

CAT2008 SOLUTIONS (111 SERIES)
SECTION – I (QUANT)

1. 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

$$= \frac{x}{4} - \frac{3}{4} - \left(\frac{x}{8} - \frac{3}{8} + \frac{1}{2}\right) = \frac{x}{8} - \frac{7}{8}$$

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

$\Rightarrow x = 7$

Choice (2)

Solutions for questions 2 and 3:

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

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

$$\Rightarrow k = -4, \text{ hence the other root of } f(x) = 0, k = -4.$$

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

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

2. Second root = -4

Choice (2)

3. Value of a + b + c cannot be uniquely determined

Choice (5)

4. Given sequences are 17, 21, 25 ---, 417 and 16, 21, 26, ---, 466.

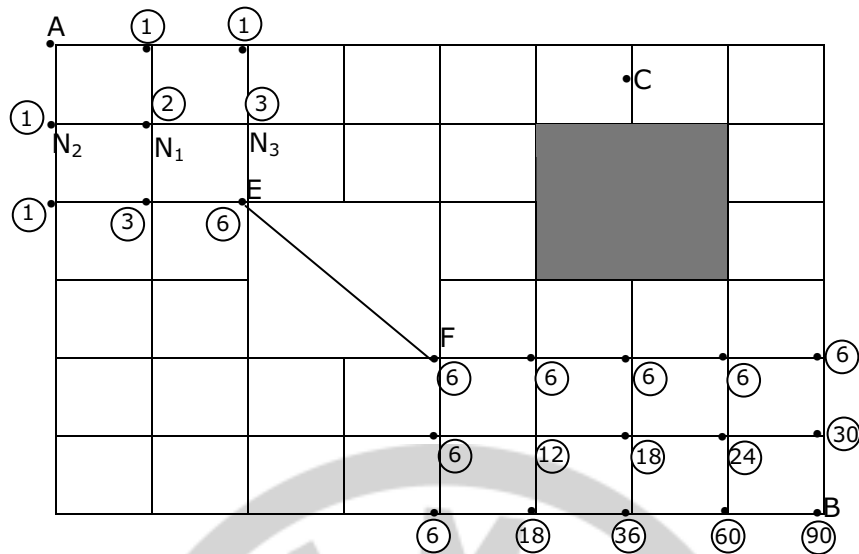
We can observe that 21 is the first common term in the two given arithmetic progressions. As their common differences are 4 and 5, the common difference of the terms common will be LCM (4, 5) i.e. 20.

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)

5.



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.

Choice (4)

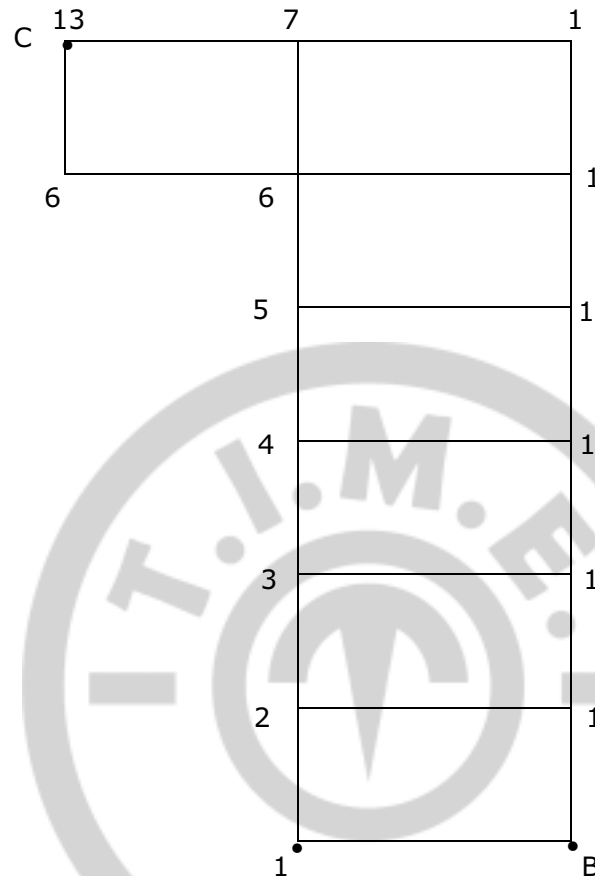
Alternative solution:

