deforestation and hillside erosion have wiped out all traces of the Maya kingdom.
- (3) Archaeological sites of Mayas do not provide any consistent evidence.
- (4) It has not been possible to ascertain which of the factors best explains as to why the Maya civilization collapsed.
- (5) At least five million people were crammed into a small area.

Solution:

Refer to para 1 – there are five strands that could explain the collapse but there is disagreement among archaeologists, in part because "the different strands evidently varied in importance among different parts of the Maya realm". Choice (4)

85. Which factor has not been cited as one of the factors causing the collapse of Maya society?

- (1) Environmental degradation due to excess population
- (2) Social collapse due to excess population
- (3) Increased warfare among Maya people
- (4) Climate change
- (5) Obsession of Maya population with their own short-term concerns

Solution:

Choice 5 is the answer because it is the rulers and not the people who were obsessed with their own short-term concerns (para 4, fifth strand). The other four choices are mentioned in the passage. Choice 1 is in para 2 (strand two). Choices 2 and 3 can be found in para 3 (strand three) and choice 4 in para 3 (strand four). Choice (5)

world of visual and spiritual experience. We should hardly be surprised if no one group succeeded completely, but achievements, though relative, have been considerable. Landmarks have been established – concrete statements of position which give a pattern to a situation which could easily have degenerated into total chaos. Beyond this, new language tools have been created for those who follow – semantic systems which can provide a springboard for further explorations.

The codifying of art is often criticized. Certainly one can understand that artists are wary of being pigeon-holed since they are apt to think of themselves as individuals – sometimes with good reason. The notion of self-expression, however, no longer carries quite the weight it once did; objectivity has its defenders. 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 – an independence which is not without its own value. The time factor is important here. As an art movement slips into temporal perspective, it ceases to be a living organism – becoming, rather, a fossil. This is not to say that 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. The artist can match the creative patterns crystallized into this structure against the potentials and possibilities of his own time. 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 conform more exactly to his – and our – present needs.

86. Many of the concepts of modern art have been the product of

- (1) ideas generated from planned deliberations between artists, painters and thinkers.
- (2) the dissemination of ideas through the state and its organizations.
- (3) accidental interactions among people blessed with creative muse.
- (4) patronage by the rich and powerful that supported art.
- (5) systematic investigation, codification and conventions.

Solution:

Refer to the fifth sentence of para one: "Many of the concepts of modern art ..." Choice (3)

87. In the passage, the word 'fossil' can be interpreted as

- (1) an art movement that has ceased to remain interesting or useful.
- (2) an analogy from the physical world to indicate a historic art movement.
- (3) an analogy from the physical world to indicate the barrenness of artistic creations in the past.
- (4) an embedded codification of pre-historic life.
- (5) an analogy from the physical world to indicate the passing of an era associated with an art movement.

Solution:

The author compares the art movements that are 'dead' to 'fossils'. Like with fossils, an artist can decipher intellectual and creative possibility from the recorded structure of a 'dead' art movement. Hence choice 5. Fossil here refers to any 'dead' art movement, not necessarily a 'historic' one. Thus option 2 is eliminated. Option 3 (barrenness of artistic creations in the past) is obviously wrong as there is no such indication in the passage. Option 4 is unrelated to art and hence is eliminated. Choice (5)

88. In the passage, which of the following similarities between science and art may lead to erroneous conclusions?

- (1) Both, in general, include a gamut of distinct but interconnecting activities.
- (2) Both have movements not necessarily concerned with innovation.
- (3) Both depend on collaborations between talented individuals.

- (4) Both involve abstract thought and dissemination of ideas.
- (5) Both reflect complex priorities of the modern world.

Solution:

Refer to the 2nd sentence in paragraph 1: "It is (almost) tempting to see a pattern emerging within the art field ... similar to ... science where the general term covers a whole range of separate, though interconnecting, activities." But the next sentence says that drawing a parallel on this basis would be misleading. Hence choice 1. Choice (1)

89. The range of concepts and ideologies embodied in the art of the twentieth century is explained by

- (1) the existence of movements such as surrealism.
- (2) landmarks which give a pattern to the art history of the twentieth century.
- (3) new language tools which can be used for further explorations into new areas.
- (4) the fast changing world of perceptual and transcendental understanding.
- (5) the quick exchange of ideas and concepts enabled by efficient technology.

Solution:

Refer to line 20 of para 6: "Different groups of artists would collaborate in trying to make sense of a rapidly changing world of visual and spiritual experience". "Visual and spiritual" is synonymous to 'perceptual and transcendental'. Choice (4)

90. The passage uses an observation by T.S. Eliot to imply that

- (1) creative processes are not 'original' because they always borrow from the past.
- (2) we always carry forward the legacy of the past.
- (3) past behaviours and thought processes recreate themselves in the present and get labelled as 'original' or 'creative'.
- (4) 'originality' can only thrive in a 'greenhouse' insulated from the past biases.
- (5) 'innovations' and 'original thinking' interpret and develop on past thoughts to suit contemporary needs.

Solution:

Refer to the last sentence of the passage which explains that these original and creative artists use ideas from earlier eras to develop ideas that correspond to present day situations. Hence option 5 is the correct choice. It is in this context that the author cites T.S. Eliot. Choice (5)



