Set 333

Note: Questions 1 to 26 carry one mark each.

Directions for questions 1 to 4: Answer the questions on the basis of the information given below.
The Dean's office recently scanned student results into the central computer system. When their character reading software cannot read something, it leaves the space blank. The scanner output read as follows:

Name	Finance	Marketing	Statistics	Strategy	Operations	GPA
Aparna		B	F			1.4
Bikas	D	D	F	F		
Chandra		D	A	F	F	2.4
Deepak	A	B		D	D	3.2
Fazal	D	F	B		D	2.4
Gowri	C	C	A		B	3.8
Hari		B	A		D	2.8
Ismet			B		A	
Jagdeep	A	A	B		C	3.8
Kunal	F		A	F	F	1.8
Leena	B	A		B	F	3.2
Manab			A	B	B	
Nisha	A	D	B	A	F	3.6
Osman	C		B	B	A	4.6
Preeti	F	D		D		3.2
Rahul	A	C	A		F	4.2
Sameer		C	F	B		
Tara	B					2.4
Utkarsh			F	C	A	3.0
Vipul	A		C	C	F	2.4

In the grading system, A, B, C, D, and F grades fetch 6, 4, 3, 2, and 0 grade points respectively. The Grade Point Average (GPA) is the arithmetic mean of the grade points obtained in the five subjects. For example Nisha's GPA is (6 + 2 + 4 + 6 + 0) / 5 = 3.6. Some additional facts are also known about the students' grades. These are

(a) Vipul obtained the same grade in Marketing as Aparna obtained in Finance and Strategy.
(b) Fazal obtained the same grade in Strategy as Utkarsh did in Marketing.
(c) Tara received the same grade in exactly three courses.

1. What grade did Preeti obtain in Statistics?
1. A 2. B 3. C 4. D

Sol. (1)
GPA of Preeti = 3.2
i.e. $\frac{F + D + x + D + y}{5} = 3.2$
0 + 2 + x + 2 + y = 16
x + y = 12
So only combination possible is A, A.
So Preeti obtained A grade in statistics.

2. In operations, Tara could have received the same grade as

1. Ismet 2. Hari 3. Jagdeep 4. Manab

Sol. (4)

Tara received same grade in 3 courses. We already know that Tara has got B grade in one of the subject and GPA is 2.4. So in 3 courses in which he scored same grade is B. So Tara has received the same grade as Manab.

3. In Strategy, Gowri's grade point was higher than that obtained by
1. Fazal 2. Hari 3. Nisha 4. Rahul

Sol. (2)

GPA of Gowri is 3.8
i.e. $3 + 3 + 6 + x + 4 = 3.8 \times 5$
$16 + x = 18$
$x = 2$
So in strategy, Gowri's grade is C.
Rahul's grade in strategy = $(4.2 \times 5) - 15 = 6$, i.e., A.
Fazal's grade in strategy = $(2.4 \times 5) - 8 = 4$, i.e., B.
Hence, Gowri's grade will be higher than that of Hari.

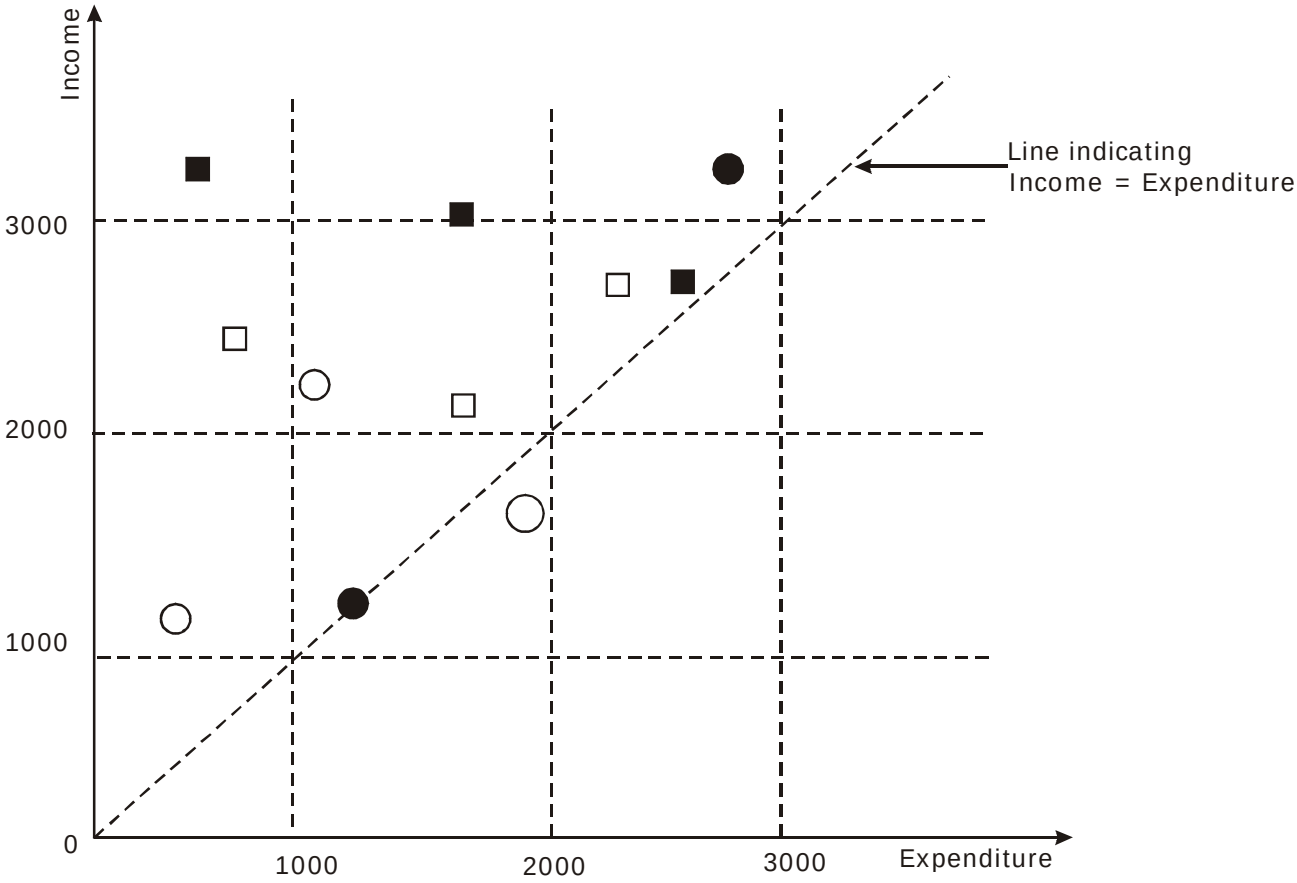
4. What grade did Utkarsh obtain in Finance?
1. B 2. C 3. D 4. F

Sol. (3)

As Fazal GPA = 2.4
So $D + F + B + P + D = 2.4 \times 5$
$2 + 0 + 4 + P + 2 = 12$
$P = 4$
So his grade in strategy is B.
So Grade of Utkarsh in marketing is also B.
So for Utkarsh, $x + B + F + C + A = 3 \times 5$
$x + 4 + 0 + 3 + 6 = 15$
$x = 2$
So grade of Utkarsh in finance = D.

Directions for questions 5 to 8: Answer the questions on the basis of the information given below.
The data points in the figure below represent monthly income and expenditure data of individual members of the Ahuja family (■), the Bose family (□), the Coomar family (○), and the Dubey family (●). For these questions, savings is defined as

Savings = Income – Expenditure



5. Which family has the lowest average income?
1. Ahuja 2. Bose 3. Coomar 4. Dubey

Sol. (3)

$$\text{Average income of Ahuja} = \frac{700+1700+1800}{3} = \frac{4200}{3}$$

$$\text{Average income of Bose} = \frac{800+1600+2300}{3} = \frac{4700}{3}$$

$$\text{Average income of Coomar} = \frac{300+1100+1900}{3} = \frac{3300}{3}$$

$$\text{Average income of Dubey} = \frac{1200+2800}{2} = \frac{4000}{2}$$

It's clear that lowest average income is of Coomar. (It is clear visually as well)

6. Which family has the highest average expenditure?
1. Ahuja 2. Bose 3. Coomar 4. Dubey

Sol. (4)

From the figure draw a line parallel to the expenditure axis and midway between observations of each family's values.

7. Which family has the lowest average savings?

1. Ahuja 2. Bose 3. Coomar 4. Dubey

Sol. (4)

From figure the Ist member of Dubey family is on the line indicating income = expenditure.

The 2nd member is just above the line.

8. The highest amount of savings accrues to a member of which family?

1. Ahuja 2. Bose 3. Coomar 4. Dubey

Sol. (1)

Look at the leftmost member of Ahuja family.

Directions for questions 9 to 12: Answer the questions on the basis of the information given below.