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

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

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

6. 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)

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

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

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

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

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

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

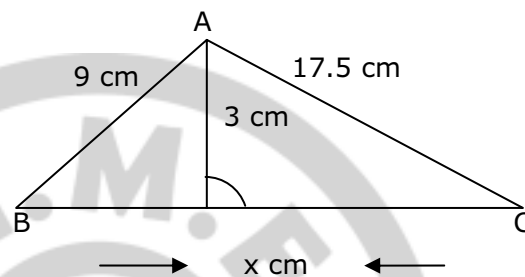
$$\Rightarrow 4 \times f\left(\frac{1}{2}\right) = f(1)$$

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

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

Choice (2)

8. 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)
9. 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 55^{th} multiple of 9. Choice (5)
10. In the given triangle $AB = 9$ cm, $AC = 17.5$ 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

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

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

Choice (5)

11. 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)

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

If α , β and γ are the 3 roots, then

$$\alpha\beta + \beta\gamma + \alpha\gamma = b \text{ (according to the properties of roots)}$$

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)

13. 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, 9cm, ----, 22 cm. Of these for (8, 9, 10, 11, 12) and (18, 19, 20, 21, 22) we get obtuse angled triangles.

Choice (3)

- 14.** 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

$$\underline{3} \times \underline{5} \times \underline{5} \times \underline{5} \rightarrow 375 \text{ in number}$$

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

Choice (4)

- 15.** 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 ${}^{n+r-1}C_{r-1}$.

\therefore Number of solutions for $p + q + r = 20$ is ${}^{20+3-1}C_{3-1}$

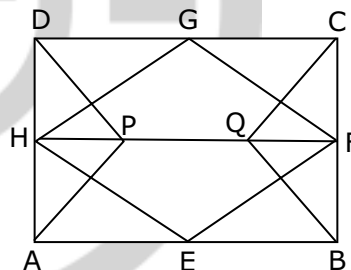
i.e., ${}^{22}C_2 = 231$

Choice (1)

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

$\therefore \angle CQF = 30^\circ$

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



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

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

Sum of areas of triangles APD and $BQC = 4 \left(\frac{s^2}{2\sqrt{3}} \right) = \frac{2s^2}{\sqrt{3}}$ as the triangles $CQF, BQF,$

ADH and DPH are congruent.

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

Choice (5)

- 17.** Given the positive integers $m, m + 1, m + 2$.

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

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

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

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

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

$$(m - 3)(m + 1) = 0 \Rightarrow m = 3 \text{ as } m \neq -1$$

Choice (1)

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

Sum of first two terms is $\frac{3}{2} + \sqrt{1+\frac{1}{4}+\frac{1}{9}}$
 $= \frac{3}{2} + \sqrt{\frac{36+9+4}{36}} = \frac{3}{2} + \frac{7}{6} = \frac{16}{6} = \frac{8}{3} = 3 - \frac{1}{3}$

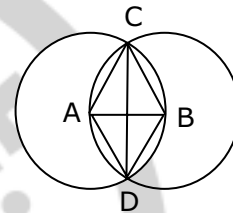
Sum of first 3 terms is $\frac{8}{3} + \sqrt{1+\frac{1}{9}+\frac{1}{16}}$

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

Similarly, the sum of the given terms is $2008 - \frac{1}{2008}$

Choice (1)

19. A and B are the centers of the circles and the two circles intersect at C and D.
 $AC = AD = AB = 1$ cm
 $\angle DAC = 120^\circ$



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

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

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 = $2 \left[\frac{\pi}{3} - \frac{\sqrt{3}}{4} \right] = \frac{2\pi}{3} - \frac{\sqrt{3}}{2}$

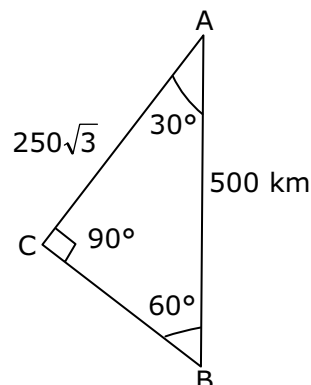
Choice (5)

20. Since $\angle A = 30^\circ$ and $\angle B = 60^\circ$
 $\therefore \angle C = 90^\circ$

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

Time taken by the train to reach from A to C = $\frac{250\sqrt{3}}{5}$ i.e. 5 hours.

i.e. at 13.00 train can reach C.



