

TCS NQT

Verbal ability

Reading comprehension

(1-7) Directions: Read the following passage carefully and answer the questions.

It seems today the mistrust of official health advice and spread of “alternative” treatments for COVID-19 are as frightening as the virus itself. How is it that so many people are ill-informed (and seemingly choose to be so) about the pandemic, despite decades of compulsory science education? Of course we are entering an era in which fake news and conspiracy theories proliferate, while many have contempt for scientific facts. But a deeper problem lies in the way we teach science. Our curriculum and instruction are still driven by content mastery and high-stakes testing, which has alienated many young people from scientific ideas. Students are taught isolated and impersonal facts without understanding the history and processes of how scientists know what we know. The Australian Curriculum defines scientific literacy as an ability to use scientific knowledge, understanding, and inquiry skills to identify questions, acquire new knowledge, explain science phenomena and draw evidence-based conclusions in making sense of the world, and to recognise how understandings of science help us make responsible decisions and shape our interpretations of information. While laudable as an educational goal, scientific literacy is seldom emphasised in practice. We need to do more to promote it in primary and secondary schools.

The problem with people’s mistrust of science has little to do with their actual intelligence or overall education. After all, some educated people still believe the Earth is flat, and climate change is contentious. Getting someone to accept a new idea goes beyond the brain to a broader consideration of the person’s social, cultural and emotional factors. American social psychologist Jonathan Haidt used a rider and elephant analogy to explain why we are resistant to new ideas and beliefs. The rider is the rational side of our mind while the elephant is the unconscious and emotional side. To change a person’s view, it is useless to focus on the rider without addressing the elephant. Science is full of strange ideas that are sometimes at odds with common sense, such as matter being made of moving atoms, or time being relative. Teaching these ideas as facts is like targeting the rider. Many educational theorists have long argued the idea knowledge could somehow be “transferred” from teachers and textbooks to

students is untenable. The students will still interpret the taught content through a conceptual framework of prior knowledge and beliefs. Years of research in science education has found teaching facts alone is an ineffective strategy when trying to change a person's ingrained misconceptions or "alternative theories".

Scientific theories are built on evidence through the process of argumentation. Every fact and theory taught in the curriculum should be questioned and tested with evidence. Students should ideally observe or collect data for themselves. Repeatedly asking students to question every fact will instil a lifelong value of critical literacy in science. It is crucial for young people to always evaluate the source of information and discern false claims that are not backed by empirical evidence. Science should also be taught as a dialogue within a community of people. This is the human side of science where ideas are discussed, argued and negotiated in the process of building consensus. Mirroring this process, students must be given opportunities to practise evidence-based argumentation. Their innate theories about the world should be elicited and compared with accepted scientific theories, so students can see their relative merits and suitability in addressing a particular phenomenon or problem. Last but not least, emotions play a big part in science learning. Scientific issues that represent social concerns (such as the lockdown) and problems related to science and technology (the 5G network) can evoke a range of emotions among students. It is important to acknowledge students' emotions as they deal with the moral and ethical issues in these ideas. Controversial issues provide not only an authentic learning context, but are also excellent topics for debate and argumentation.

1. What is the primary purpose of the author of the passage?

A -

to highlight the poor quality of science education in Australia

B -

to highlight the rise in fake news and propaganda

C -

to highlight the shortcomings in the ways in which science is taught

D -

to highlight the fall in the interest of students towards scientific fields

Solution

(c) is the right answer. The author seeks to focus on the importance of scientific literacy. It is a skill that is necessary to deal with various issues pertaining to our world. He has highlighted the shortcomings in the current method of science education and talked about ways to overcome them.

A is incorrect as the passage does not focus on quality of science education.

B is incorrect as it is not the main idea of the passage.

D is incorrect because this is not something that has been discussed in the passage.

E is incorrect because the passage does not discuss science but scientific literacy.

2. What are the problems associated with the way science is being taught?

1. Students are taught facts rather than processes through which they can be established.

2. The curriculum is dominated by a sole focus on learning the content.

3. Tests conducted to assess scientific aptitude have distanced the youth from scientific ideas.

A -

Only 1

B -

Only 2

C -

Only 2 and 3

D -

All 1, 2 and 3

Solution

(d) is the right answer. All the three options have been explicitly mentioned in the first paragraph of the passage. Refer to the lines: *Our curriculum and instruction are still driven by content mastery and high-stakes testing, which has alienated many young people from scientific ideas. Students are taught*

isolated and impersonal facts without understanding the history and processes of how scientists know what we know.

3. Which of the following statements best sums up the main idea behind the rider and elephant analogy?

A -

In order to cultivate scientific temperament, we need to focus more on engaging with the rational side of our brains.

B -

Some human beings are more emotional than others.

C -

The rational side of the human brain tends to overpower the emotional side at times of conflict.

D -

Scientific literacy should focus on both reason as well as emotion.

Solution

(d) is the right answer. Refer to the lines: *American social psychologist Jonathan Haidt used a rider and elephant analogy to explain why we are resistant to new ideas and beliefs. The rider is the rational side of our mind while the elephant is the unconscious and emotional side. To change a person's view, it is useless to focus on the rider without addressing the elephant.* Clearly, the idea behind the analogy is to highlight the change that needs to be made in teaching scientific literacy. Facts focus on the rational side of our brains; they ignore the emotional side. We need to focus on both reason and emotion. A, B and C are incorrect as they do not cover the analogy. E is incorrect as it talks about the meaning of the analogy in a very literal way.

4. What are the steps suggested by the author of the passage to bolster scientific literacy?

1. Science should be taught at an individual level

2. Teaching the students the habit of questioning every fact

3. Allowing the students to observe and collect data

A -

Only 1

B -

Only 1 and 2

C -

Only 1 and 3

D -

Only 2 and 3

Solution

(d) is the right answer. Both (2) and (3) have been mentioned in the passage. Refer to the lines: *Every fact and theory taught in the curriculum should be questioned and tested with evidence. Students should ideally observe or collect data for themselves. Repeatedly asking students to question every fact will instil a lifelong value of critical literacy in science.*

(1) is incorrect. Refer to the lines: *Science should also be taught as a dialogue within a community of people. This is the human side of science where ideas are discussed, argued and negotiated in the process of building consensus.*

5. Based on the information given in the passage, it is clear that

A -

when issues evoke emotions, the debate is likely to be polarised.

B -

teaching students how to think critically is more important than teaching them any other skills

C -

students need to develop their perspectives by questioning their intuitive understanding and contrasting them with scientific theories.

D -

controversial issues should not be discussed in the public domain as most people get emotional and lose their objectivity

Solution

(c) is the right answer. Refer to the lines: *Mirroring this process, students must be given opportunities to practise evidence-based argumentation. Their innate theories about the world should be elicited and compared with accepted scientific theories, so students can see their relative merits and suitability in addressing a particular phenomenon or problem.* The passage clearly states that students need to question their “innate theories”, which basically means the things they inherently believe and they need to develop a holistic understanding by comparing them to scientific theories.

A and D are incorrect. Refer to the lines: *Controversial issues provide not only an authentic learning context, but are also excellent topics for debate and argumentation.*

B is incorrect as the passage does not talk about prioritising scientific literacy over other skills.

6. Which of the following is closest in meaning to the word ‘contentious’ as used in the passage

A -
frenetic

B -
acute

C -
categorical

D -
controversial

Solution

(d) is the right answer. A contentious issue causes a lot of disagreement or arguments. CONTROVERSIAL is the synonym.

Frenetic(adj.)- fast and energetic in a rather wild and uncontrolled way.

Acute(adj.)- (of an unpleasant or unwelcome situation or phenomenon) present or experienced to a severe or intense degree.

Categorical(adj.)- definite

Timid(adj.)- showing a lack of courage or confidence; easily frightened.

7. Which of the following is the opposite in meaning to the word '*seldom*' as used in the passage

A -
enamoured

B -
often

C -
intrinsically

D -
assiduously

Solution

(b) is the right answer. If something SELDOM happens, it happens only occasionally. OFTEN is the antonym.

Enamoured(v.)- to have a liking or admiration for someone.

Intrinsically(adv.)- in an essential or natural way.

Assiduously(adv.)- with great care and perseverance.

Looming(adj.)- likely to happen.

Column 1 & column @ connecting sentences

8. In the following question, match the sentences beginning in Column 1 with their appropriate endings in Column 2.

Column 1	Column 2
A. The October Revolution of 1917 profoundly influenced the	D. course of the Indian freedom movement in multiple ways.

B. A cold war between the United States and China would leave	E. both countries and the world worse off.
C. Before COVID-19 shut down entire sectors of the US economy, the US workforce was	F. becoming increasingly polarized along educational, racial, and geographic lines.

A -

C and D

B -

A and E

C -

A and D

D -

B and F

Solution

(c) is the right answer. The correct pairs are AD, BE and CF.

AD- A establishes the subject: October Revolution. It talks about its impact. D concludes the sentence by telling us that the revolution had an impact on Indian freedom movement.

BE- B establishes the subject: Cold war. It talks about the cold war between the US and China. E concludes the sentence by telling us that the tension because of the cold war between the two countries would negatively affect the entire world. This pair is not given in the options.

CF- C establishes the subject: shutdown due to COVID-19. It tells us that something was happening to the US workforce even before the shutdown was enforced in the US. F concludes the sentence by telling us that the workforce was being polarised along different lines. This pair is not given in the options.

Column 1 & column @ connecting sentences

9. In the following question, match the sentences beginning in Column 1 with their appropriate endings in Column 2.

Column 1	Column 2
A. In addition to disrupting the economy, the COVID-19 pandemic is also	D. others in managing the COVID-19 pandemic and staging a robust economic recovery.
B. Sustainable human development can only be built	E. derailing educational opportunities for millions of the world's poorest
C. The latest economic and public-health indicators show that South Korea is far ahead of most	F. on a foundation of quality education.

A -

C and F

B -

A and E

C -

A and D

D -

B and E

Solution

(b) is the right answer. The correct pairs are AE, BF and CD.

AE- A establishes the subject: The impact of COVID-19 pandemic. A tells us that the economy is not the only sector that has been affected by the COVID-19 pandemic. E concludes the sentence as it tells us that COVID-19 pandemic has affected the education of millions of the world's poorest.

BF- B establishes the subject: Sustainable development. It talks about one of the components of sustainable development. F concludes the sentence by telling us that quality education is important for achieving sustainable development. This pair is not given in the options.

CD- C establishes the subject: South Korea. It tells us that economic and public-health indicators show that South Korea is doing better than most countries. D concludes the sentence by telling us what the indicators show. The indicators

point out that South Korea has fared better than most other countries in the fight against COVID-19. This pair is not given in the options.

Column 1 & column @ connecting sentences

10. In the following question, match the sentences beginning in Column 1 with their appropriate endings in Column 2.

Column 1	Column 2
A. Digital technology was not invented to tackle inequality, and there is even a	D. possible ways to narrow the opportunity gap.
B. As the case of China illustrates, digital platforms offer many	E. have unequal educational or financial starting points.
C. People born into different economic and social statuses	F. risk that it could widen existing economic and social disparities.

A -
C and D

B -
A and E

C -
A and D

E -
C and E

Solution

(d) is the right answer. The correct pairs are AF, BD and CE.