Prof. Singh has been tracking the number of visitors to his homepage? His service provider has provided him with the following data on the country of origin of the visitors and the university they belong to:

Number of visitors

	DAY		
COUNTRY	**1**	**2**	**3**
Canada	2	0	0
Netherlands	1	1	0
India	1	2	0
UK	2	0	2
USA	1	0	1

Number of visitors

	DAY		
UNIVERSITY	**1**	**2**	**3**
University 1	1	0	0
University 2	2	0	0
University 3	0	1	0
University 4	0	0	2
University 5	1	0	0
University 6	1	0	1
University 7	2	0	0
University 8	0	2	0

9. To which country does University 5 belong?
   1. India or Netherlands but not USA
   2. India or USA but not Netherlands
   3. Netherlands or USA but not India
   4. India or USA but not UK

10. University 1 can belong to
   1. UK
   2. Canada
   3. Netherlands
   4. USA

11. Which among the listed countries can possibly host three of the eight listed universities?
   1. None
   2. Only UK
   3. Only India
   4. Both India and UK

12. Visitors from how many universities from UK visited Prof. Singh's homepage in the three days?
   1. 1
   2. 2
   3. 3
   4. 4

Solution for questions 9 to 12:
Comparing Table 1 and 2, university 4 corresponds to UK and university 6 corresponds to USA (after as day 3 values are concerned and university 8 corresponds to India and university 3 to Netherlands now Indian or Netherlands can take university 1 or university 5. Now university 2 and 7 belongs to either UK or Canada (only one)

UNIVERSITY	DAY			COUNTRY
	1	2	3	
University 1	1	0	0	India / Netherlands
University 2	2	0	0	UK / Canada
University 3	0	1	0	Netherlands
University 4	0	0	2	UK
University 5	1	0	0	India/Netherlands
University 6	1	0	1	USA
University 7	2	0	0	UK/Canada
University 8	0	2	0	India

9. (1)

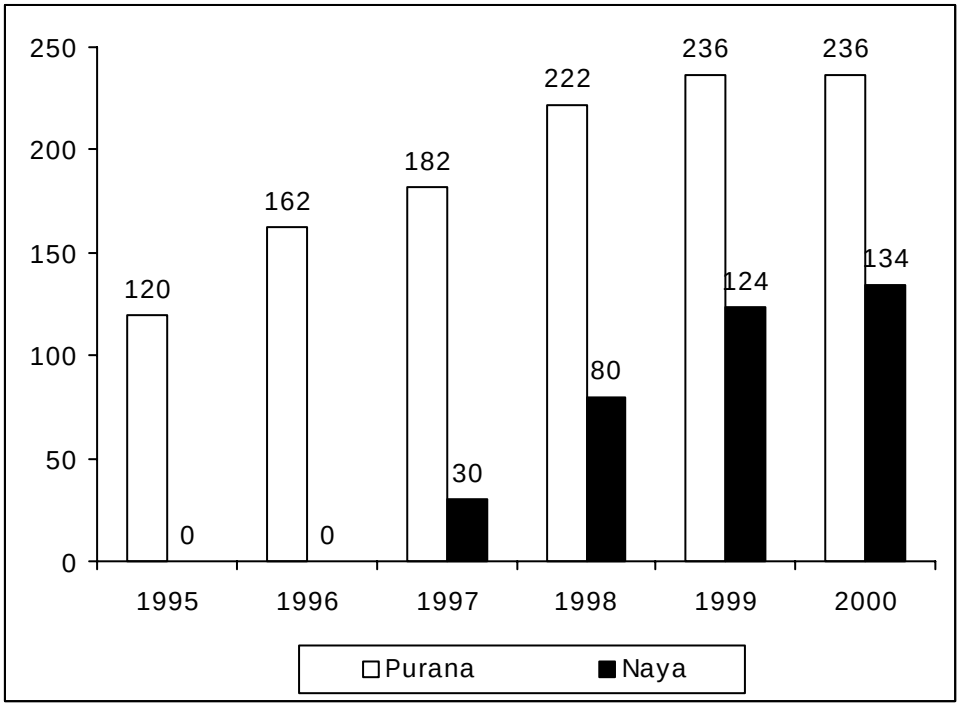
10. (3)

11. (1)

12. (2)

Directions for questions 13 to 16: Answer the questions on the basis of the information given below.

Purana and Naya are two brands of kitchen mixer-grinders available in the local market. Purana is an old brand that was introduced in 1990, while Naya was introduced in 1997. For both these brands, 20% of the mixer-grinders bought in a particular year are disposed off as junk exactly two years later. It is knows that 10 Purana mixer-grinders were disposed off in 1997. The following figures show the number of Purana and Naya mixer-grinders in operation from 1995 to 2000, as at the end of the year.



13. How many Naya mixer-grinders were purchased in 1999?
1. 44 2. 50 3. 55 4. 64

Sol. (2)

In 1999, total number of Naya mixer-grinder = 124
Number of Naya mixer-grinder disposed = 20% of 30 = 6
Number of mixtures bought
124 = [50 + 24] $\Rightarrow$ 50

14. How many Naya mixer-grinders were disposed off by the end of 2000?
1. 10 2. 16
3. 22 4. Cannot be determined from the data

Sol. (3)

Number of Naya mixer-grinder disposed in 1999 $\Rightarrow$ 6
Number of Naya mixer-grinder disposed in 2000 $\Rightarrow$ 10
Total disposed by end of 2000 = 16

15. How many Purana mixer-grinders were disposed off in 2000?
1. 0 2. 5
3. 6 4. Cannot be determined from the data

Sol. (4)

Initial number of Purana mixer-grinder not available, hence cannot be determined.

16. How many Purana mixer-grinders were purchased in 1999?
1. 20 2. 23
3. 50 4. Cannot be determined from the data

Sol. (4)

Initial number of Purana mixer-grinder not available, hence cannot be determined.

Directions for questions 17 to 20: Answer the questions on the basis of the information given below.

A study was conduced to ascertain the relative importance that employees in five different countries assigned to five different traits in their Chief Executive Officers. The traits were compassion (C), decisiveness (D), negotiation skills (N), public visibility (P), and vision (V). The level of dissimilarity between two countries is the maximum difference in the ranks allotted by the two countries to any of the five traits. The following table indicates the rank order of the five traits for each country.

	Country				
Rank	**India**	**China**	**Japan**	**Malaysia**	**Thailand**
1	C	N	D	V	V
2	P	C	N	D	C
3	N	P	C	P	N
4	V	D	V	C	P
5	D	V	P	N	D

17. Which of the following pairs of countries are most dissimilar?
1. China and Japan
2. India and China
3. Malaysia and Japan
4. Thailand and Japan

Sol. (4)

Thailand and Japan (Maximum difference of 4 ranks (5 – 1) = 4)

18. Which of the following countries is least dissimilar to India?
1. China
2. Japan
3. Malaysia
4. Thailand

Sol. (1)
China (Maximum difference between 2 parameter is 2)

19. Which amongst the following countries is most dissimilar to India?
1. China
2. Japan
3. Malaysia
4. Thailand

Sol. (2)

Japan (Maximum difference of 4)

20. Three of the following four pairs of countries have identical levels of dissimilarity. Which pair is the odd one out?
1. Malaysia and China
2. China and Thailand
3. Thailand and Japan
4. Japan and Malaysia

Sol. (4)
Japan and Malaysia (Inferring from question 17)

Directions for questions 21 to 26: Each question is followed by two statements, A and B. Answer each question using the following instructions.

Choose 1 if the question can be answered by using one of the statements alone but not by using the other statement alone.
Choose 2 if the question can be answered by using either of the statements alone.
Choose 3 if the question can be answered by using both statements together but not by either statement alone.
Choose 4 if the question cannot be answered on the basis of the two statements.

21. Zakib spends 30% of his income on his children's education, 20% on recreation and 10% on healthcare. The corresponding percentage for Supriyo are 40%, 25%, and 13%. Who spends more on children's education?
A. Zakib spends more on recreation than Supriyo.
B. Supriyo spends more on healthcare than Zakib.

Sol. (1)

Statement A: 20% of Z > 25% of S

$\frac{Z}{S} > \frac{5}{4}$ Cannot say.

Statement B: 13% of S > 10% of Z

$\Rightarrow$ 39% of S > 30% of Z. So 40% of S must be greater than 33% of Z.

Hence statement B is sufficient to answer.

22. Four candidates for an award obtain distinct scores in a test. Each of the four casts a vote to choose the winner of the award. The candidate who gets the largest number of votes wins the award. In case of a tie in the voting process, the candidate with the highest score wins the award. Who wins the award?
A. The candidates with top three scores each vote for the top score amongst the other three.
B. The candidate with the lowest score votes for the player with the second highest score.

Sol. (1)

Assume A, B, C, D get score 10, 8, 6, 4 reap.

A	B	C	D
10	8	6	4

Statement A:
With the conditions A will give vote to B
With the conditions B will give vote to A
With the conditions C will give vote to A

Even if D gives to A/B/C — 2 situation arises.
Either A will win or there will a tie when D gives vote to B.
Even then A will win.
So we are getting the answer.

Statement B: Can conclude anything.
Answer (1) first statement.

23. In a class of 30 students, Rashmi secured the third rank among the girls, while her brother Kumar studying in the same class secured the sixth rank in the whole class. Between the two, who had a better overall rank?
A. Kumar was among the top 25% of the boys merit list in the class in which 60% were boys.
B. There were three boys among the top five rank holders, and three girls among the top ten rank holders.

Sol. (1)

Statement A: Cannot say anything.
Statement B: Because amongst the Top 5 $\rightarrow$ 3 are boys, 2 are girls. And Rashmi is third among the girls and Kumar is 6^{th}.
We can conclude.
Answer (1) statement II is sufficient.

24. Tarak is standing 2 steps to the left of a red mark and 3 steps to the right of a blue mark. He tosses a coin. If it comes up heads, he moves one step to the right; otherwise he moves one step to the left. He keeps doing this until he reaches one of the two marks, and then he stops. At which mark does he stop?
A. He stops after 21 coin tosses.
B. He obtains three more tails than heads.

Sol. (2)

Statement A: We can find, there are 12 Tails and 9 Heads.
After tosses he will reach at blue point. So statement A is sufficient.
Statement B: 3 more Tails greater than Heads. So he will reach at blue point after tosses.
So statement B is also sufficient.

25. Ravi spent less than Rs. 75 to buy one kilogram each of potato, onion, and gourd. Which one of the three vegetables bought was the costliest?
A. 2 kg potato and 1 kg gourd cost less than 1 kg potato and 2 kg gourd.
B. 1 kg potato and 2 kg onion together cost the same as 1 kg onion and 2 kg gourd.

Sol. (3)

Statement A: 2 kg potato cost + 1 kg gourd cost < 1 kg potato cost + 1 kg gourd cost
$\Rightarrow$ 1 kg potato cost < 1 kg gourd cost.
So statement A is not sufficient.
Statement B: 1 kg potato cost + 2 kg onion cost = 1 kg onion cost + 2 kg gourd cost $\Rightarrow$ 1 kg potato cost + 1 kg onion cost = 2 kg gourd cost.
So statement B is also not sufficient.
Combining both statements we get
1 kg potato cost < 1 kg gourd cost ...(i)
1 kg potato cost + 1 kg onion cost = 2 kg gourd cost ...(ii)
So the onion is costliest.

26. Nandini paid for an article using currency notes of denominations Re. 1, Rs. 2, Rs. 5, and Rs. 10 using at least one note of each denomination. The total number of five and ten rupee notes used was one more than the total number of one and two rupee notes used. What was the price of the article?
A. Nandini used a total of 13 currency notes.
B. The price of the article was a multiple of Rs. 10.