Time required by Rahim to reach C = $\frac{250\sqrt{3}}{70}$ hours = $\frac{433}{70}$ hours = 6 hours 12 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)

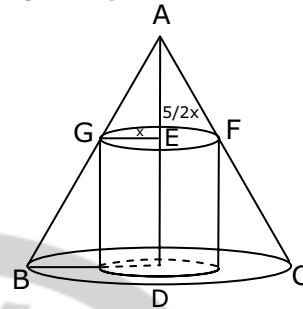
21. Consider the given figure.

Let the radius of the cylinder be x cm. Then $EG = x$ cm

Triangles AEG and ADB are similar

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

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



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

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

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

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

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

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

$$\therefore \text{Maximum T.S.A.} = \frac{100\pi}{3} \text{ sq cm.}$$

Choice (1)

Solutions for questions 22 and 23:

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.

(i) $\frac{\text{Black}}{1^{\text{st}} \text{ place}} \frac{\quad}{2^{\text{nd}} \text{ place}} \frac{\text{White}}{3^{\text{rd}} \text{ place}} \frac{\text{Red}}{4^{\text{th}} \text{ place}} \frac{\quad}{5^{\text{th}} \text{ place}}$

(or)

(ii) $\frac{\text{Black}}{1^{\text{st}} \text{ place}} \frac{\quad}{2^{\text{nd}} \text{ place}} \frac{\text{White}}{3^{\text{rd}} \text{ place}} \frac{\quad}{4^{\text{th}} \text{ place}} \frac{\text{Red}}{5^{\text{th}} \text{ place}}$

Case (c):

White horse in 2nd place

(i) $\frac{\quad}{1^{\text{st}} \text{ place}} \frac{\text{White}}{2^{\text{nd}} \text{ place}} \frac{\quad}{3^{\text{rd}} \text{ place}} \frac{\text{Black}}{4^{\text{th}} \text{ place}} \frac{\text{Red}}{5^{\text{th}} \text{ place}}$

(or)

(ii) $\frac{\quad}{1^{\text{st}} \text{ place}} \frac{\text{White}}{2^{\text{nd}} \text{ place}} \frac{\quad}{3^{\text{rd}} \text{ place}} \frac{\text{Red}}{4^{\text{th}} \text{ place}} \frac{\text{Black}}{5^{\text{th}} \text{ place}}$

- 22.** 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)

- 23.** 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)

- 24.** 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)

25. 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)

SECTION – II (DI)**Solutions for questions 26 to 28:**

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.

- 26.** 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. \therefore 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 (Section A) + 50 (Section B) + 41 (Section C) + 43 (Section D) = 184. Choice (3)
- 27.** 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)
- 28.** 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)

Solutions for questions 29 to 32:

- 29.** The growth rate in 2005 (over 2004) = $\frac{270 - 180}{180} \times 100 = 50\%$
 The growth rate in 2007 (over 2006) = $\frac{500 - 375}{375} \times 100 = 33\%$
 The required percentage = $\frac{50 - 33}{50} \times 100 = 35$ (approximately) Choice (3)
- 30.** 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 $500 \times \frac{131.5}{100} = 657.5$
 \therefore The required difference = 657.5 - 610 = 50 (approximately) Choice (1)
- 31.** 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

\therefore The percentage growth = 62

Choice (1)

- 32.** 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 2008-09.

Choice (4)

Solutions for questions 33 to 35:

- 33.** As after the transfer the average age of the Finance department increased by one year, it means that 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).

∴ 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)

- 34.** The gross pay of the person transferred from the HR department = 8000 (basic pay) + 90% of 8000 = 8000 + 7200 = 15200
The gross pay of all the 5 employees originally in the HR department = (5000 + 70% of 500 i.e. 3500)5 = 42500
The gross pay after the transfer = 42500 + 15200 = 57700

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

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

Choice (3)

- 35.** The total basic pay = 5000 × 5 + 6000 × 2 + 8000 × 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)

Solutions for questions 36 to 38:

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

36. 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)

37. 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)

38. 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)

Solutions for questions 39 and 40:

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.

