

1. From the word 'HEIRARCHICAL', the final word formed after interchanging the first and second, third and fourth, fifth and sixth letters and so on is EHRIRAHCCILA.

From the left, R is at positions 3 and 5.

From the left, C is at positions 8 and 9.

Hence, **option 1**.

2. This series contains three series in itself.

Term	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>
	-1	0	1	0	2	4	1	6	9	2	12	16

Series 1 (T<sub>1</sub>, T<sub>4</sub>, T<sub>7</sub>, T<sub>10</sub>): -1, 0, 1, 2 (AP with a common difference of +1)

Series 2 (T<sub>2</sub>, T<sub>5</sub>, T<sub>8</sub>, T<sub>11</sub>): 0, 2, 6, 12 (Differences between two terms increase by 2)

Series 3 (T<sub>3</sub>, T<sub>6</sub>, T<sub>9</sub>, T<sub>12</sub>): 1, 4, 9, 16 (Squares of consecutive numbers)

The next three numbers will thus be 3, 20 and 25.

Hence, **option 3**.

3. From the first two statements, we can infer that 'onot' means 'oak'. Note that 'onot' is in the second half of the word in the artificial language but 'oak' is the first word in the meaning.

From the second and third statement, we infer that 'bly' means 'leaf', so 'crin' will mean 'maple'. Note that 'crin' is in the second half of the word.

We need to find those words from the artificial language that mean 'maple syrup'.

Observe that 'crin' means 'maple'.

Based on the pattern, since maple is the first word in 'maple syrup', 'crin' will be the second half of the coded word. That is true only for option 3.

Hence, **option 3**.

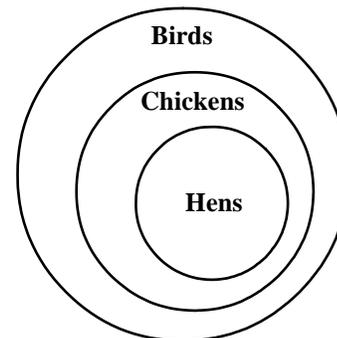
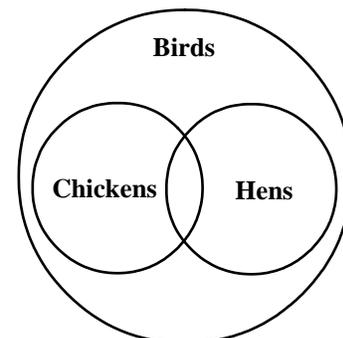
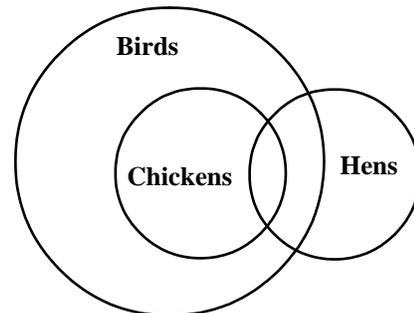
4. From the information we can infer that Bhanu is the eldest, since Bhanu is elder than Gita, who in turn is elder than Mita. So Mita is the youngest.

Hence, **option 4**.

5. The people arranged in ascending order of heights are: Diya, Tiya, Priya, Riya, Siya. Since there is no option which matches this sequence in ascending order and in the absence of 'None of these' as an option, option 3 is marked as the answer as it is the only sequence that has a valid order of heights.

Hence, **option 3**.

6. Statements I and II can be represented as venn diagrams in the following ways:



As 'Female birds lay eggs', so 'All birds lay eggs' is incorrect.

Conclusion 'Hens are Birds' may or may not be true as can be seen from the Venn diagrams.

Conclusion 'Some chickens are not hens' is also not definitely true as can be seen from the third Venn diagram.

Hence, **option 4**.

7. Since all storybooks have pictures and some storybooks have words, so some storybooks definitely have both words and pictures.

The other two conclusions cannot be derived from the statements.

Hence, **option 3**.

8. Considering the positions of the letters in the alphabet,  
 $I + 3 = L$ ,  $Q - 3 = N$  and  $S + 3 = V$   
 So  $J + 3 = M$ ,  $R - 3 = O$  and  $M + 3 = P$ .

Hence the correct analogy is JRM : MOP

Hence, **option 2**.

9. L, J and K are appearing in this show. Since J is working in this episode so M will also be there. But since K is present in this show, N cannot be there. So M must appear and O may appear. We can eliminate options 1, 2 and 4.

Hence, **option 3**.

10. In this show N is working so K will not be working. So we can eliminate options 1, 2 and 3.

Hence, **option 4**.

11. The moderator is in seat 3 and Gaj, the attorney, is in seat 4. So, as the moderator has the writer and attorney on his sides, the writer is in seat 3.

The attorney is not next to the explorer. So the explorer is in seat 1 and hence the pilot is in seat 5.

Thus we have,

Seat 1	Seat 2	Seat 3	Seat 4	Seat 5
Explorer	Writer	Moderator	Attorney	Pilot
			Gaj	Lalit

Hema is not the moderator and she sits between Kumar and Jaya. We can see from the table that Hema is the writer. The moderator is not Jaya so the moderator is Kumar.