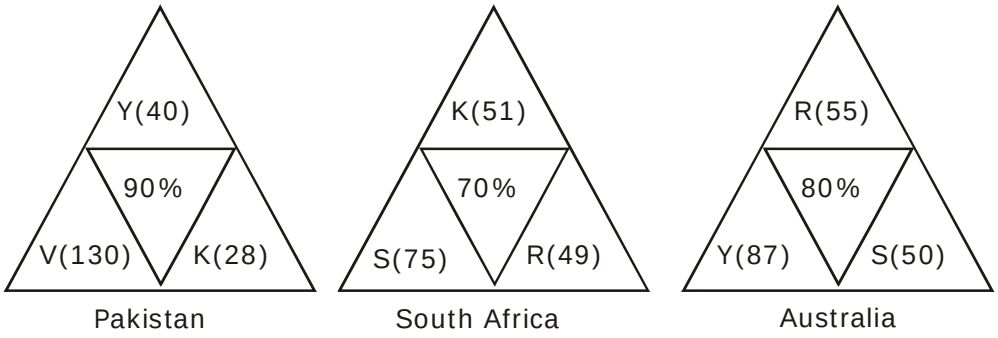
Sol. (4)

Statement A: 13 currency notes will give diff. Values.
Statement B: Multiple of 10 and by many.
Even if you combine the statement, we can have various values.
Answer is (4).

Note: Questions 27 to 38 carry two marks each.

Directions for questions 27 to 30: Answer the questions on the basis of the information given below.

Coach John sat with the score cards of Indian players from the 3 games in a one-day cricket tournament where the same set of players played for India and all the major batsmen got out. John summarized the batting performance through three diagrams, one for each games. In each diagram, the three outer triangles communicate the number of runs scored by the three top scores from India, where K, R, S, V, and Y represent Kaif, Rahul, Saurav, Virender, and Yuvraj respectively. The middle triangle in each diagram denotes the percentage of total score that was scored by the top three Indian scorers in that game. No two players score the same number of runs in the same game. John also calculated two batting indices for each player based on his scores in the tournaments; the R-index of a batsman is the difference between his highest and lowest scores in the 3 games while the M-index is the middle number, if his scores are arranged in a non-increasing order.



27. For how many Indian players is it possible to calculate the exact M-index?
1. 0 2. 1 3. 2 4. More than 2

28. Among the players mentioned, who can have the lowest R-index from the tournament?
1. Only Kaif, Rahul or Yuvraj 2. Only Kaif or Rahul
3. Only Kaif or Yuvraj 4. Only Kaif

29. How many players among those listed definitely scored less than Yuvraj in the tournament?
1. 0 2. 1 3. 2 4. More than 2

30. Which of the players had the best M-index from the tournament?
1. Rahul 2. Saurav 3. Virender 4. Yuvraj

Solution for questions 27 to 30: Go through the following table.

	Pakistan	**South Africa**	**Australia**
K	28	51	< 48
R	< 22	49	55
S	< 22	75	50
V	130	< 49	< 48
Y	40	< 49	87
Top 3 batsman	198	175	192
India Total	220	250	240

27. (3)

28. (4)

29. (2)

30. (2)

Directions for questions 31 to 34: Answer the questions on the basis of the information given below.
Twenty one participants from four continents (Africa, Americas, Australasia, and Europe) attended a United Nations conference. Each participant was an expert in one of four fields, labour, health, population studies, and refugee relocation. The following five facts about the participants are given.

(a) The number of labour experts in the camp was exactly half the number of experts in each of the three other categories.
(b) Africa did not send any labour expert. Otherwise, every continent, including Africa, sent at least one expert for each category.
(c) None of the continents sent more than three experts in any category.
(d) If there had been one less Australasian expert, then the Americas would have had twice as many experts as each of the other continents.
(e) Mike and Alfanso are leading experts of population studies who attended the conference. They are from Australasia.

31. Which of the following combinations is NOT possible?
1. 2 experts in population studies from the Americas and 2 health experts from Africa attended the conference.
2. 2 experts in population studies from the Americas and 1 health expert from Africa attended the conference.
3. 3 experts in refugee relocation from the Americas and 1 health expert from Africa attended the conference.
4. Africa and America each had 1 expert in population studies attending the conference.

32. If Ramos is the lone American expert in population studies, which of the following is NOT true about the numbers of experts in the conference from the four continents?
1. There is one expert in health from Africa.
2. There is one expert in refugee relocation from Africa.
3. There are two experts in health from the Americas.
4. There are three experts in refugee relocation from the Americas.

33. Alex, an American expert in refugee relocation, was the first keynote speaker in the conference. What can be inferred about the number of American experts in refugee relocation in the conference, excluding Alex?
i. At least one
ii. At most two

1. Only i and not ii
2. Only ii and not I
3. Both i and ii
4. Neither i nor ii

34. Which of the following numbers cannot be determined from the information given?
1. Number of labour experts from the Americas.
2. Number of health experts from Europe.
3. Number of health experts from Australasia.
4. Number of experts in refugee relocation from Africa.

Solutions for questions 31 to 34: For solving these questions make a table like this:

	Africa	America	Australia	Europe	
L	0	1	1	1	3
H			1	1	6
P			2	1	6
R			1	1	6
	4	8	5	4	
					21

(i) As the labour expert is half of each of the other, so the only possible combination is

L – 3

H, P, R — 6 each

(ii) Statement (d): If the number of Australasia expert is 1 less, i.e. total export are 20 American be twice as each of other. The only combined possible is Americas 8.

Australasia 4 + 1 = 5
Europe 4
Africa 4

Now, we need to workout the various options possible in the blank cells.

	Africa	America	Australia	Europe	
L	0	1	1	1	3
H	2	2	1	1	6
P	1	2	2	1	6
R	1	3	1	1	6
	4	8	5	4	
					21

	Africa	America	Australia	Europe	
L	0	1	1	1	3
H	1	3	1	1	6
P	1	2	2	1	6
R	2	2	1	1	6
	4	8	5	4	
					21

	Africa	America	Australia	Europe	
L	0	1	1	1	3
H	1	3	1	1	6
P	2	1	2	1	6
R	1	3	1	1	6
	4	8	5	4	
					21

31. (4)

32. (3)

33. (3)

34. (4)

Directions for questions 35 to 38: Answer the questions on the basis of the information given below.
The year was 2006. All six teams in Pool A of World Cup hockey, play each other exactly once. Each win earns a team three points, a draw earns one point and a loss earns zero points. The two teams with the highest points qualify for the semifinals. In case of a tie, the team with the highest goal difference (Goal For – Goals Against) qualifies.

In the opening match, Spain lost to Germany. After the second round (after each team played two matches), the pool table looked as shown below.

Teams	Games Played	Won	Drawn	Lost	Goals For	Goals Against	Points
Germany	2	2	0	0	3	1	6
Argentina	2	2	0	0	2	0	6
Spain	2	1	0	1	5	2	3
Pakistan	2	1	0	1	2	1	3
New Zealand	2	0	0	2	1	6	0
South Africa	2	0	0	2	1	4	0

In the third round, Spain played Pakistan, Argentina played Germany, and New Zealand played South Africa. All the third round matches were drawn. The following are some results from the fourth and fifth round matches

(a) Spain won both the fourth and fifth round matches.
(b) Both Argentina and Germany won their fifth round matches by 3 goals to 0.
(c) Pakistan won both the fourth and fifth round matches by 1 goal to 0.

35. Which one of the following statements is true about matches played in the first two rounds?
1. Germany beat New Zealand by 1 goal to 0.
2. Spain beat New Zealand by 4 goals to 0.
3. Spain beat South Africa by 2 goals to 0.
4. Germany beat South Africa by 2 goals to 1.

36. Which one of the following statements is true about matches played in the first two rounds?
1. Pakistan beat South Africa by 2 goals to 1.
2. Argentina beat Pakistan by 1 goal to 0.
3. Germany beat Pakistan by 2 goals to 1.
4. Germany beat Spain by 2 goals to 1.

37. If Pakistan qualified as one of the two teams from Pool A, which was the other team that qualified?
1. Argentina
2. Germany
3. Spain
4. Cannot be determined

38. Which team finished at the top of the pool after five rounds of matches?
    1. Argentina
    2. Germany
    3. Spain
    4. Cannot be determined

Solutions for questions 35 to 38:

From the statements from (a), (b), (c) given in the problem four teams (Spain, Argentina, Germany, Pakistan) appear to win their matches in the fifth round. However, there are only three matches per round and hence only three teams can win their matches in any round. Hence, the data set appears to be inconsistent.

Set 333

Sub–Section II-A: Number of questions = 20

Note: Questions 39 to 58 carry one mark each.

Directions for questions 39 to 52: Answer the questions independently of each other.

39. Two boats, traveling at 5 and 10 kms per hour, head directly each other. They begin at a distance of 20 kms from each other. How far apart are they (in kms) one minute before they collide.
1. 1/12 2. 1/6 3. 1/4 4. 1/3

Sol. (3)

The boats will be colliding after a time which is given by;

$t = \frac{20}{5+10} = \frac{4}{3}$ hours $= 80$ minutes.

After this time of 80 minutes, boat (1) has covered $80 \times \frac{5}{60}$ kms $= \frac{20}{3}$ kms,

whereas boat (2) has covered $80 \times \frac{10}{60}$ kms $= \frac{40}{3}$ kms.