$\Rightarrow a > f$ ---- (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 $(d + e + f) > (a + b + c)$ ---- (iii)

It is given that the price increased from 2 pm to 3 pm
 $\Rightarrow e < f$ ---- (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)

$\Rightarrow a$ is the highest

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

Choice (1) and Choice (4)

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

Choice (1)

Solutions for questions 41 to 43:

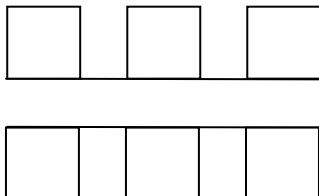
The given information can be tabulated as follows

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.



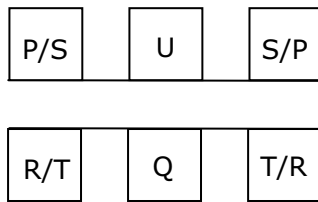
From (viii) U, P and S should be in one line with U between P and S and R, T and Q are in the other line.

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

1 – T	White	Orange	Red
2 – S/Q		U	S
3 – Q/S			
4 – P	R	Q	T
5 – R	...	-	..
6 – U			

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.

- 41.** The tallest house is T, which is Blue in colour. Choice (2)
- 42.** The red coloured house is diagonally opposite the yellow coloured house. Choice (4)
- 43.** The second tallest house is either S or Q. Choice (5)

Solutions for questions 44 to 47:

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.
 \therefore Each of E and F won the two matches.
 \Rightarrow C and D lost the two matches.
 Therefore B also won the two matches.

44. B and E won four matches each, which is the highest. Choice (5)

45. E and F defeated A (the top team in stage I). Choice (2)

46. Only B, E and F won the matches in stage II. Choice (4)

47. D and F won exactly two matches in the event. Choice (5)

Solutions for questions 48 to 50:

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.

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

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

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

$$\Rightarrow \text{Revenue from data} = (x\text{-value}) (\text{volume of data}) \text{ - (ii)}$$

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

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

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

$$\begin{aligned} &= \frac{y\text{-value} \times \text{Total Revenue}}{100} \\ &= \frac{y\text{-value} \times \text{Total Revenue}}{x\text{-value}} \end{aligned}$$

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

$$\begin{aligned} & \left(\frac{y - \text{value} \times \text{Total Revenue}}{x - \text{value} \times 100} \right)_{\text{India}} \\ &= \left(\frac{y - \text{value} \times \text{Total Revenue}}{x - \text{value} \times 100} \right)_{\text{Singapore}} \\ & \left(\frac{9 \times \text{Total Revenue}}{1 \times 100} \right)_{\text{India}} = \left(\frac{21 \times \text{Total Revenue}}{9 \times 100} \right)_{\text{Singapore}} \\ & \frac{(\text{Total Revenue})_{\text{Singapore}}}{(\text{Total Revenue})_{\text{India}}} = \frac{9 \times 9}{21 \times 1} \cong 4 \text{ times} \end{aligned}$$

Choice (5)

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

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

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

India : y - value : $3 \times 9 \cong 27$, x - value = ?

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

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

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

Choice (3)

SECTION – III (VERBAL and RC)**Solutions for questions 51 to 54:**

- 51.** 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. 'Climatic' 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)

- 52.** 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)

- 53.** 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)

- 54.** 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)

Solutions for questions 55 to 58:

- 55.** 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)

56. 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)

57. 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)

58. 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)

Solutions for questions 59 to 62:

59. 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)

- 60.** 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)

- 61.** 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)

- 62.** 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)

Solutions for questions 63 to 66:

- 63.** 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)

- 64.** 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)

- 65.** 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)

66. 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)

Solutions for questions 67 to 70:

67. 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. 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. 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)

70. 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)

Solutions for questions 71 to 75:

71. "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)

72. '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)
73. "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)
74. 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)
75. 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)

Solutions for questions 76 to 80:

76. 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)
77. 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)
78. 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)
79. 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)

- 80.** 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)

Solutions for questions 81 to 85:

- 81.** Refer to the fifth sentence of para one: "Many of the concepts of modern art ..." Choice (3)
- 82.** 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)
- 83.** 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)
- 84.** 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)
- 85.** 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)

Solutions for questions 86 to 90:

- 86.** 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)
- 87.** 'Anthropogenic' means 'originating in human activity'. Hence 'anthropogenic drought' means a drought caused by the actions of human beings. Choice (4)
- 88.** 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)
- 89.** 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)
- 90.** 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)