AF- A introduces the subject: Digital technology. It tells us that the objective behind the invention of digital technology was not to fight inequality. F concludes the sentence by telling us that there is a chance that digital technology may worsen economic and social disparities. This pair is not given in the options.

BD- B establishes the subject: China. It talks about digital platforms in China. D concludes the sentence by telling us that these platforms offer access to various opportunities which were not available to the people before. This pair is not given in the options.

CE- C tells us that the sentence talks about the impact of economic and social statuses. E concludes the sentence by telling us that these factors matter as people have different starting points, which means that they have unequal access to educational and financial resources.

Error location

11. In the following question, a sentence is given, divided into 5 parts. Part (E) is grammatically correct. Out of the other four parts, one part has an error. Mark the option containing the part with the error. If none of the parts have errors, mark 'No error' as your answer.

As the gate of the elephant yard (A)/ lifted, a keeper admonished (B)/ everyone to stood farther back, (C)/ even though there were bars (D)/ **separating us from the animals. (E)**

A -

A

B -

B

C -

C

D -

D

Solution

In C, replace the second form verb STOOD with STAND as the infinitive construction TO + VERB will take the base form of the verb. Thus, (c) is the right answer.

Error location

12. In the following question, a sentence is given, divided into 5 parts. Part (E) is grammatically correct. Out of the other four parts, one part has an error. Mark the option containing the part with the error. If none of the parts have errors, mark 'No error' as your answer.

Poachers, whom are primarily (A)/ interested in ivory, do (B)/ not hunt Asian elephants (C)/ with the same avarice they (C)/ **show African elephants. (E)**

A -

D

B -

B

C -

C

D -

A

Solution

In A, replace the object pronoun WHOM with the subject pronoun WHO as it is being used to refer to the subject of the sentence POACHERS. Thus, (d) is the right answer.

Error location

13. In the following question, a sentence is given, divided into 5 parts. Part (E) is grammatically correct. Out of the other four parts, one part has an error. Mark the option containing the part with the error. If none of the parts have errors, mark 'No error' as your answer.

Environmental advocates and others (A)/ were alarm when Brazilian (B)/ President Jair Bolsonaro announced plans (C)/ to rebuild the road in order (C)/ **to spur economic development. (E)**

A -

A

B -

B

C -

D

D -

C

Solution

In B, replace the verb ALARM with the adjective ALARMED as it is being used to modify the subject ENVIRONMENTAL ADVOCATES AND OTHERS. Thus, (b) is the right answer.

Error location

14. In the following question, a sentence is given, divided into 5 parts. Part (E) is grammatically correct. Out of the other four parts, one part has an error. Mark the option containing the part with the error. If none of the parts have errors, mark 'No error' as your answer.

Evidence is mounting that (A)/ Neanderthals had a complex language (B)/ and even, given the care (C)/ with which they buried their (D)/ **dead, some form of spirituality. (E)**

A -

B

B -

C

C -

D

D -

No error

Solution

The sentence is grammatically correct and free of error. Thus, (d) is the right answer.

Jumbled sentences

15. In the question given below, rearrange the parts of the sentence in the correct order, and choose the correct option.

since the first eggs laid on land (A)/ thicker, harder shells that prevented moisture loss (B)/ of birds and reptiles started laying eggs with (C)/ were vulnerable to drying out, the ancestors (D)

A -

ACDB

B -

ADCB

C -
BADC

D -
BCAD

Solution

ADCB is the final order. A begins the sentence by introducing the surrounding context, and telling us about the first eggs laid by animals on land. D continues by telling us how these eggs were vulnerable to drying out. D also establishes the subject - the ancestors. C follows with the verb stem, and tells us what the ancestors of birds and reptiles began to do - laying eggs with thick and hard shells (continued by B). Thus, (b) is the right answer.

Jumbled sentences

16. In the question given below, rearrange the parts of the sentence in the correct order, and choose the correct option.

with jungle zip-lining, white-water rafting (A)/ and fire spewing from the (B)/ Arenal volcano, Costa Rica offers plenty (C)/ of thrilling adventures and sights (D)

A -
ADBC

B -
ABDC

C -
CDBA

D -
No rearrangement required

Solution

ABCD is the final order. AB begins the sentence as a pair, by telling us the activities that Costa Rica offers - jungle zip lining, rafting and volcanic sights. C follows by establishing the subject - Costa Rica. D concludes with the verb stem by telling us how this nation offers adventures and sights. Thus, (d) is the right answer.

Jumbled sentences

17. In the question given below, rearrange the parts of the sentence in the correct order, and choose the correct option.

there is still some mystery left to discover (A)/ to the extent that unmanned aerial vehicles (B)/ can be sent anywhere on the planet, (C)/ though we may have mastered the skies (D)

A -
CBDA

B -
DBCA

C -
DACB

D -
CDAB

Solution

DBCA is the final order. D begins the sentence by establishing the surrounding context - we have mastered the skies. BC follows as a pair by giving evidence of this - unmanned aerial vehicles can be sent anywhere on the planet. A concludes by telling us that there is still much to be discovered. Thus, (b) is the right answer.

Jumbled sentences

18. In the question given below, rearrange the parts of the sentence in the correct order, and choose the correct option.

the only area where advancements in flight (A)/ while drone technology may seem to be (B)/ are being made, many researchers remain fascinated (C)/ by something that seems much simpler: bird flight (D)

A -
BACD

B -
DCBA

C -
BDAC

D -
DBCA

Solution

BACD is the final order. B begins by establishing the surrounding context - drone technology. A follows by telling us how it is the only area where advancements in flight are being made. C follows with the subject - many researchers. D tells us of something else that is fascinating to these researchers - bird flight. Thus, (a) is the right answer.

Phrasal verbs/idioms

19. In the following question, a sentence is given with a phrase or idiom in brackets. Select the option given below that can replace the bracketed phrase.

In many places, bigger animals have already been (wiped off) by humans.

A -
wipe away

**B -
wiped out**

C -
wiped in

D -
No Improvement

Solution

We need a phrase in the past participle form as the present perfect tense construction HAVE + VERB has been used here. The phrase WIPED OUT means to destroy completely. The sentence talks about how larger animals have been destroyed by humans. Thus, (b) is the right answer.

WIPE OFF means to erase, WIPE AWAY is in the incorrect tense, and WIPED IN is grammatically wrong.

Direct / indirect speech

20. In the following question, a sentence has been given in Direct/ Indirect speech. Out of the four alternatives suggested, select the one which best expresses the same sentence in Direct/ Indirect speech.

"Do you have the enough money for the dress?" I said to her.

A -

I asked her if she had enough money for the dress.

B -

I asked her do you have enough money for the dress.

C -

I asked her did she have enough money for the dress.

D -

I asked her if she has enough money for the dress.

Solution

Option (a) is the right answer. The sentence is in direct speech and in interrogative mood. To convert this sentence to the indirect speech, follow these rules: 1. Remove the comma and the inverted commas. 2. Change the reporting verb SAID to ASKED. The preposition TO is redundant after ASKED, so it will be removed. Begin the indirect speech sentence with the reporting speech clause I ASKED HER. 3. Put IF between the reporting and reported speeches. 4. The second person subjective pronoun YOU will change to the third person subjective SHE. 5. The simple present tense DO YOU HAVE will change to the simple past SHE HAD. 6. Use the indicative mood syntax: Reporting speech clause (I ASKED HER) + preposition (IF) + Subject (SHE) + verb clause (HAD) + Object (ENOUGH MONEY FOR THE DRESS).

Active voice/passive voice

21. In the following question, a sentence has been given in Active/ Passive Voice. Out of the four alternatives suggested, select the one which best expresses the same sentence in Passive/Active Voice.

Immigrant workers face a lot of stereotypes in the industry.

A -

A lot of stereotypes are being faced by immigrant workers in the industry.

B -

A lot of stereotypes are faced by immigrant workers in the industry.

C -

A lot of stereotypes face immigrant workers in the industry.

D -

A lot of stereotypes were being faced by immigrant workers in the industry.

Solution

The sentence is in active voice and in simple present tense (face). Follow the rules below to convert a sentence in indicative mood to passive voice:

1. The subject clause will become the object clause. Here, the subject (IMMIGRANT WORKERS) will change to the object of the verb, and the object (A LOT OF STEREOTYPES) will change into the subject and begin the sentence.
2. Replace FACE with ARE FACED. The passive voice construction for simple present tense is "is/ are + past participle".
3. Add the conjunction BY before IMMIGRANT WORKERS to link the verb with its object.

Option (b) is the right answer.

Active voice/passive voice

22. In the following question, a sentence has been given in Active/ Passive Voice. Out of the four alternatives suggested, select the one which best expresses the same sentence in Passive/Active Voice.

The ball was caught by the fielder.

A -

The fielder had been catching the ball.

B -

The fielder had caught the ball.

C -

The fielder has caught the ball.

D -

The fielder caught the ball.

Solution

The sentence is in indicative mood and passive voice. Follow the rules below to convert a sentence in indicative mood to active voice:

1. The subject clause will become the object clause. Here, the subject THE BALL will change to the object of the verb, and the object THE FIELDER will change into the subject and begin the sentence.

2. Replace WAS CAUGHT with CAUGHT.

4. Remove the conjunction BY before THE FIELDER.

Option (d) is the right answer.

Spelling test

23. In the following question, four different spellings of a word are given, out of which only one is correct. Find the correct spelling of the given word.

A -

Qurious

B -

Curious

C -

Quorious

D -

Kurious

Solution

The correct spelling is 'curious' and its meaning is "eager to know or learn something". Thus, (b) is the correct answer.

Antonyms

24. In the following question, choose the word opposite in meaning to the given word.

Vague

A -

Different

B -

Specific

C -

Similar

D -

Calm

Solution

'Vague' means indefinite or unclear. Its antonyms are specific, specialised, clear, etc. Thus, (b) is the correct answer.

Reasoning ability

Distance & direction

(25-26) Directions: Answer the questions based on the information given below.

Eight persons are sitting at different places such that D is 6m north of A, who is 8m west of C. E is 12m east of B, who is 6m south of G. H is 4m south of C. F is 10m north of E. F is exactly between A and C.