We thus have:

Seat 1	Seat 2	Seat 3	Seat 4	Seat 5
Explorer	Writer	Moderator	Attorney	Pilot
Jaya	Hema	Kumar	Gaj	Lalit

From the above table, Kumar is the moderator.

Hence, **option 4**.

12. According to the table given in the answer to the first question of the set, Jaya sits on Seat 1.

Hence, **option 1**.

13. The output has the numbers arranged in the order:

smallest, largest, second smallest, second largest, third smallest, third largest and so on.

In the first step, the smallest number is moved to position 1 and the other numbers retain their relative positions.

In the second step, the largest number is moved to position 2 and the other numbers retain their positions.

This continues till the desired output is obtained.

The steps for the given input are:

<b>INPUT</b>	64	326	187	87	118	432	219	348
<b>Step 1</b>	64	432	326	187	87	118	219	348
<b>Step 2</b>	64	432	87	326	187	118	219	348
<b>Step 3</b>	64	432	87	348	326	187	118	219
<b>Step 4</b>	64	432	87	348	118	326	187	219

Hence, **option 3**.

- 14.

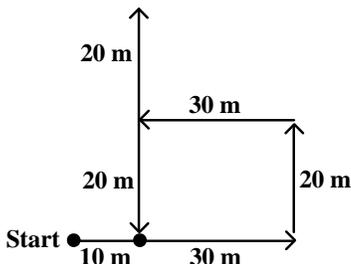
<b>INPUT</b>	319	318	746	123	15	320	78	426
<b>Step 1</b>	15	319	318	746	123	320	78	426
<b>Step 2</b>	15	746	319	318	123	320	78	426
<b>Step 3</b>	15	746	78	319	318	123	320	426
<b>Step 4</b>	15	746	78	426	319	318	123	320
<b>Step 5</b>	15	746	78	426	123	319	318	320
<b>Step 6</b>	15	746	78	426	123	320	319	318
<b>Step 7</b>	15	746	78	426	123	320	318	319

∴ Seven steps are needed to get the final output.

Hence, **option 4**.

15.  $F \neq S \ \$ B * V$   
 $F \neq S$  implies S is standing 2 kms to the right of F.  
 $S \ \$ B$  implies B is standing 2 kms above S.  
 $B * V$  implies V is standing 2 kms to the left of B.  
 So F is standing to the south of V.  
 Hence, **option 2**.

16. The path that Ritvik followed is as follows:



He is thus 10 m away from his house.  
 Hence, **option 3**.

17. The position numbers of the letters in the alphabet are as follows:

H(8)	C(3)	?
B(2)	F(6)	E(5)
P(16)	R(18)	T(20)

We can see that in each column the number in the third row is the product of the numbers in the first and second rows.  
 Thus the missing number is  $20/5 = 4$   
 The fourth letter of the alphabet is D.  
 Hence, **option 3**.

18. The final arrangement after all the exchanges will be as follows:

Monday	Tuesday	Wednesday	Thursday
Raj	Jai	Kajal	Farid

$\therefore$  Jai worked on Tuesday.  
 Hence, **option 1**.

19. Consider option 1 - 2,5,7,9.

2	5	7	9
UCE	EXP	AND	RED

If we join 2 and 9, we get REDUCE and if join 5 and 7, we get EXPAND. Reduce and Expand are antonyms.  
 Hence, **option 1**.

20. At 3:10, the hour hand is pointing south. So according to this position, the 9 hour mark is in the North and the 12 hour mark is in the east. The minute hand will point east when it points to the 12 hour mark, which will be after 50 minutes.  
 Hence, **option 3**.

21. The following table can be constructed on the basis of the data given:

Year	Exports	Imports	Difference
2002	110	275	165
2003	150	250	100
2004	150	225	75
2005	200	225	25
2006	175	270	95
2007	200	200	0
2008	275	175	-100
2009	200	175	-25
2010	260	200	-60
2011	250	175	-75
Total	1970	2170	-200

Total Exports is smaller than total imports by:

$$\frac{2170 - 1970}{2170} \times 100 = 9.21\% \approx 9\%$$

Hence, **option 3**.

22. According to the table given in the answer to the first question of the set, the lowest absolute difference is in year 2007 and is equal to 0.  
 The second and third absolute lowest differences are in the years 2005 and 2009 and are equal to 25.  
 The fourth lowest absolute difference is in the year 2010 and is equal to 60.  
 Hence, **option 1**.

**Note:** This question can be answered by simple observation of the graph as well.

23. From the table given in the solution to the first question of the set:

$$\text{Increase in exports in 2003} = \left(\frac{40}{110}\right) \times 100 = 36.36\%$$

$$\text{Increase in exports in 2005} = \left(\frac{50}{150}\right) \times 100 = 33.33\%$$

$$\text{Increase in exports in 2007} = \left(\frac{25}{175}\right) \times 100 = 14.28\%$$

$$\text{Increase in exports in 2008} = \left(\frac{75}{200}\right) \times 100 = 37.50\%$$

$$\text{Increase in exports in 2010} = \left(\frac{60}{200}\right) \times 100 = 30.00\%$$

So the fifth highest percentage increase will be in the year 2007.  
 Hence, **option 1**.

24. There is an increase in imports in only two years.

$$\text{Increase in imports in 2006} = \left(\frac{45}{225}\right) \times 100 = 22.22\%$$

$$\text{Increase in imports in 2010} = \left(\frac{25}{175}\right) \times 100 = 14.28\%$$

So the second highest percentage increase will be in the year 2010.