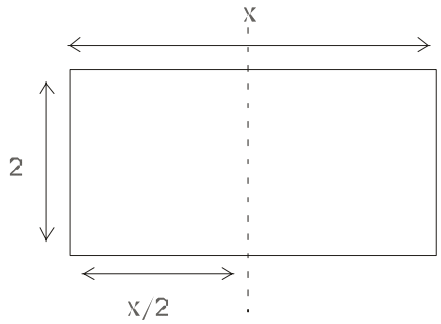
After 79 minutes, distance covered by the first boat $= d_1 = \left(\frac{20}{3} - \frac{5}{60}\right)$ kms

After 79 minutes, distance covered by the second boat $= d_2 = \left(\frac{40}{3} - \frac{10}{60}\right)$ kms

So the separation between the two boats = $20 - (d_1 + d_2) = \frac{1}{4}$ kms

40. A rectangular sheet of paper, when halved by folding it at the mid point of its longer side, results in a rectangle, whose longer and shorter sides are in the same proportion as the longer and shorter sides of the original rectangle. If the shorter side of the original rectangle is 2, what is the area of the smaller rectangle?
1. $4\sqrt{2}$ 2. $2\sqrt{2}$ 3. $\sqrt{2}$ 4. None of the above

Sol. (2)



In original rectangle ratio = $\frac{x}{2}$

In Smaller rectangle ratio = $\frac{2}{\left(\frac{x}{2}\right)}$

Given $\frac{x}{2} = \frac{2}{\frac{x}{2}} \Rightarrow x = 2\sqrt{2}$

Area of smaller rectangle = $\frac{x}{2} \times 2 = x = 2\sqrt{2}$ sq. units

41. If the sum of the first 11 terms of an arithmetic progression equals that of the first 19 terms, then what is the sum of the first 30 terms?
1. 0 2. –1 3. 1 4. Not unique

Sol. (1)

Given
$t_1 + t_2 + \ldots + t_{11} = t_1 + t_2 + \ldots + t_{19}$ (for an A.P.)
$\Rightarrow \frac{11}{2}\left[2a + (11-1)d\right] = \frac{19}{2}\left[2a + (19-1)d\right]$
$\Rightarrow$ 22 a + 110d = 28 a + 342 d
$\Rightarrow$ 16 a + 232 d = 0
$\Rightarrow$ 2a + 29 d = 0
$\Rightarrow \frac{30}{2}\left[2a + (30-1)d\right] = 0$
$\Rightarrow S_{30\text{terms}} = 0$

42. If a man cycles at 10 km/hr, then he arrives at a certain place at 1 p.m. If he cycles at 15 km/hr, he will arrive at the same place at 11 a.m. At what sped must he cycle to get there at noon?
1. 11 km/hr 2. 12 km/hr 3. 13 km/hr 4. 14 km/hr

Sol. (2)

When speed of the man = 10 km/hr = $\frac{d}{t}$. and

When speed of the man = 15 km/hr = $\frac{d}{t-2}$.

Equating the value of d: 10 × t = 15 × (t – 2)
$\Rightarrow$ t = 6 hours.

Finally desired speed = $\frac{d}{t-1} = \frac{10t}{t-1} = \frac{10\times 6}{5} = 12\,\text{km/hr}$.

43. On January 1, 2004 tow new societies S_1 and S_2 are formed, each n numbers. On the first day of each subsequent month, S_1 adds b members while S_2 multiples its current numbers by a constant factor r. Both the societies have the same number of members on July 2, 2004. If b = 10.5n, what is the value of r?
1. 2.0 2. 1.9 3.1.8 4. 1.7

Sol. (1)

There will be an increase of 6 times.
No. of members S_1 will be in A.P.
On July 2nd , 2004, S_1 will have n + 6 b members

$= n + 6 \times 10.5\, n$
$= 64n$
No. of members in S_2 will be in G.P
On July 2^{nd}, 2004 Number of members in S_2
$= nr^6$
They are equal, Hence $64\, n = = nr^6$
$\Rightarrow 64 = r^6 \Rightarrow r = 2$

44. If $f(x) = x^3 - 4x + p$, and f(0) and f(1) are of opposite sings, then which of the following is necessarily true
1. $-1 < p < 2$ 2. $0 < p < 3$ 3. $-2 < p < 1$ 4. $-3 < p < 0$

Sol. (2)

We have
$f(0) = 0^3 - 4(0) + p = p$
$f(1) = 1^3 - 4(1) + p = p - 3$
If P and P –3 are of opp. signs then $p(p - 3) < 0$
Hence $0 < p < 3$.

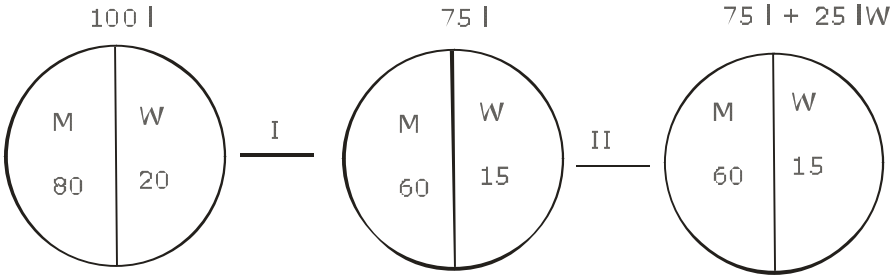
45. Suppose n is an integer such that the sum of digits on n is 2, and $10^{10} < n < 10^n$. The number of different values of n is
1. 11 2. 10 3. 9 4. 8

Sol. (1)

We have
(1) $10^{10} < n < 10^{11}$
(2) Sum of the digits for 'n' = 2
Clearly–
$(n)_{min}$ = 10000000001 (1 followed by 9 zeros and finally 1)
Obviously, we can form 10 such numbers by shifting '1' by one place from right to left again and again.
Again, there is another possibility for 'n'
n = 20000000000
So finally : No. of different values for n = 10 + 1 = 11 ans.

46. A milkman mixes 20 litres of water with 80 litres of milk. After selling one-fourth of this mixture, he adds water to replenish the quantity that he had sold. What is the current proportion of water to milk?
1. 2 : 3 2. 1 : 2 3. 1 : 3 4. 3 : 4

Sol. (1)



The diagram is self explanatory. Removal of 25 litres at stage I will result in volume of milk being reduced by 80% of 25 lit i.e. 20 lit and volume of water being reduced by the remaining 5 lit. So M = 60 lit and W = 15 lit. Addition of 25 lit water will finally given M = 60 lit and W = 40 M. Hence the ratio of W and M = 40 : 60 = 2 : 3.

47. If $\frac{a}{b+c}=\frac{b}{c+a}=\frac{c}{a+b}=r$ then r cannot take any value except.

1. $\frac{1}{2}$ 2. –1 3. $\frac{1}{2}$ or –1 4. $-\frac{1}{2}$ or –1

Sol. (3)

If $\frac{a}{b+c}=\frac{b}{c+a}=\frac{c}{a+b}=r$

then there are only two possibilities.

(i)

If $a+b+c\neq 0$, then $\frac{a}{b+c}=\frac{b}{c+a}=\frac{c}{a+b}=\frac{a+b+c}{(b+c)+(c+a)+(a+b)}$

$=\frac{a+b+c}{2(a+b+c)}=\frac{1}{2}$

(ii)

If a+ b+ c = 0, then

b + c = – a

c + a = – b

a + b = – c

Hence $\frac{a}{b+c}=\frac{a}{(-a)}=-1$

Similarly, $\frac{b}{c+a}=\frac{c}{a+b}=-1$

Therefore option (3) is the correct one 1/2 or –1

48. Let $y=\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{3+\ldots}}}}$

What is the value of y?

1. $\frac{\sqrt{11}+3}{2}$ 2. $\frac{\sqrt{11}-3}{2}$ 3. $\frac{\sqrt{15}+3}{2}$ 4. $\frac{\sqrt{15}-3}{2}$

Sol. (4)

$y=\cfrac{1}{2+\cfrac{1}{3+y}}$

$\Rightarrow y=\frac{3+y}{7+2y}$

$\Rightarrow 2y^2+6y-3=0$

$\Rightarrow y=\frac{-6\pm\sqrt{36+24}}{4}$

$$= \frac{-6 \pm \sqrt{60}}{4} = \frac{-3 \pm \sqrt{15}}{2}$$

Since 'y' is a +ve number, therefore:

$$y = \frac{\sqrt{15} - 3}{2}$$ ans.

49. Karan and Arjun run a 100-meter race, where Karan beats Arjun 10 metres. To do a favour to Arjun, starts 10 metres behind the starting line in a second 100 metre race. They both run at their earlier speeds. Which of the following is true in connection with the second race?
1. Karan and Arjun reach the finishing line simultaneously.
2. Arjun beats Karan by 1 metre
3. Arjun beats Karan by 11 metres.
4. Karan beats Arjun by 1 metre.

Sol. (4)

Situation (I):
In whatever time Karan covers a distance of 100 m, Arjun covers 90 m in the same time.
Situation (II):
Now Karan is 10 m behind the starting point. Once again to cover 100 m from this new point Karan will be taking the same time as before. In this time Arjun will be covering 90 meters only. This means that now both of them will be at the same point, which will be 10 meters away from the finish point. Since both of them are required to cover the same distance of 10 m now and Karan has a higher speed, he will beat Arjun. No need for calculations as option (4) is the only such option.

50. N persons stand on the circumference of a circle at distinct points. Each possible pair of persons, not standing next to each other, sings a two-minute song one pair after the other. If the total time taken for singing is 28 minutes, what is N?
1. 5 2. 7 3. 9 4. None of the above

Sol. (2)

Each person will form a pair with all other persons except the two beside him. Hence he will form (n – 3) pairs. If we consider each person, total pairs = n (n – 3) but here each pair is counted twice.