25. What is the direction of C with respect to G?

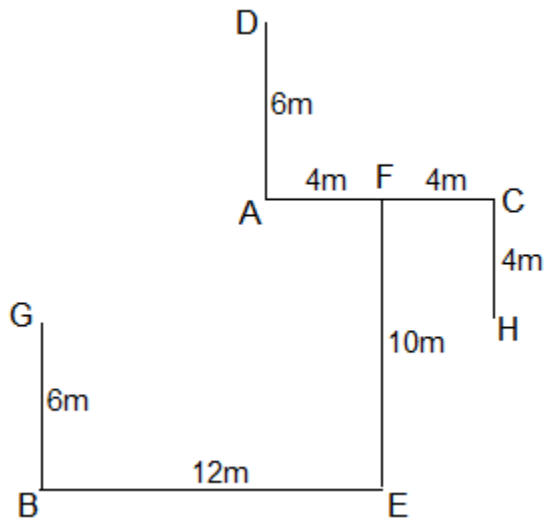
A -
South west

B -
North east

C -
North west

D -
East

Solution



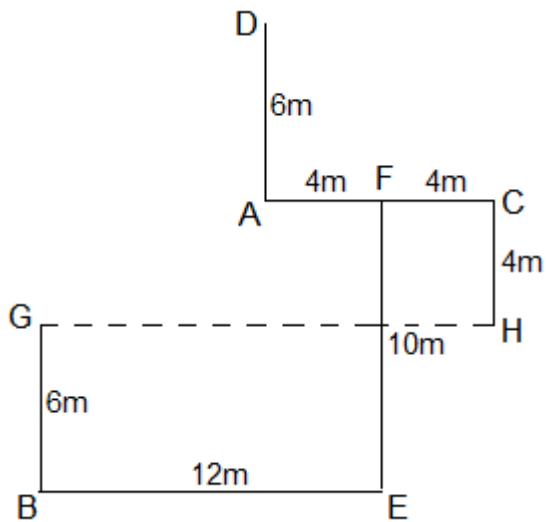
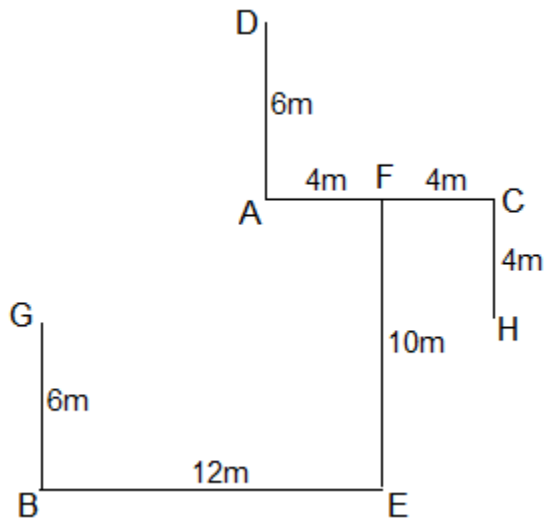
C is to the north east of G.

Hence, option b.

26. What is the shortest distance between G and H?

- A - 15m
- B - 16m
- C - 18m
- D - 20m**

Solution



The shortest distance between G and H is $(12 + 4) = 16\text{m}$

Hence, option b.

Logical inequalities

27. In the question, assuming the given statements to be true, find which of the conclusion (s) among given three conclusions is /are definitely true and then give your answer accordingly.

Statements: $V < Q \leq D$; $A < V$; $R < D \geq S$

Conclusions:

I. $S < V$

II. $A < D$

III. $R < Q$

A -

Only conclusion II is true.

B -

Only conclusions I and II are true.

C -

Only conclusions II and III are true.

D -

Only conclusion I is true.

Solution

Given statements: $V < Q \leq D$; $A < V$; $R < D \geq S$

On combining, we get

$A < V < Q \leq D > R$; $S \leq D \geq Q > V$

Conclusions:

I. $S < V$: False (As $S \leq D \geq Q > V$, relation between S and V can't be determined)

II. $A < D$: True (As $A < V < Q \leq D$, so $A < D$)

III. $R < Q$: False (As $Q \leq D > R$, relation between R and Q can't be determined)

Hence, option a.

Blood relations

(28-29) Directions: Answer the questions based on the information given below.

There are six members C, D, K, L, M and R in a family, which consists of three generations. There are two couples in the family.

R is the father of C, who is the father of M. C has no brother. K is the mother-in-law of D.

Neither D nor M is male. L is the sister of C.

28. How is L related to D?

A -

Aunt

B -
Sister

C -
Daughter

D -
Sister-in-law

Solution

Clues:

R is the father of C, who is the father of M. C has no brother. L is the sister of C. K is the mother-in-law of D. Neither D nor M is male member.

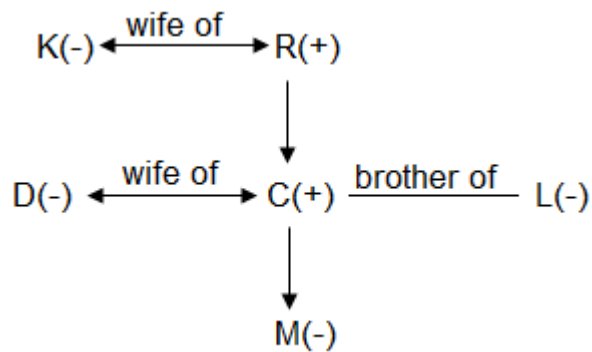
Inference:

K is the wife of R.

D is the wife of C.

L is the paternal aunt of M.

The family tree:



L is the sister-in-law of D.

Hence, option d.

29. How is M related to D's husband?

A -
Daughter

B -
Sister

C -
Grand Daughter

D -
Niece

Solution

Clues:

R is the father of C, who is the father of M. C has no brother. L is the sister of C. K is the mother-in-law of D. Neither D nor M is male member.

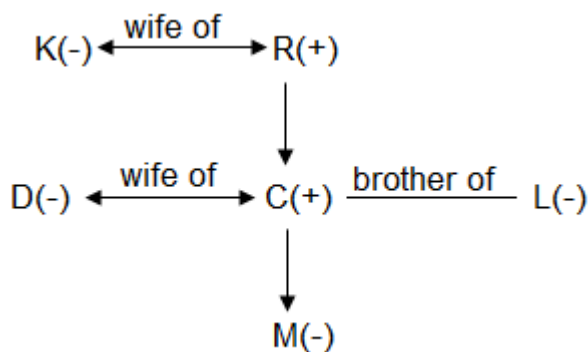
Inference:

K is the wife of R.

D is the wife of C.

L is the paternal aunt of M.

The family tree:



C is D's husband.

M is the daughter of C.

Hence, option a.

Logical inequalities

30. In the question, assuming the given statements to be true, find which of the conclusion (s) among given three conclusions is /are definitely true and then give your answer accordingly.

Statements: $T < M \leq Q$; $D < R$; $S \geq M$; $T < A < D$

Conclusions:

I. $R > T$

II. $S > A$

III. $D > M$

A -

Only conclusion II is true.

B -

Only conclusions I and II are true.

C -

Only conclusions II and III are true.

D -

Only conclusion I is true.

Solution

Given statements: $T < M \leq Q$; $D < R$; $S \geq M$; $T < A < D$

On combining, we get

$S \geq M > T < A < D < R$; $Q \geq M > T < A < D$

Conclusions:

I. $R > T$: True (As $T < A < D < R$, so $R > T$)

II. $S > A$: False (As $S \geq M > T < A$, relation between S and A can't be determined)

III. $D > M$: False (As $M > T < A < D$, relation between D and M can't be determined)

Hence, option d.

Alphabet test

31. How many pairs of letters are there in the word "LANGUETS" which has as many letters between them in the word as in the alphabet?

A -

Four

B -
Three

C -
Five

D -
More than Five

Solution

Given: LANGUETS

LN, LS, AE, NS, EG and ST are the six pairs which have as many letters between them in the word as in the alphabet.

Hence, option d.

Circular sitting arrangement

(32-36) Directions: Answer the questions based on the information given below.

Eight students A, B, C, D, E, O, P and Q sit around a circular table equidistant from each other such that students, whose name starts with a vowel, face towards the centre while others face outside. Five of them have different ranks 1, 2, 3, 4 and 5 in a class test.

B sits 2nd to the left of D. Student, whose rank is 5, sits adjacent to B. C sits opposite to the one, whose rank is 5. O sits adjacent to C. Student, whose rank is 3, sits 2nd to the right of O. A sits immediate left of Q. P sits 2nd to the right of E but doesn't have any rank. B's rank is one more than the person, who sits to the immediate left of P. Neither C nor D has rank 4.

32. Who sits immediate right of the person, whose rank is 1?

A -
C

B -
Q

C -
B

D -

D

Solution

Starting Point: First we shall try to place B and D, and then proceed by placing the student, whose rank is 5, so as to get only two cases.

Clues:

B sits 2nd to the left of D.

Student, whose rank is 5, sits adjacent to B.

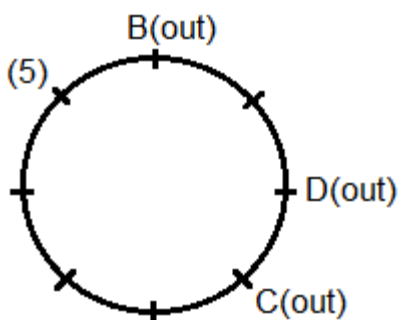
C sits opposite to the one, whose rank is 5.

Inference:

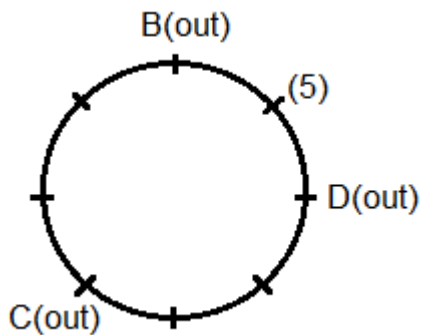
Student, whose rank is 5, sits either immediate left of B or immediate right of B.

C sits immediate right of D or 3rd to the right of D.

Case I: Student, whose rank is 5, sits immediate left of B:



Case II: Student, whose rank is 5, sits immediate right of B:



Clues:

O sits adjacent to C.

Student, whose rank is 3, sits 2nd to the right of O.

P sits 2nd to the right of E but doesn't have any rank.

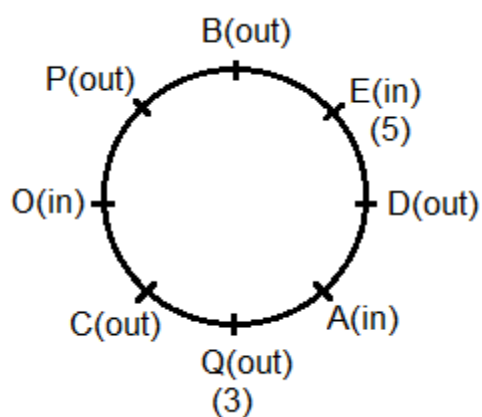
A sits immediate left of Q, this is not possible in case I, so case I is rejected.

Inference:

O sits immediate right of C.

Q's rank is 3 and E's rank is 5.

A sits immediate right of D.



Clues:

B's rank is one more than the person, who sits immediate left of P.

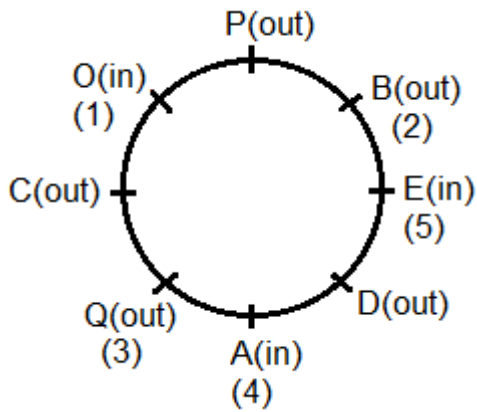
Neither C nor D has rank 4.

Inference:

B's rank is 2 and O's rank is 1.

A's rank is 4.

The final seating arrangement is given below:



C sits immediate right of O, whose rank is 1.

Hence, option a.

33. What is the position of the B with respect to the student, whose rank is 4?

A -

3rd to the left

B -

2nd to the left

C -

3rd to the right

D -

4th to the right

Solution

Starting Point: First we shall try to place B and D, and then proceed by placing the student, whose rank is 5, so as to get only two cases.

Clues:

B sits 2nd to the left of D.

Student, whose rank is 5, sits adjacent to B.