Hence, **option 1**.

25. Referring to the solutions to the previous questions of the set, the maximum annual percentage increase in exports is in the year 2008 i.e. 37.5%

The minimum annual percentage decrease in imports is in the year 2003 i.e.  $(25/275) \times 100 = 9.09\%$

∴ The difference ≈ 28 percentage points.

Hence, **option 1**.

26.

Year	Aluminium	Coal	Copper	Gold	Iron Ore	Total
2005	69	91	71	15	100	346
2006	75	88	75	18	120	376
2007	81	97	79	21	102	380
2008	98	107	88	25	131	449
2009	93	110	92	24	143	462
2010	99	116	97	20	154	486
2011	105	122	103	25	163	518
Total	620	731	605	148	913	

$$\text{Growth rate in production} = \left(\frac{\text{Difference in production in 2011 and 2005}}{\text{Production in 2005}}\right) \times 100$$

Aluminium	$\left(\frac{3600}{69}\right) > 50\%$
Coal	$\frac{3100}{91} < 50\%$
Copper	$\frac{3200}{71} < 50\%$
Gold	$\frac{1000}{15} = \frac{200}{3} = 66.66\%$
Iron Ore	$\frac{6300}{100} = 63\%$

∴ The maximum growth rate was witnessed by gold.

Hence, **option 3**.

27. From the table given in the solution to the first question of the set, the year 2008 has witnessed the highest absolute increase of  $(449 - 380) = 69$  million tonnes in total production of minerals and metals.

Hence, **option 2**.

28. According to the table given in the solution to the 1<sup>st</sup> question of the set:

$$\text{Iron ore production in 2008 grows by} \left(\frac{29}{102}\right) \times 100$$

$$\approx 29\%$$

$$\text{Gold production in 2011 grows by} \left(\frac{5}{20}\right) \times 100 = 25\%$$

$$\text{Aluminium production in 2008 grows by} \left(\frac{17}{81}\right) \times 100$$

$$< 25\%$$

$$\text{Gold production in 2006 grows by} \left(\frac{3}{15}\right) \times 100 = 20\%$$

Hence, **option 1**.

29. From the table given in the solution to the first question of the set:

Production of Aluminium in 2006 = 75 million tonnes.

Production of Aluminium in 2011 = 105 million tonnes

$$\therefore \text{Growth rate} = \left(\frac{30}{75}\right) \times 100 = 40\%$$

$$\text{Average annual growth} = \frac{40}{5} = 8\%$$

If this rate continues, the production of aluminium in

2015 will be

$$105 + \frac{105 \times 4 \times 8}{100} = 138.6 \text{ million tonnes}$$

The closest option is 140 million tonnes.

Hence, **option 2**.

**Note:** The question does not specify whether simple or compounded average growth is to be considered. If we consider a compounded growth, the annual rate of growth would be

$$\left( \left( \frac{105}{75} \right)^{\frac{1}{5}} - 1 \right) \times 100 = 106, \text{ which is } 6\%$$

The production in 2015 would then be  $105 \times (1.06)^4 = 132.56$ , which is not available in the options.

30. From the table given in the answer to the first question of the set:

Proportion of copper production in each year:

2010	$97/486 < 1/5$
2008	$88/449 < 1/5$
2009	$92/462 < 1/5$
2007	$79/380 > 1/5$

Hence we see that the copper production as a proportion of the total mineral and metal production is maximum in the year 2007.

Hence, **option 4**.

31. By observation we can see that Aluminium, Coal and Copper have grown about 30% from 2006 to 2010, whereas the growth in gold is much less than 30%.

Hence, **option 4**.

32. Even though the question asks for CAGR, we only need to compare percentage growth since the time period is the same for all regions.

Eastern Europe:

$$\frac{227650 - 152764}{152764} = \frac{74886}{152764} \approx 50\%$$

Central & South America:

$$\frac{54728 - 42319}{42319} = \frac{12409}{42319} < 50\%$$

West Asia:

$$\frac{235317 - 171661}{171661} = \frac{63656}{171661} < 50\%$$

South East Asia:

$$\frac{409043 - 303475}{303475} = \frac{105568}{303475} < 50\%$$

Thus Eastern Europe has the highest CAGR.

Hence, **option 1**.

33. A CAGR of 10% for 3 years = a growth which is  $(1.1)^3$  times, or 33.1%

$\therefore$  The difference in the number of tourists in 2010 and in 2007 has to be more than one third of the number of tourists in 2007.

By observation, we can see that this is true only for Eastern Europe, West Asia and South East Asia.

Hence, **option 1**.

34. For Africa the highest annual growth rate is recorded in the year 2010. It is

$$\frac{204525 - 164474}{164474} \times 100 = 24.35\%$$

For Eastern Europe the highest annual growth rate is recorded in the year 2010. It is

$$\frac{227650 - 183475}{183475} \times 100 = 24.07\%$$

For West Asia the highest annual growth rate is recorded in the year 2008. It is

$$\frac{210542 - 171661}{171661} \times 100 = 22.64\%$$

For East Asia the highest annual growth rate is recorded in the year 2010. It is

$$\frac{411947 - 322797}{322797} \times 100 = 27.61\%$$

Hence, highest annual growth is recorded for East Asia.