Hence actual number of pairs $= \frac{n(n-3)}{2}$

They will sing for $\frac{n(n-3)}{2} \times 2 = n(n-3)$ min

Hence $n(n-3) = 28$

$\Rightarrow n^2 - 3n - 28 = 0$

$\Rightarrow n = 7$ or -4

Discarding the –ve value: $n = 7$

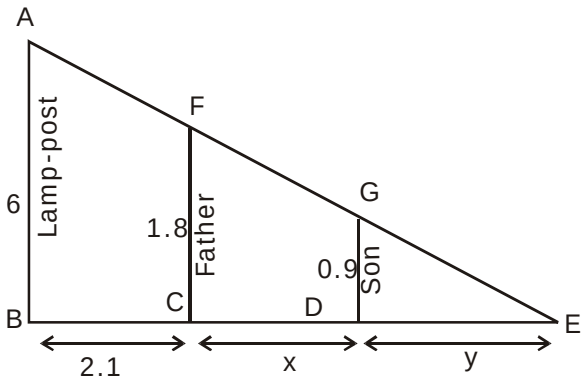
51. In NutsAndBolts factory, one machine produces only nuts at the rate of 100 nuts per minute and needs to be cleaned for 5 minutes after production of every 1000 nuts. Another machine produces only bolts at the rate of 75 bolts per minute and needs to cleaned for10 minutes after production of every 1500 bolts. If both the machines start production at the same time, what is the minimum duration required for producing 9000 pairs of nuts and bolts?
1. 130 minutes 2. 135 minutes 3. 170 minutes 4. 180 minutes

Sol. (3)

Machine I:
Number of nuts produced in one minute = 100
To produce 1000 nuts time required = 10 min
Cleaning time for nuts = 5 min
Over all time to produce 1000 nuts = 15 min.
Over all time to produce 9000 = 138 min – 5 min = 133 min … (1)
Machine II:
To produce 75 bolts time required = 1 min
To produce 1500 bolts time required = 20 min
Cleaning time for bolts = 10 in.
Effective time to produce 1500 bolts = 30 min
Effective time to produce 9000 bolts = 30 × 6 – 10 = 170 min … (2)
From (1) and (2)
Minimum time = 170 minutes

52. A father and his son are waiting at a bus stop in the evening. There is a lamp post behind them. The lamp post, the and his son stand on the same straight line. The father observes that the shadows of his head and his son's head are incident at the same point on the ground. If the heights of the lamp post, the father and his son are 6 metres, 1.8 metres and 0.9 metres respectively, and the father is standing 2.1 metres away form the post then how far (in metres) is son standing form his father?
1. 0.9 2. 0.75 3. 0.6 4. 0.45

Sol. (4)



$\Delta ABE \sim \Delta FCE$

$\therefore \frac{6}{1.8} = \frac{2.1 + x + y}{x + y}$ ...(i)

Also $\Delta ABE \sim \Delta GDE$

$\therefore \frac{6}{0.9} = \frac{2.1 + x + y}{y}$ ...(ii)

From (i) and (ii) x = 0.45.

Directions for Questions 53 to 55: Answer the questions on the basis of the information given below
In the adjoining figure I and II are circles with P and Q respectively, The two circles touch each other and have common tangent that touches them at points R and S

respectively. This common tangent meets the line joining P and Q at O. The diameters of I and II are in the ratio 4: 3. It is also known that the length of PO is 28 cm.

53. What is the ratio of the length of PQ to that of QO?
1. 1 : 4 2. 1 ; 3 3. 3 : 8 4. 3 : 4

Sol. (2)

$$\frac{OP}{OQ} = \frac{PR}{QS} = \frac{4}{3}$$
$OP = 28$
$OQ = 21$
$PQ = OP - OQ = 7$
$$\frac{PQ}{OQ} = \frac{7}{21} = \frac{1}{3}$$

54. What is the radius of the circle II?
1. 2 cm 2. 3 cm 3. 4 cm 4,. 5 cm

Sol. (2)

$PR + QS = PQ = 7$
$$= \frac{PR}{QS} = \frac{4}{3}$$
$\Rightarrow QS = 3$

55. The length of SO is
1. $8\sqrt{3}$ cm 2. $10\sqrt{3}$ cm 3. $12\sqrt{3}$ cm 4. $14\sqrt{3}$ cm

Sol. (3)

$$SO = \sqrt{OQ^2 - QS^2}$$
$$= \sqrt{21^2 - 3^2}$$
$$= \sqrt{24 \times 18} = 12\sqrt{3}$$

Directions for Questions 56 to 58: Answer the questions independently of each other.

56. Let $f(x) = ax^2 - b|x|$, where a and b are constants. Then at x = 0, f(x) is
1. maximized whenever a > 0, b > 0
2. maximized whenever a > 0, b < 0
3. minimized whenever a > 0, b > 0
4. minimized whenever a > 0, b< 0

Sol. (4)

When a > 0, b < 0,
ax^2 and $-b|x|$ are non negative for all x, i.e. $ax^2 - b|x| \geq 0$
$\therefore ax^2 - b|x|$ is minimum at x = 0 when a > 0, b < 0.

57. Each family in a locality has at most tow adults, and no family has fewer than 3 children. Considering all the families together, there are adults than boys, more boys than girls, and more girls than families, Then the minimum possible number of families in the locality is

1. 4 2. 5 3. 2 4. 3

Sol. (4)

Family	Adults	Children
1	0, 1, 2	3, 4, 5, ...
II	0, 1, 2	3, 4, 5, ...
III	0, 1, 2	3, 4, 5, ...

As per the question, we need to satisfy three conditions namely:
1. Adults (A) > Boys (B)
2. Boys (B) > Girls (G)
3. Girls (G) > Families (F)

Clearly, if the number of families are 2, maximum number of adults can only be 4. Now, for the second condition to be satisfied, every family should have atleast two boys and one girl each. This will result in non-compliance with the first condition because adults will be equal to boys. If we consider the same conditions for 3 families, then all three conditions will be satisfied.

58. The total number of integers pairs (x, y) satisfying the equation x + y = xy is

1. 0 2. 1 3. 2 4. None of the above

Sol. (3)

Given equation is $x + y = xy$

$\Rightarrow xy - x - y + 1 = 1$

$\Rightarrow (x-1)(y-1) = 1$

$\Rightarrow$ either $x-1=1$ & $y-1=1$ or $x-1=-1$ & $y-1=-1$

Clearly (0, 0) and (2, 2) are the only pairs that will satisfy the equation.

Sub–Section II – B: Number of Questions = 15

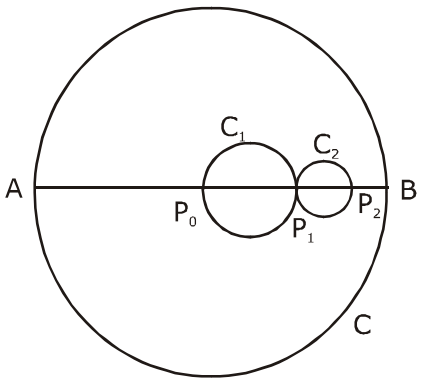
Note: Questions 59 to 73 carry two marks each.

Directions for Questions 59 to 62: Answer the questions independently of each other.

59. Let C be a circle with centre P_0 and AB be a diameter of C. Suppose P_1 is the mid point of the line segment P_0B, P_2 is the mid point of the line segment P_1B and so on. Let $C_1, C_2, C_3, \ldots$ be circles with diameters $P_0P_1, P_1P_2, P_2P_3 \ldots$ respectively. Suppose the circles $C_1, C_2, C_3, \ldots$ are all shaded. The ratio of the area of the unshaded portion of C to that of the original circle is

1. 8 : 9 2. 9 : 10 3. 10 : 11 4. 11 : 12

Sol. (4)



Circle	Radius
C	R
C_1	$\frac{r}{4}$
C_2	$\frac{r}{8}$
C_3	$\frac{r}{16}$
⋮	⋮

$$\frac{\text{Area of unshaded portion of C}}{\text{Area of C}} = 1 - \frac{\text{Area of shaded portion}}{\text{Area of C}}$$

$$= 1 - \frac{\pi\left(\left(\frac{r}{4}\right)^2 + \left(\frac{r}{8}\right)^2 + \ldots\right)}{\pi r^2}$$

$$= 1 - \left(\frac{1}{4^2} + \frac{1}{8^2} + \ldots\right) = 1 - \frac{\frac{1}{16}}{1 - \frac{1}{4}}$$

$$= \frac{11}{12}$$

60. Consider the .....this sequence

Sol. (3)

Given $a_1 = 81.33; a_2 = -19$

Also:

$a_j = a_{j-1} - a_{j-2}$, for $j \geq 3$

$\Rightarrow a_3 = a_2 - a_1 = -100.33$

$a_4 = a_3 - a_2 = -81.33$

$a_5 = a_4 - a_3 = 19$

$a_6 = a_5 - a_4 = +100.33$

$a_7 = a_6 - a_5 = +81.33$

$a_8 = a_7 - a_6 = -19$

Clearly 'a_3' onwards there is a cycle of 6 and the sum of terms in every such cycle = 0.
Therefore, when we add $a_1, a_2, a_3 \ldots$ upto a_{6002}, we will eventually be left with $a_1 + a_2$ only i.e. 81.33 – 19 = 62. 33.

61. A sprinter starts running ..... previous round?

Sol. (3)

As options are independent of n
Let n = 2

Time taken for first round = $\frac{1}{2} + 1 + 2 + 4 = 7.5$ minutes

Time taken for second round = 8 + 16 + 32 + 64 = 120 minutes

Ratio = $\frac{120}{7.5} = 16$

62. Let u = $(\log_2 x)^2$ ..... has

Sol. (2)

$u = (\log_2 x)^2 - 6\log_2 x + 12$
$x^u = 256$
Let $\log_2 x = y \Rightarrow x = 2^y$

$x^u = 2^8 \Rightarrow uy = 8 \Rightarrow u = \frac{8}{y}$

$\frac{8}{y} = y^2 - 6y + 12 \Rightarrow y^3 - 6y^2 + 12y - 8 = 0$

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

$\Rightarrow x = 4, \quad u = 4$

63. How many of the ..... For every x.

Sol. (3)

$f_1 f_2 = f_1(x) f_1(-x)$

$$f_1(-x) = \begin{cases} -x & 0 \le -x \le 1 \\ 1 & -x \ge 1 \\ 0 & \text{other wise} \end{cases}$$

$$= \begin{cases} -x & -1 \le x \le 0 \\ 1 & x \le -1 \\ 0 & \text{other wise} \end{cases}$$

$f_1 f_1(-x) = 0 \quad \forall x$

Similarly $f_2 f_3 = -(f_1(-x))^2 \neq 0$ for some x

$f_2 f_4 = f_1(-x) \cdot f_3(-x)$
$= -f_1(-x)\, f_2(-x)$
$= -f_1(-x)\, f_1(x) = 0 \quad \forall x$

64. Which of the following is necessarily true?

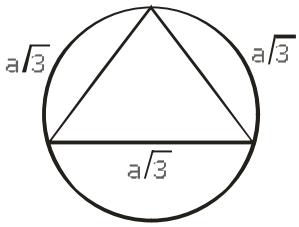
Sol. (2)

Check with options
Option (2)
$f_3(-x) = -f_2(-x)$
$= -f_1(x)$
$\Rightarrow f_1(x) = -f_3(-x)\ \forall\ x$

65. If the lengths of .....triangle will be

Sol. (1)

DF, AG and CE are body diagonals of cube.
Let the side of cube = a
Therefore body diagonal is $a\sqrt{3}$



Circum radius for equilateral triangle
$= \frac{\text{side}}{\sqrt{3}}$

Therefore $\frac{a\sqrt{3}}{\sqrt{3}} = a$

66. In the adjoining .....point A?

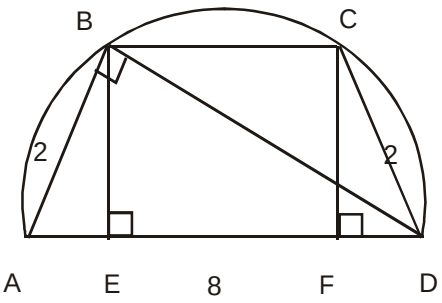
Sol. (2)

From A to B, there are 8 on- way roads out of which 3 roads are in Northwards and 5 roads are Westwards.