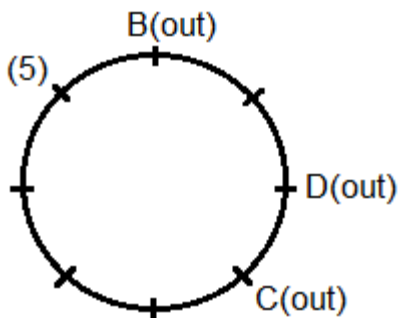
C sits opposite to the one, whose rank is 5.

Inference:

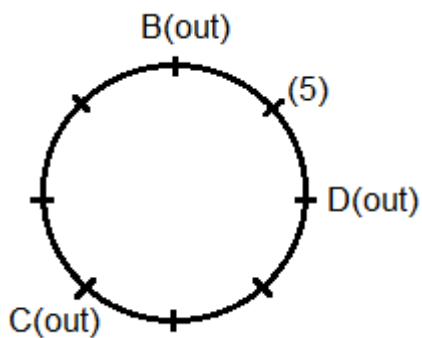
Student, whose rank is 5, sits either immediate left of B or immediate right of B.

C sits immediate right of D or 3rd to the right of D.

Case I: Student, whose rank is 5, sits immediate left of B:



Case II: Student, whose rank is 5, sits immediate right of B:



Clues:

O sits adjacent to C.

Student, whose rank is 3, sits 2nd to the right of O.

P sits 2nd to the right of E but doesn't have any rank.

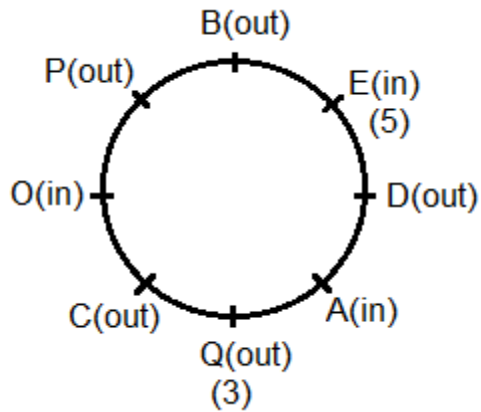
A sits immediate left of Q, this is not possible in case I, so case I is rejected.

Inference:

O sits immediate right of C.

Q's rank is 3 and E's rank is 5.

A sits immediate right of D.



Clues:

B's rank is one more than the person, who sits immediate left of P.

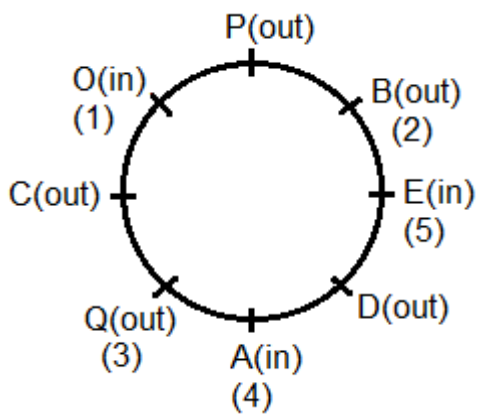
Neither C nor D has rank 4.

Inference:

B's rank is 2 and O's rank is 1.

A's rank is 4.

The final seating arrangement is given below:



B sits 3rd to the right of A, whose rank is 4.

Hence, option c.

34. Who sits opposite to the student, whose rank is 2?

- A -
- O

B -

Q

C -

A

D -

E

Solution

Starting Point: First we shall try to place B and D, and then proceed by placing the student, whose rank is 5, so as to get only two cases.

Clues:

B sits 2nd to the left of D.

Student, whose rank is 5, sits adjacent to B.

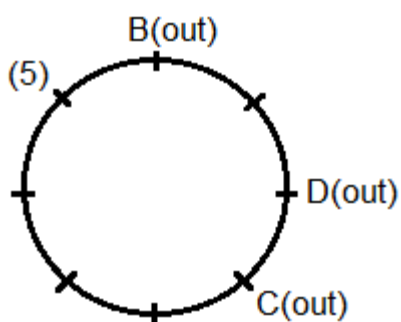
C sits opposite to the one, whose rank is 5.

Inference:

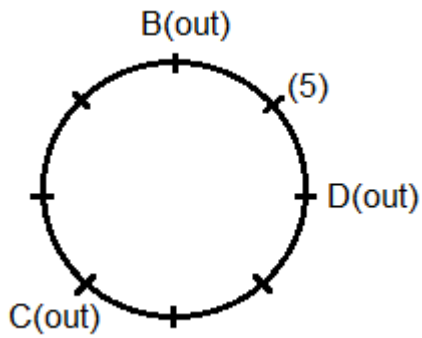
Student, whose rank is 5, sits either immediate left of B or immediate right of B.

C sits immediate right of D or 3rd to the right of D.

Case I: Student, whose rank is 5, sits immediate left of B:



Case II: Student, whose rank is 5, sits immediate right of B:



Clues:

O sits adjacent to C.

Student, whose rank is 3, sits 2nd to the right of O.

P sits 2nd to the right of E but doesn't have any rank.

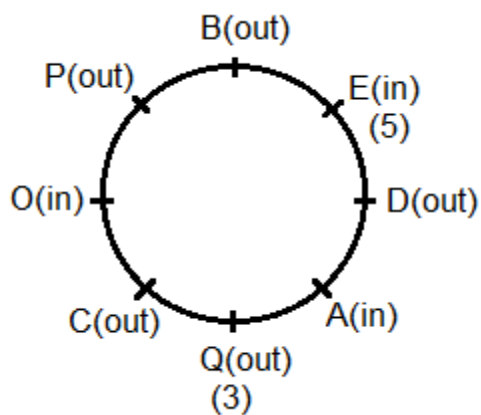
A sits immediate left of Q, this is not possible in case I, so case I is rejected.

Inference:

O sits immediate right of C.

Q's rank is 3 and E's rank is 5.

A sits immediate right of D.



Clues:

B's rank is one more than the person, who sits immediate left of P.

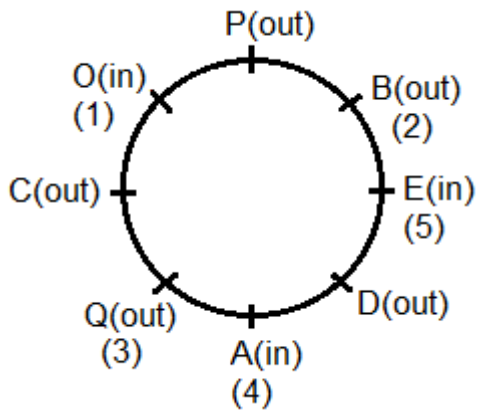
Neither C nor D has rank 4.

Inference:

B's rank is 2 and O's rank is 1.

A's rank is 4.

The final seating arrangement is given below:



Q sits opposite to B, whose rank is 2.

Hence, option b.

35. Find the odd one out.

A -

D

B -

E

C -

B

D -

O

Solution

Starting Point: First we shall try to place B and D, and then proceed by placing the student, whose rank is 5, so as to get only two cases.

Clues:

B sits 2nd to the left of D.

Student, whose rank is 5, sits adjacent to B.

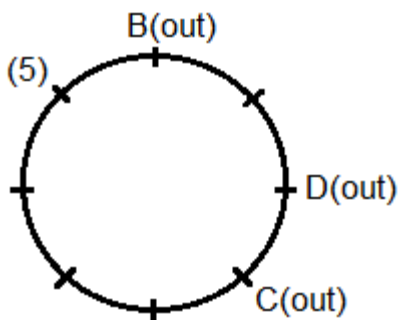
C sits opposite to the one, whose rank is 5.

Inference:

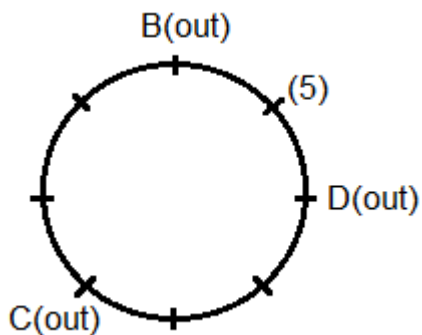
Student, whose rank is 5, sits either immediate left of B or immediate right of B.

C sits immediate right of D or 3rd to the right of D.

Case I: Student, whose rank is 5, sits immediate left of B:



Case II: Student, whose rank is 5, sits immediate right of B:



Clues:

O sits adjacent to C.

Student, whose rank is 3, sits 2nd to the right of O.

P sits 2nd to the right of E but doesn't have any rank.

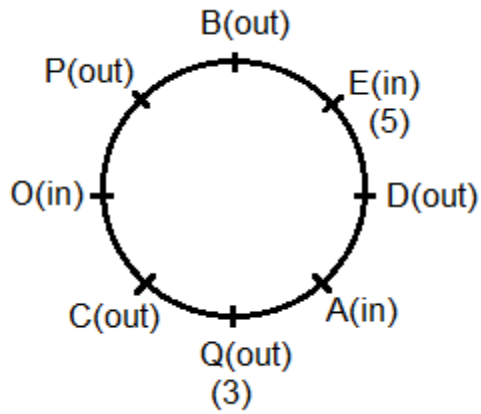
A sits immediate left of Q, this is not possible in case I, so case I is rejected.

Inference:

O sits immediate right of C.

Q's rank is 3 and E's rank is 5.

A sits immediate right of D.



Clues:

B's rank is one more than the person, who sits immediate left of P.

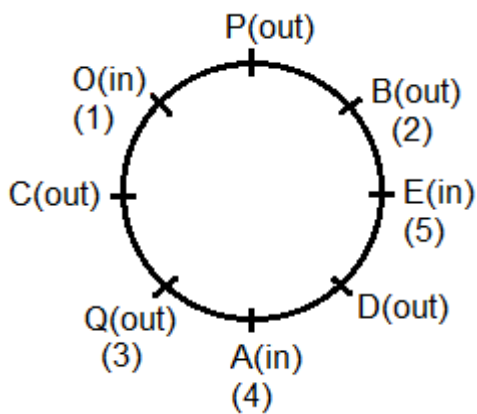
Neither C nor D has rank 4.

Inference:

B's rank is 2 and O's rank is 1.

A's rank is 4.

The final seating arrangement is given below:



All except D are rank holders.

Hence, option a.

36. Who sits 3rd to the right of E?

- A -
- C

B -

Q

C -

O

D -

P

Solution

Starting Point: First we shall try to place B and D, and then proceed by placing the student, whose rank is 5, so as to get only two cases.

Clues:

B sits 2nd to the left of D.

Student, whose rank is 5, sits adjacent to B.

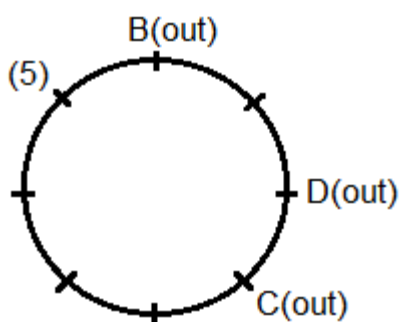
C sits opposite to the one, whose rank is 5.