Hence, **option 4**.

35.

		2006	2007	2008	2009	2010	2011
LCD	Sales	400	500	600	660	700	875
	Production	875	950	1000	950	950	1025
	Exports	475	450	400	290	250	150
LED	Sales	500	450	850	800	900	975
	Production	425	475	500	725	700	825
	Exports	-75	25	-350	-75	-200	-150
Plasma	Sales	825	750	750	650	500	525
	Production	850	750	750	575	575	550
	Exports	25	0	0	-75	75	25
External Trade =  Sales - Production		575	475	750	440	525	325
Net Exports = Exports - Imports		425	475	50	140	125	25

External trade = |Sales - Production|

From the table above, the highest external trade is done in year 2008.

Hence, **option 3**.

36. From the table given in the solution to the first question of the set, net exports are the highest in the year 2007.

Hence, **option 2**.

37. According to the table given in the solution to the first question of the set:

Statement 1 is always true.

Statement 2 is false as the net exports of all the categories of TVs for all the years is 1240.

Statement 3 is also true as the production of plasma TV's fell short of sales only in the year 2009.

Hence, **option 3**.

38. Sales of Figo cars in 2010 =  $\left(\frac{9}{100}\right) \times 80000 = 7200$

$$\begin{aligned} \text{Sales of Figo cars in 2011} &= \left(\frac{44}{360}\right) \times \left(\frac{125}{100}\right) \times 80000 \\ &= 12222 \end{aligned}$$

Hence the increase is the sales is  $12222 - 7200 = 5022$

The closest option is 4860.

Hence, **option 1**.

39. We need to find the number of models for which the sales in 2011 are 25% more than the sales in 2010.

For ease of calculations let us assume that the total sales in 2011 are 360.

$$\text{Then the sales in 2010 are } \frac{360}{1.25} = 288$$

Model	Sales in 2010	Sales in 2011	Percentage increase
Figo	$2.88 \times 9 = 25.92$	44	> 25%
Alto	$2.88 \times 32 = 92.16$	111	< 25%
Swift	$2.88 \times 24 = 69.12$	67	< 25%
i10	$2.88 \times 21 = 60.48$	82	> 25%
Honda City	$2.88 \times 14 = 40.32$	56	> 25%

Hence the sales grew by more than 25% only for three models - Figo, i10 and Honda City.

Hence, **option 2**.

40. We need  $0.0010101 \times 10^k > 1000$

$$\therefore 1010.1 \times 10^{-6} \times 10^k > 1000$$

$$\therefore 1010.1 \times 10^{-6+k} > 1000$$

$$\therefore 1010.1 > 1000, 10^{-6+k} = 1$$

$$\therefore k - 6 = 0$$

$$\therefore k = 6$$

Hence, **option 3**.

41. There are at least three packets of chips in the cupboard. There are 10 packets in all.

$\therefore$  (Number of packets of chips, Number of packets of biscuits)  $\equiv$  (3, 7) or (4, 6) or (5, 5) or (6, 4) or (7, 3) or (8, 2) or (9, 1) or (10, 0)

The number of ways in which three packets of chips can be drawn =  ${}^3C_3 + {}^4C_3 + {}^5C_3 + {}^6C_3 + {}^7C_3 + {}^8C_3 + {}^9C_3 + {}^{10}C_3 = 330$

The number of ways in which three packets of chips can be drawn when there are 9 packets of chips =  ${}^9C_3 = 84$

$$\therefore \text{Required probability} = \frac{84}{330} = \frac{14}{55}$$

Hence, **option 3**.

42.  $7^{x-1} + 11^{x-1} = 170$

WE can see that the RHS is a multiple of 10.

$11^{x-1}$  has 1 in its units place.

$\therefore 7^{x-1}$  should have 9 in its units place.  
 The lowest value for which this is true is  $x = 3$   
 $7^2 + 11^2 = 170$   
 We can see that the for any other value of  $x$ , which is greater than 3,  
 $7^{x-1} + 11^{x-1} > 170$   
 Hence, **option 2**.

**43.** In the given time period, there would be an increase of 18% from 2008-2009, followed by a compounded increase of 18% from 2009-2010, followed by a compounded decrease of 12% from 2010-2011. Finally, there is a compounded increase of 18%.  
 Hence, it is clear that effectively the production has increased. Hence, options 2 and 4 are ruled out.  
 Also, even if the increase is not compounded, there would have been a net increase of  $18 + 18 - 12 + 18 = 42\%$ .  
 Since the increase is compounded, the net effect would be more than 42%.  
 The exact value in 2012, if the base value is  $x$  in 2008 is  $x \times 1.18 \times 1.18 \times 0.88 \times 1.18 = 1.445x$   
 This is an increase of approximately 45%.  
 Hence, **option 3**.

**44.**  $\log(3^x - 2) - \log 3 = \log(3^x + 4) - \log(3^x - 2)$   
 Let  $3^x = t$

$$\therefore \log\left\{\frac{t-2}{3}\right\} = \log\left\{\frac{t+4}{t-2}\right\}$$

$$\therefore \frac{t-2}{3} = \frac{t+4}{t-2}$$

$$\therefore t^2 + 4 - 4t = 3t + 12$$

$$\therefore t^2 - 7t - 8 = 0$$

$$\therefore (3^x - 8)(3^x + 1) = 0$$

Since  $3^x$  cannot be negative,

$$\therefore 3^x = 8$$

$$\therefore x = \log_3 8$$

Hence, **option 2**.