Therefore number of distinct routes is = $\frac{8!}{5!3!} = 56$

67. On a semicircle with ..... length of BC?

Sol. (2)



$\frac{1}{2} \times AB \times BD = \frac{1}{2} \times AD \times BE$

$2\sqrt{8^2 - 2^2} = 8 \times BE$

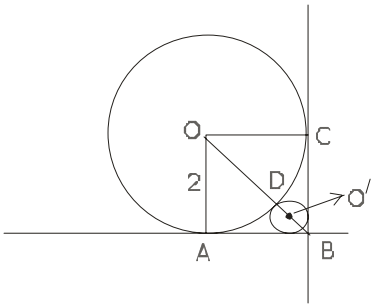
$BE = \frac{\sqrt{60}}{4} = \frac{\sqrt{15}}{2}$

$$AE = \sqrt{2^2 - \left(\frac{\sqrt{15}}{2}\right)^2} = \sqrt{4 - \frac{15}{4}} = \frac{1}{2}$$

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

68. A circle with ..... Smaller circle?

Sol. (4)



Let the radius of smaller circle = r

$\therefore O'B = r\sqrt{2}$

$\therefore OB = O'B + O'D + OD$

$= r\sqrt{2} + r + 2$

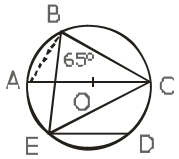
Also $OB = 2\sqrt{2}$

$\Rightarrow r\sqrt{2} + r + 2 = 2\sqrt{2}$

$\Rightarrow r = 6 - 4\sqrt{2}$

69. In the adjoining figure .....value of $\angle DEC$

Sol. (4)



In ΔABC,

$\angle B = 90°$ (Angles in semicircle)

Therefore $\angle ABE = 90 - 65 = 25°$

Also $\angle ABE = \angle ACE$ (angle subtended by same arc AE)

Also $\angle ACE = \angle CED$ [AC $\|$ ED]

Therefore $\angle CED = 25°$

70. If group B ..... Group C?

Sol. (1)

Since Group (B) contains 23 questions, the marks associated with this group are 46. Now check for option (1). If Group (C) has one question, then marks associated with this group will be 3. This means that the cumulative marks for these two groups taken together will be 49. Since total number of questions are 100, Group (A) will have 76

questions, the corresponding weightage being 76 marks. This satisfies all conditions and hence is the correct option. It can be easily observed that no other option will fit the bill.

71. If group C contains …..in group B?

Sol. (3)

Since Group (C) contains 8 questions, the corresponding weightage will be 24 marks. This figure should be less than or equal to 20% of the total marks. Check from the options . Option (3) provides 13 or 14 questions in Group (B), with a corresponding weightage of 26 or 28 marks. This means that number of questions in Group (A) will either be 79 or 78 and will satisfy the desired requirement.

72. The reminder ….. 19, is

Sol. (3)

$15^{23} = (19-4)^{23} = 19x + (-4)^{23}$ where x is a natural number.

$23^{23} = (19+4)^{23} = 19y + (4)^{23}$ where y is a natural number.

$15^{23} + 23^{23} = 19(x+y) + 4^{23} + (-4)^{23}$

= 19 (x +y)

73. A new flag is … colour is

Sol. (1)

The first strip can be of any of the four colours, The 2^{nd} can be of any colour except that of the first (i.e. 3). Similarly, each subsequent strop can be of nay colour except that of the preceding strip (=3)

Hence number of ways = 4×3^5

= 12 × 81

Set 333

Section III (A)

Note: Question 74 to 83 carry half a mark each. All the other question in Sub-section III-A carry one marks each.

Directions for questions 74 to 83: Fill up the blanks, numbered **[74], [75]** …… up to **[83],** in the two passages below with most appropriate word from the options given for each blank.

"Between the year 1946 and the year 1955, I did not file any income tax returns." With that **[74]** statement, Ramesh embarked on an account of his encounter with the income tax department. " I originally owned Rs. 20,000 in unpaid taxes. With **[75]** and **[76]**, the 20,000 became 60,000. The Income tax Department then went into action, and I learned first hand just how much power the Tax Department wields. Royalties and trust funds can be **[77]**; automobiles may be **[78],** and auctioned off. Nothing belongs to the **[79]** until the case is settled."

74. 1. devious 2. blunt 3. tactful 4. pretentious

Sol. (2)
Ramesh makes a direct, blatant statement that he did not file his income tax returns. Devious means scheming, deceitful.

75. 1. interest 2. taxes 3. principal 4. returns

Sol. (1)
The principal tax is already mentioned as Rs. 20000. He hasn't filed his income tax returns. Due to the delay he will also have to pay interest on the principal amount.

76. 1. sanctions 2. refunds 3. fees 4. fines

Sol. (4)
There are no sanctions involved with the income tax. It's not possible for him to get a refund unless he files his returns. Due to the delay he will be charged a fine and not a fee.

77. 1. closed 2. detached 3. attached 4. impounded

Sol. (3)
To impound means to seize property (usually by force of power). Attached here refers to attaching property by legal writ.

78. 1. smashed 2. seized 3. dismantled 4. frozen

Sol. (2)
Automobiles can only be seized before being auctioned off (and not smashed, dismantled or frozen!).

79. 1. purchaser 2. victim 3. investor 4. offender

Sol. (4)
An income tax defaulter is an offender and not a purchaser, victim or investor.

At that time the white house was as serene as a resort hotel out of season. The corridors were **[80]**. In the various offices, **[81]** gray men in waistcoats talked to one another in low-pitched voices. The only color, or choler, curiously enough, was provided by President Eisenhower himself. Apparently, his **[82]** was easily set off; he scowled when he **[83]** the corridors.

80. 1. striking 2. hollow 3. empty 4. white

Sol. (3)
The words in the previous sentence and the tone of the passage indicate that the corridors were empty.

81. 1. quiet 2. faded 3. loud 4. stentorian

Sol. (1)
This choice is appropriate because the men were talking in low-pitched voices. Stentorian means marked by loud voice.

82. 1.laughter 2. curiously 3. humour 4. temper

Sol. (4)
The word 'choler' (which means anger or irritability) in the previous sentence indicates a direct relationship with temper.

83. 1. paced 2. strolled 3. stormed 4. prowled

Sol. (1)
He couldn't have strolled the corridors because he was angry. The President would not prowl in the corridors. Also one does not storm a corridor but may storm in and out of a corridor or a room. But one can pace up and down.

Directions for questions 84 to 86: Identify the incorrect sentence or sentences.

84.
A. It was a tough situation and Manasi was taking pains to make it better.
B. Slowly her efforts gave fruit and things started improving.
C. Everyone complemented her for her good work.
D. She was very happy and thanked everyone

1. A 2. D 3. B and C 4. A and C

Sol. (3)
Sentence B is wrong because efforts 'bear fruit' and not 'give fruit'. Sentence C is incorrect because the spelling of 'complemented' should be 'complimented'.

85.
A. Harish told Raj to plead guilty.
B. Raj pleaded guilty of stealing money from the shop.
C. The court found Raj guilty of all the crimes he was charged with.
D. He was sentenced for three years in jail

1. A and C 2. B and D 3. A, C, and D 4. B, C, and D

Sol. (2)
Sentence B is wrong because you don't plead 'guilty of' but plead 'guilty to' a crime. Sentence D is wrong because one gets 'sentenced to' prison.

86. A. Last Sunday, Archana had nothing to do.
B. After waking up, she lay on the bed thinking of what to do.
C. At 11 o' clock she took shower and got ready.
E. She spent most of the day shopping

1. B and C 2. C 3. A and B 4. B, C, and D

Sol. (1)
Sentence B is incorrect because the correct usage of its last part would be – 'thinking what to do'. Sentence C is wrong because the article 'a' should precede 'shower'.

Directions for questions 87 to 89: Each statement has a part missing. Choose the best option from the four options given below the statement to make up the missing part.

87. Many people suggest _____ and still other would like to convince people not to buy pirated cassettes.

1. to bring down audiocassette prices to reduce the incidence of music piracy, others advocate strong legal action against the offenders,
2. bringing down audiocassette prices to reduce the incidents of music piracy, others are advocating strong legal action against offenders,
3. bringing down audiocassette prices to reduce the incidents of music piracy, others advocate strong legal action against offenders,
4. audiocassette prices to be brought down to reduce incidents of music piracy, others advocate that strong legal action must be taken against offenders,

Sol. (3)
In option (1), the usage 'suggest to bring down is incorrect'. In option 4 audiocassette prices 'should' be (and not 'to' be) brought down. Between options (2) and (3), 'incidence' of music piracy can be reduced and not 'incidents'.

88. The ancient Egyptians believed _____so that when these objects were magically reanimated through the correct rituals, they would be able to functions effectively.

1. that it was essential that things they portrayed must have every relevant feature shown as clearly as possible
2. it was essential for things they portray to have had every relevant feature shown as clearly as possible,
3. it was essential that the things they portrayed had every relevant feature shown as clearly as possible.
4. that when they portrayed things, it should have every relevant feature shown as clearly as possible

Sol. (3)
Option (2) is incorrect due to the usage of the simple present tense in 'they portray'. Option (4) is incorrect due to the usage if the singular 'it' for the plural 'things'. Option (1) is wrong because of the unnecessary usage of 'must have' after using 'essential'.

89. Archaeologists believe that the pieces of red – ware pottery excavated recently near Bhavnagar and _____shed light on a hitherto dark 600-year period in the Harappan history of Gujarat.