Inference:

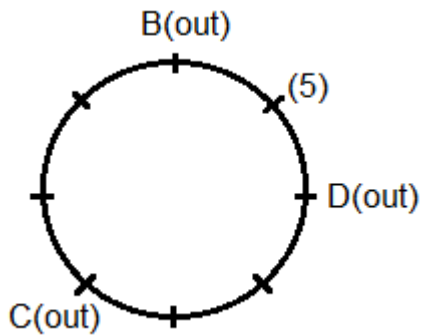
Student, whose rank is 5, sits either immediate left of B or immediate right of B.

C sits immediate right of D or 3rd to the right of D.

Case I: Student, whose rank is 5, sits immediate left of B:



Case II: Student, whose rank is 5, sits immediate right of B:



Clues:

O sits adjacent to C.

Student, whose rank is 3, sits 2nd to the right of O.

P sits 2nd to the right of E but doesn't have any rank.

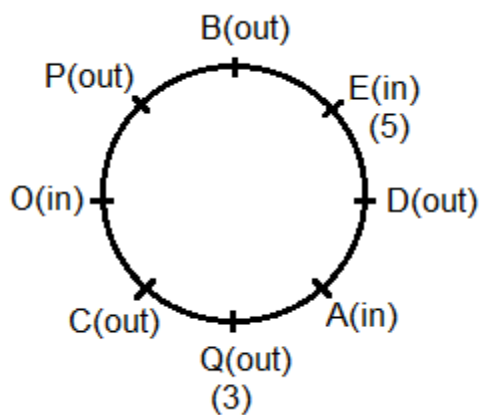
A sits immediate left of Q, this is not possible in case I, so case I is rejected.

Inference:

O sits immediate right of C.

Q's rank is 3 and E's rank is 5.

A sits immediate right of D.



Clues:

B's rank is one more than the person, who sits immediate left of P.

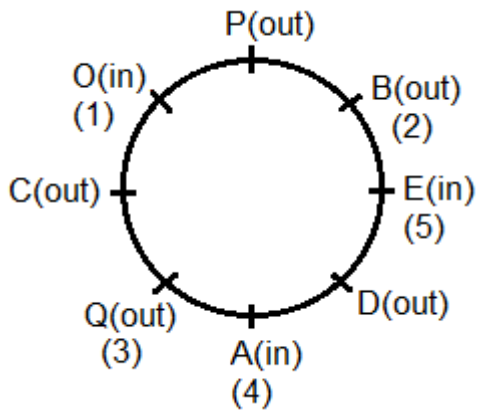
Neither C nor D has rank 4.

Inference:

B's rank is 2 and O's rank is 1.

A's rank is 4.

The final seating arrangement is given below:



O sits 3rd to the right of E.

Hence, option c.

Ordering & ranking

(37-38) Directions: Answer the questions based on the information given below.

Six persons A, C, D, K, M and R have different number of coins. More than two persons have more coins than M. D has lowest number of coins. Less than four persons have fewer coins than A.

R doesn't have 3rd highest number of coins. C has more coins than K, who has more coins than R.

37. Who has 3rd highest number of coins?

A -

A

B -

K

C -

M

D -

Can't be determined

Solution

Clues:

More than two persons have more coins than M. D has lowest number of coins. Less than four persons have fewer coins than A. C has more coins than K, who has more coins than R. R doesn't have 3rd highest number of coins.

Inference:

C has highest number of coins.

K has 2nd highest number of coins.

$C > K > A > M/R > R/M > D$

A has 3rd highest number of coins.

Hence, option a.

38. How many persons have more coins than M?

A -

Two

B -

Four

C -

Three

D -

Can't be determined

Solution

Clues:

More than two persons have more coins than M. D has lowest number of coins. Less than four persons have fewer coins than A. C has more coins than K, who has more coins than R. R doesn't have 3rd highest number of coins.

Inference:

C has highest number of coins.

K has 2nd highest number of coins.

$$C > K > A > M/R > R/M > D$$

Either three or four persons have more coins than M.

Hence, option d.

Logical inequalities

39. In the question, assuming the given statements to be true, find which of the conclusion (s) among given three conclusions is /are definitely true and then give your answer accordingly.

Statements: $T > A \geq R$; $S \leq T$; $L \leq V < A$

Conclusions:

I. $T > L$

II. $A < S$

III. $V < R$

A -

Only conclusion II is true.

B -

Only conclusion I is true.

C -

Only conclusions I and II are true.

D -

Only conclusions II and III are true.

Solution

Given statements: $T > A \geq R$; $S \leq T$; $L \leq V < A$

On combining, we get

$$S \leq T > A > V \geq L; R \leq A > V; R \leq A < T \geq S$$

Conclusions:

I. $T > L$: True (As $T > A > V \geq L$, so $T > L$)

II. $A < S$: False (As $A < T \geq S$, relation between A and S can't be determined)

III. $V < R$: False (As $R \leq A > V$, relation between V and R can't be determined)

Hence, option b.

Logical inequalities

40. In the question, assuming the given statements to be true, find which of the conclusion (s) among given three conclusions is /are definitely true and then give your answer accordingly.

Statements: $B < L \geq A$; $N < C \leq A$; $T \geq B < V$

Conclusions:

I. $V > A$

II. $L \geq C$

III. $N < B$

A -

Only conclusion II is true.

B -

Only conclusion I is true.

C -

Only conclusions I and II are true.

D -

Only conclusions II and III are true.

Solution

Given statements: $B < L \geq A$; $N < C \leq A$; $T \geq B < V$

On combining, we get

$T \geq B < L \geq A \geq C > N$; $V > B < L \geq A$

Conclusions:

I. $V > A$: False (As $V > B < L \geq A$, relation between V and A can't be determined)

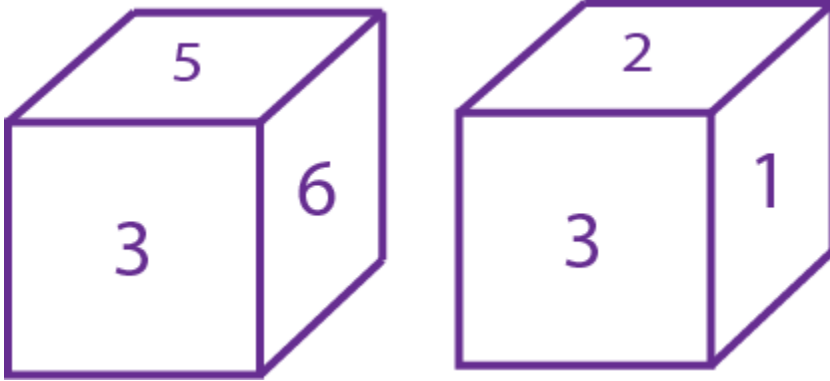
II. $L \geq C$: True (As $L \geq A \geq C$, so $L \geq C$)

III. $N < B$: False (As $B < L \geq A \geq C > N$, relation between N and B can't be determined)

Hence, option a.

Cubes & dices

41. Two positions of the same dice are given, which of the following number will be opposite to 1?



A -

4

B -

6

C -

5

D -

2

Solution

The number opposite to 1 would be '6'.

Hence, option b.

Alphabet & number series

42. Which of the following pair replaces ? in series given.

C19D, ? , M13H, R10J, W7L

A -

J15F

B -

H16F

C -

H17G

D -
H16E

Solution

Given series

C19D, ? , M13H, R10J, W7L

$C + 5 = H$, $H + 5 = M$, $M + 5 = R$, $R + 5 = W$

$19 - 3 = 16$, $16 - 3 = 13$, $13 - 3 = 10$, $10 - 3 = 7$

$D + 2 = F$, $F + 2 = H$, $H + 2 = J$, $J + 2 = L$

Hence, option b.

Circular sitting arrangement

(43-44) Directions: Answer the questions based on the information given below:

Seven persons N, P, Q, R, S, T and U sit around a circular table facing outside the centre.

One person sits between N and U. R sits to the immediate right of U. P doesn't sit 3rd to the right of T.

S doesn't sit 2nd to the left of R. S and P sit adjacent to each other. Q sits 3rd to the right of R.

43. Who sits to the immediate right of T?

A -
U

B -
N

C -
P

D -
Q

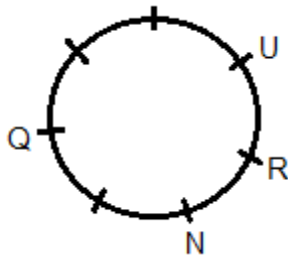
Solution

As One person sits between N and U.

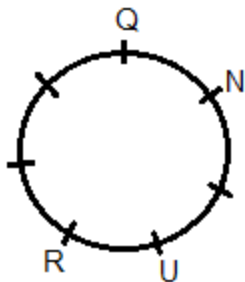
R sits to the immediate right of U.

Q sits 3rd to the right of R, so either U sits 2nd to the left of N or U sits 2nd to the right of N.

Case I: U sits 2nd to the left of N:



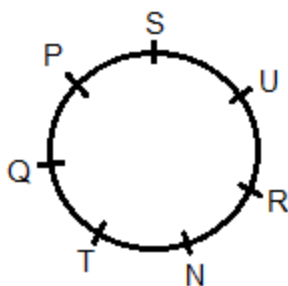
Case II: U sits 2nd to the right of N:



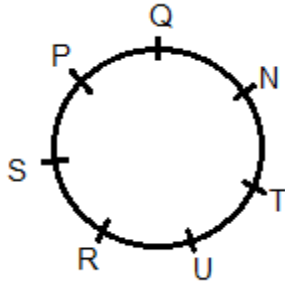
S and P sit adjacent to each other.

P doesn't sit 3rd to the right of T.

Case I:

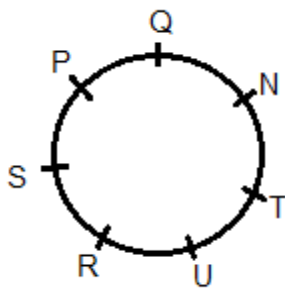


Case II:



S doesn't sit 2nd to the left of R, so case I is rejected.

The final circular seating arrangement is given below:



U sits to the immediate right of T.

Hence, option a.

44. How many persons sit between S and N from the right of S?

A -
Four

**B -
Two**

C -
Three

D -
One

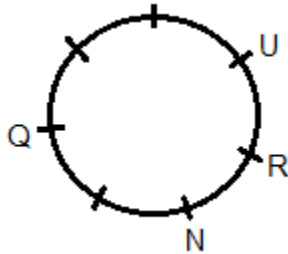
Solution

As One person sits between N and U.

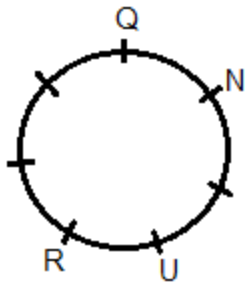
R sits to the immediate right of U.

Q sits 3rd to the right of R, so either U sits 2nd to the left of N or U sits 2nd to the right of N.

Case I: U sits 2nd to the left of N:



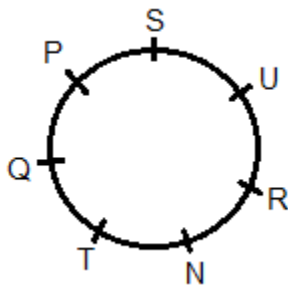
Case II: U sits 2nd to the right of N:



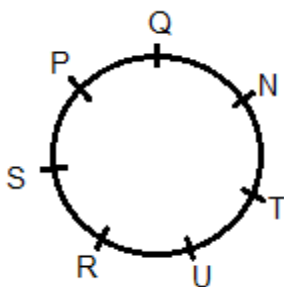
S and P sit adjacent to each other.