**45.** As there are 5 questions in each section we have three different cases to be considered.

**Case 1:**

3 questions from section 1 and 3 questions from section 2

$$\text{Number of ways} = {}^5C_3 \times {}^5C_3 = 100$$

**Case 2:**

4 questions from section 1 and 2 questions from section 2

$$\text{Number of ways} = {}^5C_4 \times {}^5C_2 = 50$$

**Case 3:**

2 questions from section 1 and 4 questions from section 2

$$\text{Number of ways} = {}^5C_2 \times {}^5C_4 = 50$$

$\therefore$  Total number of ways =  $100 + 50 + 50 = 200$   
 Hence, **option 3**.

**46.** The paper of each student can go to any of the nine professors.

As there are 5 students, there are  $9 \times 9 \times 9 \times 9 \times 9 = 9^5$  ways in which the papers can be checked by the professors.

Now, number of ways of selecting two professors =  ${}^9C_2$   
 The five papers can be checked by the two professors in  $2^5$  ways, but this will contain two ways in which the papers are checked by just one professor.

$\therefore$  The number of ways in which 5 answer sheets are checked by exactly two professors =  ${}^9C_2 \times (2^5 - 2)$

Number of ways in which each paper can be checked by a professor = 2

$\therefore$  Number of ways such that five papers can be checked by those 2 professors =  ${}^9C_2 \times (2^5 - 2)$

$$\therefore \text{Probability} = \frac{{}^9C_2 \times (2^5 - 2)}{9^5} = \frac{40}{2187}$$

Hence, **option 2**.

**47.** Let the amounts invested in fixed deposits X and Y be  $x$  and  $y$  respectively.

$$\therefore x + y = 25000 \quad \dots (i)$$

As the interest at the end of two years is 3518,

$$(1.06)^2x + (1.08)^2y - 25000 = 3518$$

$$\therefore 1.1236x + 1.1664y = 28518 \quad \dots (ii)$$

Solving (i) and (ii),

$$x = 15000$$

Hence, **option 3**.

**48.** Probability that the LPG will last  $\geq 60$  days = 0.8

$$\therefore \text{Probability that the LPG will last} < 60 \text{ days} = 1 - 0.8 = 0.2$$

Probability that the LPG will last  $\leq 90$  days = 0.6

$$\therefore \text{The probability that the LPG will last} \geq 60 \text{ days and} \leq 90 \text{ days will be} = (\text{Probability that a LPG will last} \leq 90 \text{ days}) - (\text{Probability that a LPG will last} < 60 \text{ days}) = 0.6 - 0.2 = 0.4$$

Hence, **option 1**.

**49.** Funds allocated for Research & Development in 2011 = Rs.  $4.5 \times 10^7$

Funds allocated for Research & Development in 2012 = Rs.  $6 \times 10^7$

Difference in the funds = Rs.  $1.5 \times 10^7$

Difference in the funds received by each Department

$$= \frac{1.5 \times 10^7}{2 \times 10^2} = 7.5 \times 10^4$$

Hence, **option 3**.

**50.** Area of a circular field =  $\pi r^2$

Area of tank =  $130 \times 110 = 14300 \text{ m}^2$

$$\therefore \pi r^2 - 14300 = 20350$$

$$\begin{aligned} \therefore \pi r^2 &= 34650 \\ r^2 &= 1575 \times 7 = 225 \times 49 \\ r &= 15 \times 7 = 105 \text{ m} \end{aligned}$$

Hence, **option 3**.

51. Let the height of the cylindrical vessel be  $2h$ .  
 $\therefore$  Radius of the cylindrical vessel is  $3h$ .  
 Also the radius of the hemispherical bowl =  $3h$

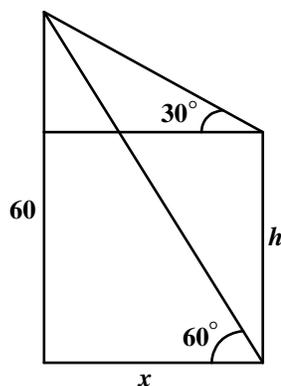
$$\begin{aligned} \therefore \text{Volume of the hemispherical bowl} &= \left(\frac{2}{3}\right) \times \pi \times (3h)^3 \\ &= 18\pi h^3 \end{aligned}$$

$$\begin{aligned} \text{Volume of the cylindrical vessel} &= \pi \times (3h)^2 \times (2h) \\ &= 18\pi h^3 \end{aligned}$$

Hence the cylindrical vessel will be completely filled when the contents are transferred.

Hence, **option 3**.

52.



Let the height of the shorter building be  $h$ .  
 Let the distance between the two buildings be  $x$ .  
 Therefore from the diagram,

$$\tan 60 = \frac{60}{x}$$

$$\therefore x = \frac{60}{\sqrt{3}} = 20\sqrt{3}$$

$$\therefore \tan 30 = \frac{60 - h}{x}$$

$$\therefore 60 - h = 20$$

$$\therefore h = 40$$

Hence, **option 3**.