1. estimated with a reasonable certainty as being about 3400 years old,
2. are estimated reasonably certain to be about 3400 years old,
3. estimated at about 3400 years old with reasonable certainty,

4. estimated with reasonable certainty to be about 3400 years old,

Sol. (4)
Option (2) is incorrect because we cannot say that 'archeologists … are estimated'. Options (1) and (3) have the problems of misplaced modifiers.

Directions for questions 90 to 92: In each question, the word at the top of the table is used in four different ways, numbered 1 to 4. Choose the options in which the usage of the word is INCORRECT or INAPPROPRIATE.

90. BOLT

1.	The shopkeeper showed us a bolt of fine silk.
2.	As he could not move, he made a bolt for the gate.
3.	Could you please bolt he door?
4.	The thief was arrested before he could bolt from the scene of the crime.

Sol. (2)
The correct usage would have been – 'he bolted for the gate'.

91. FALLOUT

1.	Nagasaki suffered from the fallout of nuclear radiation.
2.	People believed that the political fallout of the scandal would be insigficant.
3.	Who can predict the environmental fallout of the WTO agreements?
4.	The headmaster could not understand the fallout of several of his good students at the public examination.

Sol. (4)
Fallout does not mean failure. It refers to consequence or argument.

92. PASSING

1.	She did not have passing marks in mathematics.
2.	The mad woman was cursing everybody passing her on the road.
3.	At the birthday party all the children enjoyed a game of passing the parcel.
4.	A passing taxi was stopped to rush the accident victims to the hospital.

Sol. (4)
The usage of 'passing' is redundant, one can simply say that 'a taxi was stopped/hailed'.

Directions for questions 93 to 95: The sentences given in each question, when properly sequenced, form a coherent paragraph. Each sentences is labeled with a letter. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

93. A. The two neighbours never fought each other.
B. Fights involving three male fiddler crabs have been recorded, but the status of the participants was unknown
C. They pushed or grappled only with the intruder.
D. We recorded 17 cases in which a resident that was fighting an intruder was joined by an immediate neighbour, an ally.
F. We therefore tracked 268 intruder males until be saw them fighting a resident male.

1. BEDAC 2. DEBAC 3. BDCAE 4. BCEDA

Sol. (1)
AC is a mandatory pair and DAC is a mandatory sequence.

94. A. In the west, Allied Forces had fought their way through southern Italy as far as Rome.
B. In June 1944 Germany's military position in World War two appeared hopeless
C. In Britain, the task of amassing the men and materials for the liberation of northern Europe had been completed.
D. Red Army was poised to drive the Nazis back through Poland.
E. The situation on the eastern front was catastrophic.

1. EDACB 2. BEDAC 3. BDECA 4. CEDAB

Sol. (2)
B is the opening statement as it introduces the subject and the date. EDA is a sequence that describes the situation from the east to the west. Statement C is a stand-alone statement.

95. A. He felt justified in bypassing Congress altogether on a variety of moves.
B. At times he was fighting the entire Congress.
C. Bush felt he had a mission to restore power to the presidency.
D. Bush was not fighting just the democrats.
E. Representatives democracy is a messy business, and a CEO of the white House does not like a legislature of second guessers and time wasters.

1. CAEDB 2. DBAEC 3. CEADB 4. ECDBA

Sol. (4)
CDBA is a mandatory sequence. "Bush was not fighting just the democrats" in statement D, relates directly with "At times he was fighting…" in statement B.

Directions for questions 96 to 97: Four alternative summaries are given below each text. Choose the option that best captures the essence of the text.

96. The human race is spread all over world, from the polar regions to the tropics. The people of whom it is made up eat different kinds of food, partly according to the climate in which they live, and partly according to the kind of food which their country produces. In hot climates; meat and fat are not much needed; but in the Arctic regions they seem to be very necessary for keeping up the heat of the body. Thus, in India, People live chiefly on different kinds of grains, eggs, milk, or sometimes fish and meat. In Europe people eat more meat and less gain. In the Arctic regions, where no grains and fruits are produced, the Eskimo and others races live almost entirely on meat and fish.

1. Food eaten by people in different regions of the world depends on the climate and produce of the region, and varies from meat and fish in the Arctic to predominantly grains in the tropics.
2. Hot climates require people to eat grains while cold regions require people to eat meat and fish.
3. In hot countries people eat mainly grains while in the Arctic, they eat meat and fish because they cannot grow grains.
4. While people in Arctic regions like meat and fish and those in hot regions like India prefer mainly grains, they have to change what they eat depending on the local climate and the local produce.

Sol. (1)
Statement 2 is only partially true. It only talks of requirements and not of what grows in those regions. Similarly, statement 3 talks only of produce and not requirement. The passage is not concerned with what people like or prefer but with what is locally available or required.

97. You seemed at first to take no notice of your school-fellows, or rather to set yourself against them because they were strangers to you. They knew as little of you as you did of them; this would have been the reason for their keeping aloof from you as well, which you would have felt as a hardship. Learn never to conceive a prejudice

against others because you know nothing of them. It is bad reasoning, and makes enemies of half the world. Do not think ill of them till they behave ill to you; and then strive to avoid the faults, which you see in them. This will disarm their hostility sooner than pique or resentment or complaint.

1. The discomfort you felt with your school fellows was because both sides knew little of each other. You should not complain unless you find others prejudiced against you and have attempted to carefully analyze the faults you have observed in them.
2. The discomfort you felt with your school fellows was because both sides knew little of each other. Avoid prejudice and negative thoughts till you encounter bad behaviour from others, and then win them over by shunning the faults you have observed.
3. You encountered hardship amongst your school fellows because you did not know then well. You should learn not to make enemies because of your prejudices irrespective of their behaviour towards you.
4. You encountered hardship amongst your school fellows because you did not know them well. You should learn to not make enemies because of your prejudices unless they behave badly with you.

Sol. (2)
The last sentence of the passage is only conveyed fully in option (2).

Directions for questions 98 to 118: Each of the five passages given below is followed by a set of questions. Choose the best answer to each question.

PASSAGE I

The painter is now free …..they served so sincerely.

98. When a culture is insecure, the painter chooses his subject on the basis of:

1. The prevalent style in the society of his time.
2. Its meaningfulness to the painter.
3. What is put in front of the easel.
4. Past experience and memory of the painter

Sol. (1)
The confusion could be between answer choices 1 and 2. However, answer choice 2 deals with what the author feels about the subject of a painting, whereas we are concerned about a painter and an insecure culture. The second line of the last paragraph confirms the answer choice 1.

99. In the sentence, “I believe there is a connection” (second paragraph), what two developments is the author referring to?

1. Painters using a dying hero and using a fruit as a subject of painting.
2. Growing success of painters and an increase in abstract forms.
3. Artists gaining freedom to choose subjects and abandoning subjects altogether.
4. Rise of Impressionists and an increase in abstract forms.

Sol. (3)
Reading the first and the second paragraph quite easily takes us to the answer choice 3.

100. Which of the following is NOT necessarily among the attributes needed for a painter to succeed:

1. The painter and his public agree on what is significant.

2. The painting is able to communicate and justify the significance of its subject selection.
3. The subject has a personal meaning for the painter.
4. The painting of subjects is inspired by historical developments.

Sol. (3)
The second sentence of the fifth paragraph says 'the subject may have a personal meaning … ; but there … general meaning.' This is quite the opposite of what answer choice 3 states, and so it becomes the answer.

101. In the context of the passage, which of the following statements would NOT be true?

1. Painters decided subjects based on what they remembered from their own lives.
2. Painters of reeds and water in China faced no serious problem of choosing a subject.
3. The choice of subject was a source of scandals in nineteenth century European art.
4. Agreement on the general meaning of a painting is influenced by culture and historical context.

Sol. (1)
The third paragraph, second line says 'a subject does not start … or with something which the painter has to remember'.

102. Which of the following views is taken by the author?

1. The more insecure a culture, the greater the freedom of the artist.
2. The more secure a culture, the greater the freedom of the artist.
3. The more secure a culture, more difficult the choice of subject.
4. The more insecure a culture, the less significant the choice of the subject.

Sol. (1)
Refer to the second-last paragraph, first line.

PASSAGE II

Recently I spent several hours … most of their factories.

103. According to the passage, which of the following statements is true?

1. Executives of automobile companies are inefficient and ludicrous.
2. The speed at which an automobile is driven in a city has not changed much in a century.
3. Anthropological factors have fostered innovation in automobiles by promoting use of new technologies.
4. Further innovation in jet engines has been more than incremental.

Sol. (2)
Quite a direct answer, refer to the fourth paragraph.

104. Which of the following views does the author fully support in the passage?

1. Nothing is as permanent as change.
2. Change is always rapid.
3. More money spent on innovation leads to more rapid change.
4. Over decades, structural change has been incremental.

Sol. (4)
Refer to the sixth paragraph.

105. Which of the following best describes one of the main ideas discussed in the passage?

1. Rapid change is usually welcomed in society.
2. Industry is not as innovative as it is made out to be.
3. We should have less change than what we have now.
4. Competition spurs companies into radical innovation.

Sol. (2)
This is a main idea question; if you look at the complete passage, the author through examples of aeroplanes and cars and even telephones etc. is trying to show that innovation has not happened as much as it has been made out to be. The changes have been basically incremental and cosmetic.

106. According to the passage, the reason why we continues to be dependent on fossil fuels is that:

1. Auto executives did not wish to change.
2. No alternative fuels were discovered.
3. Change in technology was not easily possible
4. German, Japanese and French companies could not come up with new technologies.

Sol. (1)
Refer to the last two lines of the last paragraph.

PASSAGE III

The viability of the … professional elites.

107. According to the author, the British policy during the 'New Imperialism' period tended to be defensive because

1. it was unable to deal with the fallouts of a sharp increase in capital.
2. its cumulative capital had undesirable side-effects.
3. its policies favoured developing the vast hinterland.
4. it prevented the growth of a set-up which could have been capitalistic in nature.

Sol. (1)
The answer is clearly stated in the fifth line.

108. Under New Mercantilism, the fervent nationalism of the native middle classes does not create conflict with the multinational corporations because they (the middle classes)

1. negotiate with the multinational corporations
2. are dependent on the international system for their continued prosperity.
3. are not in a position to challenge the status quo.
4. do not enjoy popular support.

Sol. (3)
The second-last paragraph talks of the various factors that are responsible for this. Answer choice 3 combines all of them.