P doesn't sit 3rd to the right of T.

Case I:

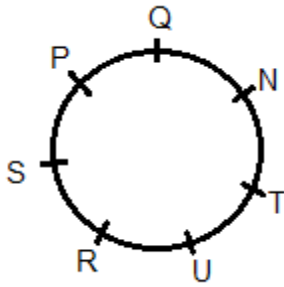


Case II:



S doesn't sit 2nd to the left of R, so case I is rejected.

The final circular seating arrangement is given below:

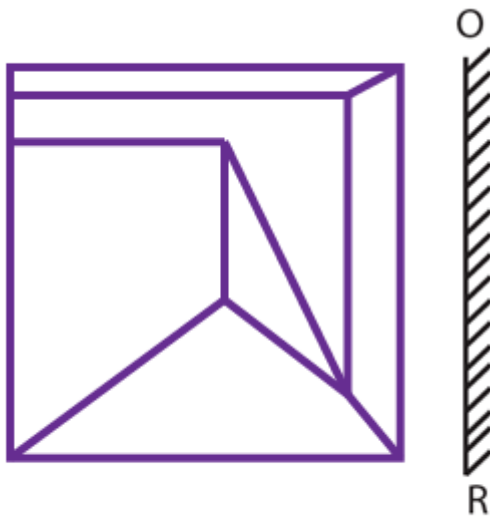


If counted in clockwise direction, two persons sit between S and N.

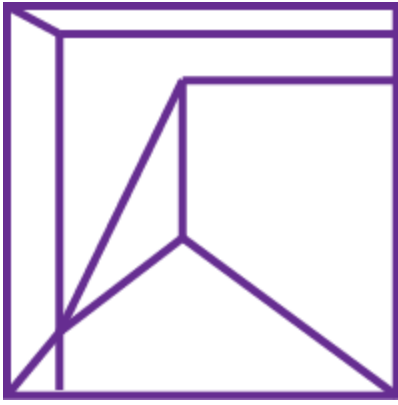
Hence, option b.

Mirror image

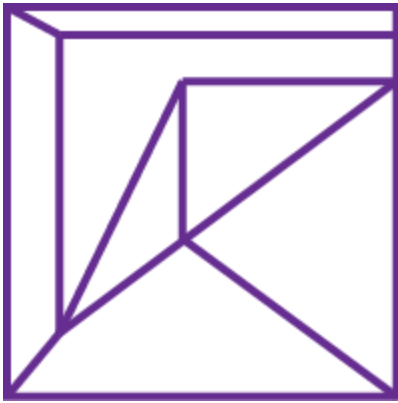
45. If a mirror is placed on the line OR, then which of the answer figures is the right image of the given figure?



A -



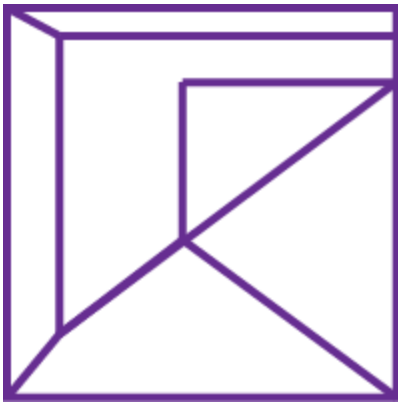
B -



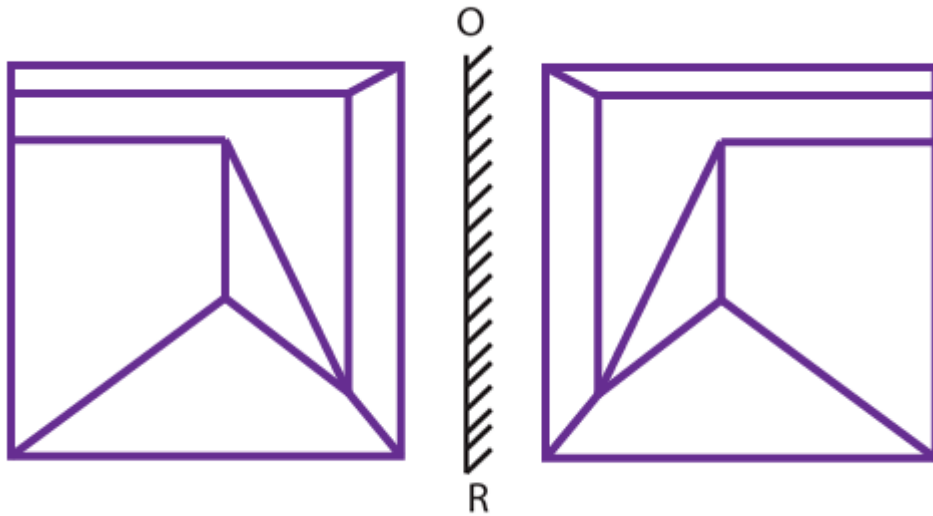
C -



D -



Solution



Hence, option c.

Matrix coding

46. In the question, a word is represented by only one set of number as given in any one of the alternatives. The sets of numbers given in the alternatives are represented by 2 classes of alphabets as in two matrices given below. The columns and rows of matrix I are numbers from 0-4 and that of matrix II are numbers from 5-9. A letter from this matrix can be represented 1st by its row and next by its column. Ex- 'A' can be represented by 20, 66 etc. and 'B' can be represented by 10, 79, 97 etc. Similarly, you have to identify the set of word 'ASSEMBLY'.

Matrix I

	0	1	2	3	4
0	J	F	E	R	I
1	B	M	V	X	E
2	A	C	S	Z	Q
3	P	U	J	N	F

4	E	H	V	F	Y
---	---	---	---	---	---

Matrix II

	5	6	7	8	9
5	K	H	D	C	J
6	M	A	L	G	T
7	H	R	S	P	B
8	W	P	K	G	D
9	V	N	B	X	C

A -

20, 22, 77, 02, 65, 78, 67, 44

B -

20, 22, 77, 68, 65, 97, 67, 44

C -

20, 22, 77, 02, 65, 97, 67, 44

D -

20, 22, 77, 02, 65, 97, 58, 44

Solution

As the digits of the numbers represented by columns and rows respectively,

A	S	S	E	M	B	L	Y
20, 66	22, 77	22, 77	02, 14, 40	11, 65	10, 79, 97	67	44

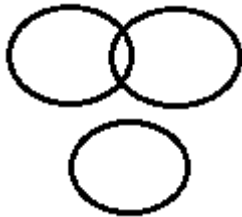
Hence, option c.

Logical venn diagram type-1

47. Select the Venn diagram that best illustrates the relationship between the following classes:

Men, Students, Literate

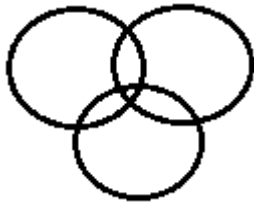
A -



B -



C -

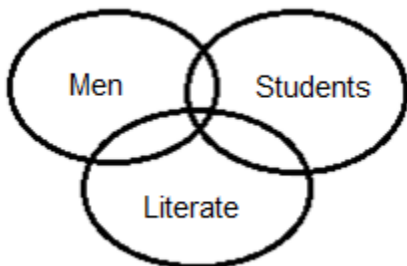


D -



Solution

Following Venn diagram represents the relation between worker, graduate and educated



Hence, option c.

Syllogisms

48. Three statements are given followed by three conclusions numbered I, II, and III assuming the statements to be true, even if they seem to be at variance with commonly known facts. Decide which of conclusion logically follow(s) from the statement.

Statements:

Some apples are mangoes.

All mangoes are bananas.

No oranges are mangoes.

Conclusions:

I. Some bananas being oranges is a possibility.

II. All apples are bananas.

III. A few apples are not oranges.

A -

Only conclusion I follows

B -

Only conclusion II follows

C -

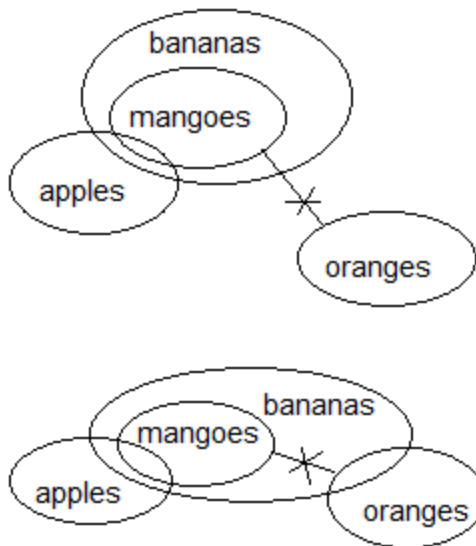
Conclusion II and conclusion III follow

D -

Conclusion I and conclusion III follow

Solution

Following figure can be formed from the statements.



Conclusion I and conclusion III follow.

Hence, option d.

Blood relations

49. If father of S is K's father's mother's only son in law then how is mother of S related to K's paternal grandmother?

- A - Daughter
- B - Sister
- C - Daughter in law
- D - Sister in law

Solution

Mother of S is the daughter of K's paternal grandmother.

Hence, option a.

Inserting the missing number

50. Select the digit which can replace the ? from the given four alternatives.

5	1	4
4	6	2
3	2	6
18	11	?

A -
39

B -
32

C -
42

D -
26

Solution

Given

5	1	4
4	6	2
3	2	6
18	11	?

The pattern is $3^2 + 4 + 5 = 18$, $2^2 + 6 + 1 = 11$, similarly, $6^2 + 2 + 4 = 42$.

Hence, option c.

Odd man out

51. Three of the following four letter-clusters are alike in a certain way and one is different. Pick the odd one out.

A -

JMHG

B -

LOJI

C -

QTON

D -

FHDC

Solution

2nd letter of each letter-cluster is the 3rd succeeding letter of the 1st letter.

3rd letter is the 5th preceding letter of the 2nd letter.

4th letter is the immediate preceding letter of the 3rd letter.

This is not followed in 'FHDC'.

Hence, option d.

Odd man out

52. Three of the following four word pairs are alike in a certain way and one is different. Pick the odd one out.

A -

South Korea – Seoul

B -

Nepal - Kathmandu

C -

Canada - Ottawa

D -

Germany - Euro

Solution

Seoul is the capital of South Korea.

Kathmandu is the capital of Nepal.

Ottawa is the capital of Canada.

Euro is the currency of Germany.

Hence, option d.