53. Relative speed of the longer train with respect to the

$$\text{shorter one} = (60 + 48) \times \frac{5}{18} = 30 \text{ m/s}$$

Let the length of the longer train be  $x$  m.

Now the distance travelled by the longer train to cross the shorter train = length of the longer train + length of the shorter train =  $x + x/2 = 3x/2$

The trains cross each other with a speed of  $(60 + 48)$  km/h

$$(60 + 48) \text{ km/h} = (60 + 48) \times \frac{5}{18} = 30 \text{ m/s}$$

Therefore,

$$\frac{3x}{2} = 30 \times 15$$

$$\therefore x = 300 \text{ mts}$$

Let the length of the bridge be  $L$ .

Now total distance covered in crossing the bridge = length of the longer train + length of the bridge =  $300 + L$

$$\therefore 300 + L = 60 \times \left(\frac{5}{18}\right) \times 51 = 850$$

$$\therefore L = 550 \text{ mts}$$

Hence, **option 1**.

54. Let one man complete the piece of work in  $m$  days and let one woman complete the piece of work in  $n$  days.

$$\therefore \frac{12}{m} = \frac{1}{10} \text{ and } \frac{20}{w} = \frac{1}{12}$$

$$\therefore \frac{1}{m} = \frac{1}{120} \text{ and } \frac{1}{w} = \frac{1}{240}$$

Let  $n$  be the number of days after 9 days that the work takes to get over.

$$\therefore 9 \left(\frac{8}{m} + \frac{4}{w}\right) + n \left(\frac{8}{m} + \frac{4}{w} + \frac{10}{w}\right) = 1$$

$$\therefore 9 \left(\frac{1}{15} + \frac{1}{60}\right) + n \left(\frac{1}{15} + \frac{1}{60} + \frac{1}{24}\right) = 1$$

$$\therefore \frac{3}{4} + \frac{15n}{120} = 1$$

$$\therefore n = 2$$

Hence, **option 1**.

55. Let the reduced speed of the train be denoted by  $S$  and the number of wagons attached to it be denoted by  $N$ .

$$\therefore S \propto \sqrt{N}$$

$$\therefore \frac{S_1}{S_2} = \sqrt{\frac{N_1}{N_2}}$$

The speed reduces from 45 km/hr to 30 km/hr with 9 wagons.

$$\therefore \text{The reduction in speed} = S_1 = 45 - 30 = 15 \text{ km/hr}$$

Now, let  $N_2$  number of wagons attached when the train halts completely.

$$\text{Hence, } S_2 = \text{reduction in speed at this point} = 45 - 0 = 45 \text{ km/hr.}$$

$$\therefore \frac{15}{45} = \frac{\sqrt{9}}{\sqrt{N_2}}$$

$$\therefore N_2 = 81 \text{ wagons}$$

Hence, when 81 wagons are attached, the train halts completely. For the train to just move, the number of wagons attached should be 1 less than 81 i.e. 80.

Hence, **option 3**.

56. Let the fixed expenses be  $k$ .  
Let the variable expenses per student be  $m$ .

$$\therefore \frac{20m + k}{20} = 400 \quad \dots (i)$$

$$\frac{40m + k}{40} = 300 \quad \dots (ii)$$

Solving (i) and (ii) simultaneously, we get  $m = 200$  and  $k = 4000$

There average cost for 80 students will be

$$= \frac{80 \times 200 + 4000}{80} = \text{Rs. } 250$$

Hence, **option 1**.

- 57.

	Soap	Toothpaste
Cost Price	$s$	$0.6s$
Number bought	20	12
Profit on each	$0.15s$	20
Number sold	15	8
Number not sold	5	4
Total profit on items sold	$15 \times 0.15s = 2.25s$	160

$$\therefore 2.25s + 160 = 385$$

$$\therefore s = 100$$

Cost of unsold items =  $5s + 4 \times 0.6s = 7.4s = 740$ , which is a loss.

$$\text{Total cost} = 20s + 12 \times 0.6s = 27.2s$$

$$\therefore \text{Overall loss} = 740 - 385 = 355$$

Hence, **option 1**.

58. Let  $x = \sqrt{7 + \sqrt{7 - \sqrt{7 + \sqrt{7 - \dots}}}}$

$$\therefore \sqrt{7 + \sqrt{7 - x}} = x$$

$$\therefore 7 + \sqrt{7 - x} = x^2$$

Substituting the options, only  $x = 3$  satisfies the equation.

Hence, **option 3**.

59. The unit's digit of  $(8267)^{153}$  is same as unit digit of  $7^{153}$ .  
Since cyclicity of 7 is 4 and the remainder obtained when 153 is divided by 4 is 1,

$$\therefore \text{Unit's digit of } (8267)^{153} = \text{unit's digit of } 7^{153} = \text{unit's digit of } 7^1 = 7$$

Similarly,

Unit's digit of  $(341)^{72}$  is same as unit's digit of  $1^{72} = 1$

Hence the unit's digit of the product =  $7 \times 1 = 7$

Hence, **option 3**.