109. In the sentence, “They are prisoners of the taste patterns and consumption standards set at the center.” (fourth paragraph), what is the meaning of ‘centre’?

1. National government
2. Native capitalists.
3. New capitalists.
4. None of the above.

Sol. (4)
The centre as can be seen from the first paragraph is the - `rival centers of capital on the Continent and in America,’ therefore none of these is the answer.

110. The author is in a position to draw parallels between New Imperialism and New Mercantilism because

1. both originated in the developed Western capitalist countries.
2. New Mercantilism was a logical sequel to New Imperialism
3. they create the same set outputs – a labour force, middle classes and rival centers of capital.
4. both have comparable uneven and divisive effects.

Sol. (4)
The answer can be figured out from the first and the third paragraph.

PASSAGE IV

Fifty feet away … mystery to science.

111. The book *Man-Eaters of Tsavo* annoys some scientists because

1. it revealed that Tsavo lions are ferocious.
2. Patterson made a helluva lot of money from the book by sensationalism.
3. it perpetuated the bad name Tsavo lions had.
4. it narrated how two male Tsavo lions were killed.

Sol. (3)
Refer to the third paragraph, last three lines.

112. The sentence which concludes the first paragraph, “Now they knew better”, implies that:

1. The two scientists were struck by wonder on seeing maneless lions for the first time.
2. Though Craig was an expert on the Serengeti lion, now he also knew about the Tsavo lions.
3. Earlier, Craig and West thought that amateur observers had been mistaken.
4. Craig was now able to confirm that darkening of the noses as lions aged applied to Tsavo lions as well.

Sol. (3)
Refer to the first paragraph, second-last line.

113. According to the passage, which of the following has NOT contributed to the popular image of Tsavo lions as savage creatures?

1. Tsavo lions have been observed to bring down one of the strongest and most aggressive animals — the Cape buffalo.
2. In contrast to the situation in traditional lion haunts, scarcity of non-buffalo prey in the Tsavo makes the Tsavo lions more aggressive.
3. The Tsavo lion is considered to be less evolved than the Serengeti variety.
4. Tsavo lions have been observed to attack vehicles as well as humans.

Sol. (3)
All the other three answer choices are in the fourth and fifth paragraphs.

114. Which of the following, if true, would weaken the hypothesis advanced by Gnoske and Peterhans most?

1. Craig and Peyton develop even more serious doubts about the idea that Tsavo lions are primitive.
2. The maneless Tsavo East lions are shown to be closer to the cave lions.
3. Pleistocene cave lions are shown to be far less violent than believed.
4. The morphological variations in body and skull size between the cave and Tsavo lions are found to be insignificant.

Sol. (3)
If 3 is true and if Tsavo lions are similar to the cave lions, then the Tsavo lions should also be less violent, whereas the hypothesis tries to give reasons for the Tsavo lions being more ferocious.

PASSAGE V

Throughout human history … health of the nation.

115. The author recommends micronutrient-repletion for large-scale treatment of chronic degenerative diseases because

1. it is relatively easy to manage.
2. micronutrient deficiency is the cause of these diseases.
3. it can overcome genetic risk factors.
4. it can compensate for other lifestyle factors.

Sol. (2)
Refer to the fourth paragraph, first line.

116. Tailoring micronutrient-based treatment plans to suit individual deficiency profiles is not necessary because

1. it very likely to give inconsistent or negative results.
2. it is a classic pharmaceutical approach not suited to micronutrients.
3. most people are consuming suboptimal amounts of safe-to-consume micronutrients.
4. it is not cost effective to do so.

Sol. (3)
Refer to the fourth paragraph, third-last line.

117. Type-B malnutrition is a serious concern in developed countries because

1. developing countries mainly suffer from Type-A malnutrition.
2. it is a major contributor to illness and death.
3. pharmaceutical companies are not producing drugs to treat this condition.
4. national surveys on malnutrition do not include newer micronutrient groups.

Sol. (2)
The fourth paragraph, first line says Type B malnutrition is the major cause of chronic degenerative diseases. The first paragraph says chronic degenerative diseases are the major causes of ill-health and death, hence answer choice 2 follows.

118. Why are a large number of apparently healthy people deemed pre-ill?

1. They may have chronic degenerative diseases.
2. They do not know their own genetic risk factors which predispose them to diseases.
3. They suffer from Type-B malnutrition.
4. There is a lengthy latency period associated with chronically degenerative diseases.

Sol. (1)
Check the first paragraph for the answer.

Sub section III-B: Number of Questions = 5

Note: Questions 119 to 123 carry two marks each.

Directions for Questions 119 and 120: The sentences given in each question, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a letter. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

119. A. But this does not mean that death was the Egyptians' only preoccupation.
B. Even papyri come mainly from pyramid temples.
C. Most of our traditional sources of information about the Old Kingdom are monuments of the rich like pyramids and tombs.
D. Houses in which ordinary Egyptian lived have not been preserved, and when most people died they were buried in simple graves.
E. We know infinitely more about the wealthy people of Egypt than we do about the ordinary people, as most monuments were made for the rich.

1. CDBEA 2. ECDAB 3. EDCBA 4. DECAB

Sol. (3)
Both statements C and B (papyri is the plural for Egyptian papers and documents) are talking about sources of information. That is why CB is a mandatory pair.

120. A. Experts such as Larry Burns, head of research at GM, reckon that only such a full hearted leap will allow the world to cope with the mass motorization that will one day come to China or India.
B. But once hydrogen is being produced from biomass or extracted from underground coal or made from water, using nuclear or renewable electricity, the way will be open for a huge reduction in carbon emissions from the whole system.
C. In theory, once all the bugs have been sorted out, fuel cells should deliver better total fuel economy than any existing engines.
D. That is twice as good as the internal combustion engine, but only five percentage points better than a diesel hybrid.
E. Allowing for the resources needed to extract hydrogen from hydrocarbon, oil coal or gas, the fuel cell has an efficiency of 30%.

1. CEDBA 2. CEBDA 3. AEDBC 4. ACEBD

Sol. (1)
ED is a mandatory pair as 'the fuel cell efficiency has an efficiency of 30%' in E connects with 'That is twice as good' in D. BA is a pair because 'the way will be open for a huge reduction…' in B connects with 'only such a full-hearted leap will allow the world to cope with mass motorization' in A.

Directions for Questions 121 to 123: Four alternative summaries are given below each text. Choose the option that best captures the essence of the text.

121. Local communities have often come in conflict with agents trying to exploit resources, at a faster pace, for an expanding commercial-industrial economy. More often than not, such agents of resource-intensification are given preferential treatment by the state, through the grant of generous long leases over mineral or fish stocks, for example, or the provision of raw material at an enormously subsidized price. With the injustice so compounded, local communities at the receiving end of this process have no recourse expect direct action, resisting both the state and outside exploiters through a variety of protest techniques. These struggles might perhaps be seen as a manifestation of a new kind of class conflict.

1. A new kind of class conflict arises from preferential treatments given to agents of resource-intensification by the state, which the local community sees as unfair.
2. The grant of long leases to agents of resource-intensification for an expanding commercial-industrial economy leads to direct protests from the local community, which sees it as unfair.
3. Preferential treatment given by the state to agents of resource-intensification for an expanding commercial-industrial economy exacerbates injustice to local communities and leads to direct protests from them, resulting in a new type of class conflict.
4. Local communities have no option but to protest against agents of resource-intensification and create a new type of class conflict when they are given raw material at subsidized prices for an expanding commercial-industrial economy.

Sol. (3)
Statements 2 and 4 are partially true, as they do not cover all the examples of preferential treatment. Statement 1 is incomplete, as it does not mention direct protest.

122. Although almost all climate scientists agree that the Earth is gradually warming, they have long been of two minds about the process of rapid climate shifts within larger periods of change. Some have speculated that the process works like a giant oven or freezer, warming or cooling the whole planet at the same time. Others think that shifts occur on opposing schedules in the Northern and Southern Hemisphere, like exaggerated seasons. Recent research in Germany examining climate patterns in the Southern Hemisphere at the end of the last Ice Age strengthens the idea that warming and cooling occurs at alternate times in the two hemispheres. A more definitive answer to this debate will allow scientists to better predict when and how quickly the next climate shift will happen.

1. Scientists have been unsure whether rapid shifts in the Earth's climate happen all at once or on opposing schedules in different hemispheres; research will help find a definitive answer and better predict climate shifts in future.
2. Scientists have been unsure whether rapid shifts in the Earth's climate happen all at once or on opposing schedules in different hemispheres; finding a definitive answer will help them better predict climate shifts in future.
3. Research in Germany will help scientists find a definitive answer about warming and cooling of the Earth and predict climate shifts in the future in a better manner.

4. More research rather than debates on warming or cooling of the Earth and exaggerated seasons in its hemisphere will help scientists in Germany predict changes better in future.

Sol. (2)
Statement 3 is factually wrong as we don't know if further research can happen only in Germany. Option 4 wrongly brings out a contest between research and debate. Between options 1 and 2, choice 1 is inappropriate because we don't know if 'research' will help find a 'definitive answer'.

123. Modern bourgeois society, said Nietzsche, was decadent and enfeebled – a victim of the excessive development of the rational faculties at the expense of will and instinct. Against the liberal-rationalist stress on the intellect, Nietzsche urged recognition of the dark mysterious world of instinctual desires – the true forces of life. Smother the will excessive intellectualizing and you destroy the spontaneity that sparks cultural creativity and ignites a zest for living. The critical and theoretical outlook destroyed the creative instincts. For man's manifold potential to be realized, he must forego relying on the intellect and nurture again the instinctual roots of human existence.

1. Nietzsche urges the decadent and enfeebled modern society to forego intellect and give importance to creative instincts.
2. Nietzsche urges the decadent and enfeebled modern society to smother the will with excessive intellectualizing and ignite a zest for living.
3. Nietzsche criticizes the intellectuals for enfeebling the modern bourgeois society by not nurturing man's creative instincts.
4. Nietzsche blames excessive intellectualization for the decline of modern society and suggests nurturing creative instincts instead.

123. (1)
Option 2 is factually wrong. Option 3 is wrong because Nietzsche does not criticize 'intellectuals'. Option 4 is wrong because he does not talk of 'the decline of modern society'.