Mathematical operations (interchange of signs & numbers)

53. If - denotes \div , \times denotes +, \div denotes \times and + denotes -,

$$4 - 7 \div 28 \times 11 \times 35 \div 5 - 7 + 17 = ?$$

A -

40

B -

46

C -

35

D -

38

Solution

If - denotes \div , \times denotes +, \div denotes \times and + denotes -,

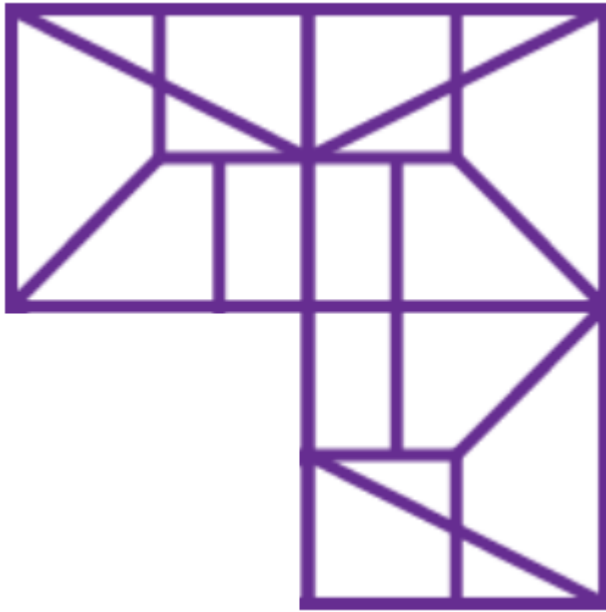
$$4 - 7 \div 28 \times 11 \times 35 \div 5 - 7 + 17 = ? \text{ means}$$

$$4 \div 7 \times 28 + 11 + 35 \times 5 \div 7 - 17 = 35$$

Hence, option c.

Completion of incomplete pattern

54. Select the option in which will complete the following figure.



A -



B -



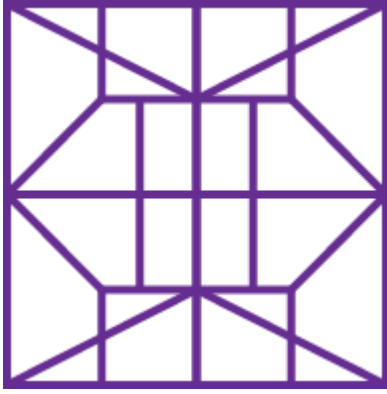
C -



D -



Solution



Hence, option c.

Numerical ability

Time & distance

55. The radius of a circular wheel is 3.5 m. The number of revolutions it will make in travelling 11 km is:

- A - 600
- B - 800
- C - 1000
- D - 500

Solution

Circumference of the circular wheel = $2 \times \frac{22}{7} \times 3.5 = 22$ m

The number of revolution = $11000/22 = 500$

Hence, option d.

Ratios & proportions

56. 84 is divided into two parts in such a way that $(1/5)^{\text{th}}$ of the first and $(1/6)^{\text{th}}$ of the second are in the ratio 3:1, respectively. Find the first part.

A -
60

B -
24

C -
50

D -
64

Solution

Let the first part = x

Second part = $84 - x$

According to the question,

$$(x \times 1/5):(84 - x)/6 = 3:1$$

$$x/5 = (84 - x)/6 \times 3$$

$$2x = 420 - 5x$$

$$7x = 420$$

$$x = 60$$

First part = 60

Hence, option a.

Averages

57. The average of 12 numbers is 30. The average of first 7 numbers is 24 and that of the last 4 numbers is 36. What is the 8th number?

A -
40

B -
36

C -
56

D -

48

Solution

Sum of 12 numbers = $12 \times 30 = 360$

Sum of first 7 numbers = $7 \times 24 = 168$

Sum of last 4 numbers = $4 \times 36 = 144$

8th number = $360 - 168 - 144 = 48$

Hence, option d.

Percentages

58. The number of employees in a company is 240 and the number of male employees in the company is 45%. If 25% of the male employees and 50% of the female employees are married, find the number of employees that are not married.

A -
147

B -
156

C -
162

D -
178

Solution

Total employees in the company = 240

Male employees in the company = $240 \times 45\% = 108$

Female employees in the company = $240 \times 55\% = 132$

Male employees that are married = $108 \times 25\% = 27$

Male employees that are not married = $108 \times 75\% = 81$

Female employees that are married = $132 \times 50\% = 66$

Female employees that are not married = $132 - 66 = 66$

Required number of employees = $66 + 81 = 147$

Hence, option a.

Problems on trains

59. A train is running with the speed of 54 km/h and crosses a 240 m long platform in 36 seconds. Find the length of the train.

A -
200 m

B -
360 m

C -
240 m

D -
300 m

Solution

Let the length of the train = x m

According to the question,

$$54 \times \frac{5}{18} = \frac{(240 + x)}{36}$$

$$15 \times 36 = 240 + x$$

$$540 - 240 = x$$

$$x = 300 \text{ m}$$

Hence, option d.

Divisibility rules

60. If the 8-digit number 5963x55y is divisible by 72, then the value of $(8x - 2y)$ is:

A -
4

B -
6

C -
8

D -
5

Solution

If a number is divisible by 72 so it should be divisible by 8 and 9 together.

Last 3 digits should be divisible by 8.

So $y = 2$

Sum of the digits of the number should be divisible by 9.

$$(5 + 9 + 6 + 3 + x + 5 + 5 + 2)/9 = (35 + x)/9$$

So, $x = 1$

$$\text{Required value} = (8 \times 1 - 2 \times 2) = 4$$

Hence, option a.

Time & work

61. A and B together can complete a piece of work in 24 days and A alone can complete the work in 32 days. C is 100% more than efficient than B, find the time taken by C to complete the work alone.

A -
60 days

B -
54 days

C -
32 days

D -
48 days

Solution

Let the total amount of the work = 96 units

Amount of the work done by A and B together in one day = $96/24 = 4$ units

Amount of the work done by A in one day = $96/32 = 3$ units

Amount of the work done by B in one day = $4 - 3 = 1$ unit

Amount of the work done by C in one day = $1 \times 200\% = 2$ units

Time taken by C alone to complete the work alone = $96/2 = 48$ days

Hence, option d.

Data interpretation (tabular form on absolute values)

(62-63) The table given below shows the number of scooters produced by five different companies in five different years.

Companies	2013	2014	2015	2016	2017
A	175	140	165	125	180
B	140	185	160	220	190
C	160	200	215	180	185
D	220	195	150	170	180
E	190	225	210	180	240

62. The number of scooter produced by company A in 2014 is what percent of the total number of scooter produced by all companies in 2016?

- A -
20%
- B -
24%
- C -
16%
- D -
28%

Solution

Total number of scooter produced by all companies in 2016 = $125 + 220 + 180 + 170 + 180 = 875$

Required percentage = $140/875 \times 100 = 16\%$

Hence, option c.

63. What is the ratio of the number of scooters produced by company A in 2015 and 2017 together to that by company C in 2013 and 2014 together?

A -
23:24

B -
15:16

C -
20:23

D -
18:19

Solution

Required ratio = $(165 + 180):(160 + 200) = 345:360 = 23:24$

Hence, option a.

Algebra

64. If $x = (\sqrt{5} + 2)^{-1/3}$, find the value of $x^3 - 1/x^3$

A -
0

B -
 $\sqrt{5}$

C -
-4

D -
2

Solution

$$x = (\sqrt{5} + 2)^{-1/3}$$

$$x = 1/(\sqrt{5} + 2)^{1/3}$$

$$x^3 = 1/(\sqrt{5} + 2)$$

$$1/x^3 = (\sqrt{5} + 2)$$

$$\text{Again, } x^3 = 1/(\sqrt{5} + 2)$$

$$x^3 = 1/(\sqrt{5} + 2) \times (\sqrt{5} - 2)/(\sqrt{5} - 2)$$

$$x^3 = (\sqrt{5} - 2)$$

$$\text{Required Value} = x^3 - 1/x^3$$

$$= (\sqrt{5} - 2) - (\sqrt{5} + 2)$$

$$= \sqrt{5} - 2 - \sqrt{5} - 2$$

$$= -4$$

Hence, option c.

Algebra

65. If $x \neq 0$, $y \neq 0$ and $z \neq 0$, and $1/x^2 + 1/y^2 + 1/z^2 = 1/xy + 1/yz + 1/zx$, what is the relation among x , y and z ?

A -

$$x = y = z$$

B -

$$x + y + z = 0$$

C -

$$1/x + 1/y + 1/z = 0$$

D -

$$x + y = z$$

Solution

$$1/x^2 + 1/y^2 + 1/z^2 = 1/xy + 1/yz + 1/zx$$

$$1/x^2 - 1/xy + 1/y^2 - 1/yz + 1/z^2 - 1/zx = 0$$

$$1/x(1/x - 1/y) + 1/y(1/y - 1/z) + 1/z(1/z - 1/x) = 0$$

Solve through option,

$$\text{Let } x = y = z$$

$$1/x(1/x - 1/x) + 1/x(1/x - 1/x) + 1/x(1/x - 1/x) = 0$$

$$0 = 0$$

Hence, option a.

Algebra

66. If $(3a + 4)^2 + (6b + 1)^2 + (2c - 3)^2 = 0$, find the value of $(a^3 + b^3 + c^3 - 3abc)/(a^2 + b^2 + c^2) + 5$.

A -

0

B -

3

C -

-1

D -

5

Solution

$$(3a + 4)^2 + (6b + 1)^2 + (2c - 3)^2 = 0$$

$$\text{So, } (3a + 4)^2 = (6b + 1)^2 = (2c - 3)^2 = 0$$

$$a = -4/3, b = -1/6, c = 3/2$$

$$a + b + c = -4/3 - 1/6 + 3/2$$

$$= 0$$

$$\text{So, } a^3 + b^3 + c^3 - 3abc = 0$$

$$\text{Required value} = (a^3 + b^3 + c^3 - 3abc)/(a^2 + b^2 + c^2) + 5$$

$$= 0/(a^2 + b^2 + c^2) + 5$$

$$= 5$$

Hence, option d.

Time & work

67. The work done by a woman in 12 hours is equal to the work done by a man in 15 hours or a boy in 10 hours. If 8 men working 6 hours a day can complete a work in 58 days, then in how many days 6 men, 4 women and 12 boys, together can complete the same work, working 2 hours a day?

A -
40

B -
36

C -
24

D -
48

Solution

According to the question,

$$12W = 15M = 10B$$

$$\text{Or, } 4W = 5M \text{ and } 12B = 18M$$

$$\text{Therefore, } 6 \text{ men} + 4 \text{ women} + 12 \text{ boys} = 6M + 5M + 18M = 29 \text{ men}$$

Let the time taken by 29 men to complete the work be 'D' days

Therefore,

$$(8 \times 6 \times 58) = (29 \times 2 \times D)$$

$$\text{Or, } D = 48$$

Hence, option d.

Mixtures & allegations

68. In a mixture of (HCl + water), the water content is 40%. When 25% of the mixture is replaced with same quantity of HCl, then the new quantity of HCl will be how much percent of the total mixture?

A -
64%

B -
70%

C -
75%

D -
72%

Solution

Let the initial quantity of HCl and water in the mixture be $3x$ litres and $2x$ litres, respectively

According to the question,

New quantity of HCl in the mixture = $(0.75 \times 3x) + (0.25 \times 5x) = 2.25x + 1.25x = 3.5x$ litres

Required percentage = $(3.5x/5x) \times 100 = 70\%$

Hence, option b.

Probability

69. A bag contains 4 red balls, 6 black balls and 8 yellow balls. 3 balls are picked at random. Find the probability that at least one of them is yellow.

A -
 $25/34$

B -
 $27/34$

C -
 $29/34$

D -
 $21/34$

Solution

Number of balls other than yellow = $4 + 6 = 10$

Probability of getting balls other than yellow = $\frac{{}^{10}C_3}{{}^{18}C_3} = \frac{5}{34}$

Therefore, probability of getting a yellow ball = $1 - (5/34) = 29/34$

Hence, option c.