60.  $Z = 31!$

$Z$  is divisible by all numbers less than 32.

$$X = 31! + 1$$

$X + 1 = 31! + 2$ , will be divisible by 2,

$X + 2 = 31! + 3$  will be divisible by 3,

$X + 3 = 31! + 4$  will be divisible by 4 and so on.

Hence none of the numbers will be prime.

Hence, **option 4**.

61. The amount of sugar in the cylinder = 1.5 litres

$$\text{Now, } 1.5 \left\{ 1 - \left( \frac{a}{10} \right)^2 \right\} \text{ is the amount of sugar}$$

left after a litres has been replaced twice.

Now after replacement, sugar left is 10% of the total solution i.e. 10% of 10 litres = 1 litre

$$\therefore 1 = 1.5 \left\{ 1 - \left( \frac{a}{10} \right)^2 \right\}$$

$$\therefore 0.66 = \left\{ 1 - \left( \frac{a}{10} \right)^2 \right\}$$

$$\sqrt{0.66} \approx 0.8$$

$$\therefore 0.8 = 1 - \left( \frac{a}{10} \right)$$

$$\therefore \frac{a}{10} = 0.2$$

$$\therefore a = 2$$

Hence, **option 4**.

62. The number of triangles formed using the 8 points

$$= {}^8C_3 = 56$$

The number of quadrilaterals formed using the 8 points =  ${}^8C_4 = 70$

$$\therefore \text{The difference} = 14$$

Hence, **option 2**.

63. All the three options given satisfy the perimeter criteria. The hypotenuse is the greatest side.

$\therefore$  Option 1 is eliminated.

$$\text{Now, } 97^2 = 9409$$

**Option 2:**

$$97^2 - 72^2 = 4225 = 65^2$$

**Option 3:**

$$97^2 - 80^2 = 3009 \neq 57^2$$

Hence, **option 2**.

64.  $A : B = 3 : 4$ ,  $B : C = 3 : 4$ ,  $C : D = 3 : 4$

$$\therefore A : D = \left( \frac{3}{4} \right)^3 = \frac{27}{64}$$

$$\text{Let } D = 64$$

Then,  $C = 3/4 \times 64 = 48$

$B = 3/4 \times 48 = 36$

$A = 3/4 \times 36 = 27$

$\therefore A : B : C : D = 27 : 36 : 48 : 64$

$\therefore C's \text{ share} = \left\{ \frac{48}{27 + 36 + 48 + 64} \right\} \times 1400 = \text{Rs. } 384$

Hence, **option 4**.

65. Statements I, III and V are interrogative sentences used as examples by the author to explain language devices. They must come together. Statement II with 'examples' follows. Finally, statement IV covers the gist of the examples in I, III and IV and provides for a fitting conclusion. Also, from statement IV, you get the sequence of books, plays and food.  
Hence, the correct answer is **option 4**.
66. Statement II introduces the paragraph with ITCs invaluable lessons. III takes this forward by expanding the 'solutions' aspect mentioned in II. V and IV follow. IV follows V as it has the word 'also'. Finally, I with 'all these help' forms a fitting conclusion.  
Hence, the correct answer is **option 4**.
67. In B, the adverb 'gradually' has been placed incorrectly before 'thought' instead of 'spread'. In C, 'an orderly process' has been incorrectly attributed to 'thought'. The error found in statement C is also there in statement D.  
Hence, the correct answer is **option 1**.
68. In A and D, there is an error in parallelism. "...can be TAKING.....as on PUTS...." Both verbs should be in the same form- either infinitive or present participle. In B, there is an error in pronoun. In all places, the pronoun 'one' is used and in the last line the pronoun "' THEY' put into them" is used.  
Hence, the correct answer is **option 3**.
69. Indefatigable means persisting tirelessly and inveterate means having a particular habit, activity, or interest that is long-established and unlikely to change. This is given directly in option C.  
Hence, the correct answer is **option 3**.
70. Misanthrope is someone who hates human beings in the same way a misogynist hates women. A chauvinist is someone who is highly patriotic. An agnostic is one who believes that it is impossible to know whether there is a God. A witch practices or believes in magic.  
Hence, the correct answer is **option 2**.
71. The meanings of the words are as follows:  
Arrogate - to attribute or assign to another; ascribe  
Arraign - to call or bring before a court to answer to an indictment  
Chagrin- marked by disappointment or humiliation  
Conscript - to compel into service  
Vacillate - to oscillate or fluctuate  
Hence, the correct answer is **option 2**.
72. The meanings of the words are as follows:  
Ephemeral - lasting a very short time; short-lived  
Ethereal - Highly refined; spiritual  
Aperitif - a small drink of alcoholic liquor taken to stimulate the appetite before a meal  
Candour - the quality of being open and honest; frankness  
Chimera - dream, fantasy, delusion  
Hence, the correct answer is **option 4**.
73. In sentence A the pronoun 'their' is incorrect. It should be 'his' to complement the subject 'each of the boys'. In B 'his' should be replaced by 'one's'. In C, 'either' should be followed by the singular pronoun 'his'. D is constructed correctly.  
Hence, the correct answer is **option 4**.
74. In B, the conditional tense with 'would' in the first part is constructed incorrectly. In C the first part should be 'When you come to see me..' In D, the placement of 'both' is incorrect. It should be placed after 'to'. Here, the 'both' is attributed to 'two letters' or 'two documents'. Statement A is constructed correctly.  
Hence, the correct answer is **option 1**.
75. 'Between' is used with two people. Above two, the relationship is conveyed with the word 'among'. B and C are ruled out. 'Since' is used to indicate from then till now; between a particular past time and the present and 'From' is used to indicate source or origin: to come from the Midwest, start from January.  
Hence, the correct answer is **option 4**.
76. 'By dint of' means because of something; due to the efforts of something and is best suited for sentence 1. 'By virtue of' means 'because of something; due to something'. 'In consequence of' means by reason of; as the effect of. It is best suited for sentence 3. 'In case of' means 'if there should happen to be.' These phrases are best arranged in option B.  
Hence, the correct answer is **option 2**.
77. Metaphor is a figure of speech in which a term or phrase is applied to something to which it is not literally applicable in order to suggest a resemblance. It is an indirect comparison. In statement D, an indirect comparison is made between him and a lion.  
Hence, the correct answer is **option 4**.
78. An oxymoron is a figure of speech/an epigrammatic effect, by which contradictory terms are used in conjunction: living death; fiend angelica. This is seen in sentence A with 'kind cruelty'.  
Hence, the correct answer is **option 1**.

79. Puerile means 'youthful, juvenile or silly'. The antonym or opposite for this is 'adult'. Servile means being in slavery; oppressed. Ambiguous means unclear.  
Hence, the correct answer is **option 1**.
80. Prosaic means 'commonplace or dull'. Its antonym or opposite is 'interesting'. Mundane means ordinary and predisposed means to make (someone) inclined to something in advance.  
Hence, the correct answer is **option 3**.
81. The correct spelling is 'exorbitant' and it means 'inordinate, outrageous, extreme or extravagant'.  
Hence, the correct answer is **option 1**.
82. The correct spelling is 'acquiescence' and it means 'the act or condition of acquiescing or giving tacit assent; agreement or consent by silence or without objection.'  
Hence, the correct answer is **option 2**.
83. Perilous, precarious and hazardous are synonyms meaning 'dangerous'. Copious means 'abundant' and is the odd one out.  
Hence, the correct answer is **option 4**.
84. Propitiate, Appease and Conciliate are synonyms meaning 'satisfy/pacify'. Appreciate means 'to value someone or something.'  
Hence, the correct answer is **option 2**.
85. The third paragraph of the passage mentions, "Profit is not the explanation, cause or rationale.....but rather the test of their validity."  
Hence, the correct answer is **option 3**.
86. The sixth paragraph mentions "It (theory of profit maximisation and profit motive) is largely responsible for the worst mistakes of public policy."  
Hence, the correct answer is **option 1**.
87. The seventh paragraph states, "There is only one valid definition of business purpose: to create a customer"  
Hence, the correct answer is **option 3**.
88. Look at the last paragraph. The passage states, ".....it remained a potential want until the action of business people converted it into effective demand. Only then is there a customer and a market."  
Hence, the correct answer is **option 1**.
89. Vapid means 'Offering nothing that is stimulating or challenging'. Lackluster means the same.  
Hence, the correct answer is **option 3**.
90. The first few paragraphs talk about the teacher. The fourth paragraph mentions mother in detail. The fifth paragraph mentions 'grandmother' only once - "...silver sugar bowls from my grandmother's ..." The last paragraphs mention classmates.  
Hence, the correct answer is **option 3**.
91. The third paragraph mentions that the author's father was not an authority figure and that his mother 'was hardly an alien or distant tyrant.'  
Hence, the correct answer is **option 3**.
92. The last paragraph mentions, "... there was rumoured to be a dentist.....to send naughty children there."  
Hence, the correct answer is **option 4**.
93. The first paragraph mentions, "...time for Kaun Banega Crorepati had come and gone." This supports statement 1. It also mentions, "It had no backbiting intrigue.....nothing ever needed to be beeped out on it...." which supports statement 2. The other two statements do not find support in the passage.  
Hence, the correct answer is **option 2**.
94. The second paragraph mentions, "...but as an idea that connects with something deep and real in our lives"  
Hence, the correct answer is **option 4**.
95. The third paragraph mentions, "...not as a jackpot but as a vardan, a gift from divinity that comes for one's persistent effort, a prize for the penance called ordinary life."  
Hence, the correct answer is **option 3**.
96. The last paragraph mentions, "As the winners no doubt find out, one can never have enough money..."  
Hence, the correct answer is **option 1**.
97. The first paragraph mentions, "The warm rains had been falling.....no promise for relief." The paragraph ends with ".....soggy ground and overflowing water channels only depressed him."  
Hence, the correct answer is **option 3**.
98. The second paragraph mentions points A and D. The third paragraph mentions point C. The first paragraph mentions that even the garden could not pull out Babur from his depression. It does not mention Babur's effort to go to the garden.  
Hence, the correct answer is **option 2**.
99. The last paragraph states, "But he had never thought that Humayun - so healthy and strong- might succumb to sickness."  
Hence, the correct answer is **option 4**.
100. The third paragraph mentions 'shrewd and subtle minded' as adjectives for Humayun. The last paragraph mentions 'healthy and strong' as well as 'beloved'. The passage does mention 'neatly turbaned head' but in the context of Abdul-Malik.  
Hence, the correct answer is **option 3**.