Partnership

70. 'A', 'B' and 'C' invested Rs. 12000, Rs. 20000 and Rs. 16000, respectively, in a business together. After 8 months, each of them withdrew Rs. 4000 from their initial investments. At the end of the year, the profit received by 'A' is how much percent less than that by 'B' and 'C' together?

A -

70%

B -

65%

C -

72%

D -

68%

Solution

Respective ratio of the profits received by 'A', 'B' and 'C'

$$\{(12000 \times 8) + (8000 \times 4)\} : \{(20000 \times 8) + (16000 \times 4)\} : \{(16000 \times 8) + (12000 \times 4)\} = 8:14:11$$

$$\text{Required percentage} = \frac{\{(11 + 14 - 8)\}}{\{(11 + 14)\}} \times 100 = 68\%$$

Hence, option d.

Boats & streams

71. A boat can travel 90 km upstream in 6 hours and 155 km downstream in 5 hours. If the speed of the current had been twice, then find the time taken by the boat to cover 195 km in downstream.

A -

4.5 hours

B -

5 hours

C -

8 hours

D -

6 hours

Solution

Let the speed of the boat in still water and the speed of the current be 'x' km/hr and 'y' km/hr, respectively

According to the question,

$$(x - y) = 90/6 = 15 \dots (1)$$

$$\text{And, } (x + y) = 155/5 = 31 \dots (2)$$

On solving equation (1) and (2), we get

Speed of the boat in still water = $x = 23$ km/hr

And, the speed of the current = $y = 8$ km/hr

Required time taken = $195/(x + 2y) = 195/39 = 5$ hours

Hence, option b.

Ratios & proportions

72. 'A', 'B' and 'C' have some chocolates in the ratio 5:8:3, respectively. If 'A' had twice the number of chocolates and 'C' had half the number of chocolates, they had originally, then 'B' would have 14 chocolates less than total chocolates 'A' and 'C' would have, together. Find the original number of chocolates all three have.

A -

32

B -

80

C -

64

D -
48

Solution

Let the original number of chocolates 'A', 'B' and 'C' have be $5x$, $8x$ and $3x$, respectively

According to the question,

$$(2 \times 5x) + (3x/2) = 8x + 14$$

$$\text{Or, } 11.5x - 8x = 14$$

$$\text{Or, } x = 14/3.5 = 4$$

$$\text{Required number of chocolates} = (5x + 8x + 3x) = 16x = 64$$

Hence, option c.

Profit & loss

73. An article is marked up by 25% above its cost price. The article is then sold after giving a discount of Rs. 204. If there is a profit of 15%, then find the cost price of the article.

A -
Rs. 2120

**B -
Rs. 2040**

C -
Rs. 2440

D -
Rs. 2520

Solution

Let the cost price of the article be Rs. x

Therefore, marked price of the article = Rs. $1.25x$

Selling price of the article = Rs. $1.15x$

According to the question,

$$1.25x - 1.15x = 204$$

$$\text{Or, } x = 204/0.1 = 2040$$

Therefore, cost price of the article = Rs. 2040

Hence, option b.

Problems on ages

74. The present age of 'A' is 8 years less than the age of 'B' 4 years ago from now. If 4 years hence from now, the age of 'B' will be 75% more than that of 'A', then find the ratio of their present ages.

A -

4:5

B -

2:3

C -

3:4

D -

1:2

Solution

Let the age of 'B' 4 years ago from now be 'x' years

Therefore, present age of 'A' = (x - 8) years

According to the question,

$$1.75(x - 8 + 4) = x + 4 + 4$$

$$\text{Or, } 0.75x = 15$$

$$\text{Or, } x = 15/0.75 = 20$$

Therefore, required ratio = (x - 8):(x + 4) = 12:24 = 1:2

Hence, option d.

Percentages

75. In 2018, the total population of a town is 7200. Next year, the population of male increased by 25% and population of female decreased by 20% such

that the new population of the town becomes 7920. Find the number of males in the town, in 2018.

A -
3600

B -
4800

C -
5000

D -
4500

Solution

In 2018,

Let the number of males be x

Therefore, number of females = $(7200 - x)$

According to the question,

$$1.25x + 0.8(7200 - x) = 7920$$

$$\text{Or, } 0.45x = 2160$$

$$\text{Or, } x = 2160/0.45 = 4800$$

Hence, option b.

Data interpretation (tabular form on percentages)

(76-78) Directions: Answer the questions based on the information given below.

The given table shows the average number of people (male + female) who applied for visa and percentage of people whose visa application is accepted out of total number of people who applied, in five different years.

	Average number of people who applied for visa	Percentage of people whose visa is accepted
2010	1200	75%

2011	1050	60%
2012	750	40%
2013	1600	45%
2014	2000	65%

76.1/3rd of the people whose visa application is accepted in 2010 and 25% of the people whose visa application is accepted in 2011, were males. Find the number of females whose visa application is accepted in 2010 and 2011, together.

A -
2240

B -
2025

C -
2145

D -
2320

Solution

	Total number of people who applied for visa	Number of people whose application is accepted	Number of people whose application is rejected
2010	$1200 \times 2 = 2400$	$0.75 \times 2400 = 1800$	$2400 - 1800 = 600$
2011	$1050 \times 2 = 2100$	$0.6 \times 2100 = 1260$	$2100 - 1260 = 840$
2012	$750 \times 2 = 1500$	$0.4 \times 1500 = 600$	$1500 - 600 = 900$
2013	$1600 \times 2 = 3200$	$0.45 \times 3200 = 1440$	$3200 - 1440 = 1760$

2014	$2000 \times 2 = 4000$	$0.65 \times 4000 = 2600$	$4000 - 2600 = 1400$
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Required number of females = $\{(2/3) \times 1800\} + (0.75 \times 1260) = 1200 + 945 = 2145$

Hence, option c.

77. Find the ratio of the number of people whose visa application is accepted in 2012 to the number of people whose visa application is rejected in 2010.

A -

4:5

B -

3:2

C -

2:5

D -

1:1

Solution

	Total number of people who applied for visa	Number of people whose application is accepted	Number of people whose application is rejected
2010	$1200 \times 2 = 2400$	$0.75 \times 2400 = 1800$	$2400 - 1800 = 600$
2011	$1050 \times 2 = 2100$	$0.6 \times 2100 = 1260$	$2100 - 1260 = 840$
2012	$750 \times 2 = 1500$	$0.4 \times 1500 = 600$	$1500 - 600 = 900$
2013	$1600 \times 2 = 3200$	$0.45 \times 3200 = 1440$	$3200 - 1440 = 1760$
2014	$2000 \times 2 = 4000$	$0.65 \times 4000 = 2600$	$4000 - 2600 = 1400$

Required ratio = $600:600 = 1:1$

Hence, option d.

78. Find the difference between the number of people whose visa application is accepted in 2012 and 2014, together and number of people whose visa application is rejected in 2011.

- A -
2360
- B -
2240
- C -
2120
- D -
1760

Solution

	Total number of people who applied for visa	Number of people whose application is accepted	Number of people whose application is rejected
2010	$1200 \times 2 = 2400$	$0.75 \times 2400 = 1800$	$2400 - 1800 = 600$
2011	$1050 \times 2 = 2100$	$0.6 \times 2100 = 1260$	$2100 - 1260 = 840$
2012	$750 \times 2 = 1500$	$0.4 \times 1500 = 600$	$1500 - 600 = 900$
2013	$1600 \times 2 = 3200$	$0.45 \times 3200 = 1440$	$3200 - 1440 = 1760$
2014	$2000 \times 2 = 4000$	$0.65 \times 4000 = 2600$	$4000 - 2600 = 1400$

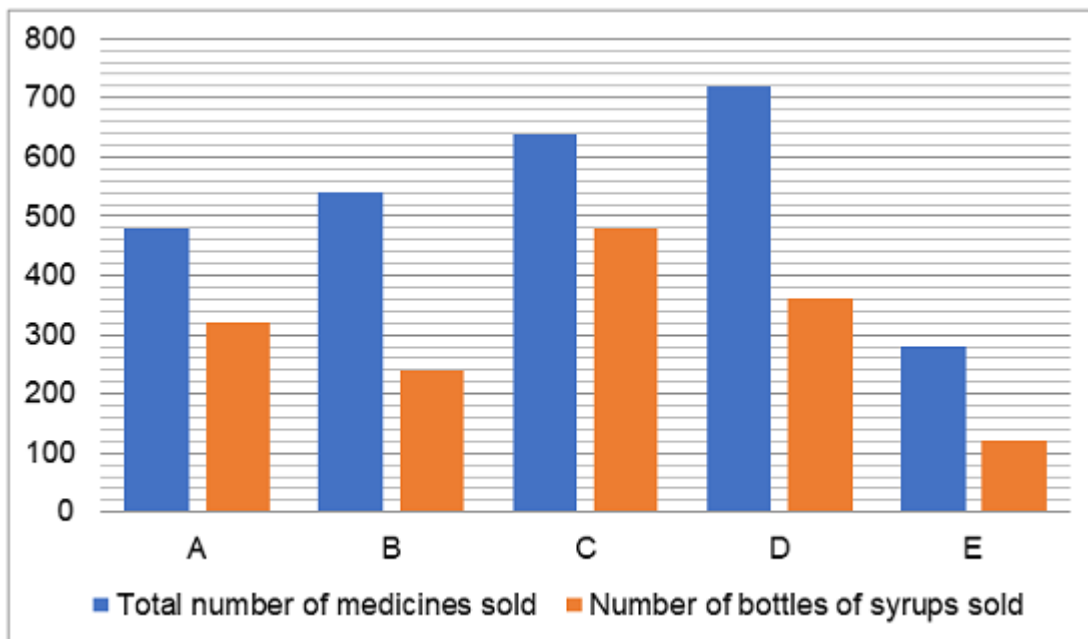
Required difference = $(600 + 2600) - 840 = 2360$

Hence, option a.

Data interpretation (bar graphs on absolute values)

(79-80) Directions: Answer the questions based on the information given below.

The given bar graph shows the total number of medicines (bottles of syrups + packets of tablets) sold and number of bottles of syrups sold, by five different sellers.



79. Find the average number of packets of tablets sold by sellers 'B' and 'D'.

- A -
330
- B -
325
- C -
315
- D -
340

Solution

	Total number of medicines sold	Number of bottles of syrups sold	Number of packets of tablets sold
A	480	320	$480 - 320 = 160$
B	540	240	$540 - 240 = 300$

C	640	480	$640 - 480 = 160$
D	720	360	$720 - 360 = 360$
E	280	120	$280 - 120 = 160$

Required average = $(300 + 360)/2 = 330$

Hence, option a.

80. Out of total number of packets of tablets sold by seller 'C', 45% were sold to males and rest to females. Find the number of packets of tablets sold to females, by seller 'C'.

A -
102

B -
84

C -
96

D -
88

Solution

	Total number of medicines sold	Number of bottles of syrups sold	Number of packets of tablets sold
A	480	320	$480 - 320 = 160$
B	540	240	$540 - 240 = 300$
C	640	480	$640 - 480 = 160$
D	720	360	$720 - 360 = 360$

E	280	120	$280 - 120 = 160$
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Required number of packets = $0.55 \times 160 = 88$

Hence, option d.