

Q.1)

Ans) d

Exp) Option d is the correct answer.

The passage discusses the potential of hydropower energy and also the challenges associated with it, which makes it clear that hydropower plants will play a role in the energy mix of the nation, but obviously can't fulfill energy needs. So Option a is an inference that can be made, but not the most critical. **So option a is incorrect.**

The passage states that 'environmental impact of dams and the displacement of communities have sparked opposition to new projects'. So it can be inferred from the passage that dams have some adverse impacts on the environment. But this again is not the most critical inference as this is one aspect of the dam being discussed. **So option b is incorrect.**

In the passage it's discussed that 'India needs to shift towards renewable energy sources that are more accessible and cost-effective', but it can't be concluded that they can meet India's energy demands as it's also stated that hydropower will remain. **So option c is incorrect.**

After discussing the challenges associated with hydropower energy, but still its relevance in the energy mix and the potential of renewable energy sources, passage at the end highlights that 'the future lies in a diversified and sustainable approach that prioritizes the needs of communities and the environment'. It implies that everything has to be done keeping in mind the needs of the environment and communities. i.e. We are switching to renewable energy to save the communities and environment. So option d is the most critical inference that can be drawn. **Hence option d is correct.**

Q.2)

Ans) b

Exp) Option b is the correct answer.

In the passage, it's stated that 'Despite extensive efforts to detect and measure this mysterious substance, its nature and properties remain largely unknown.' So it indicates that knowing the nature and properties of dark matter is difficult. So it is an idea discussed in the passage, but not the central idea of the passage. **Hence option a is incorrect.**

Since it's stated in the passage, dark matter is composed of electromagnetic radiation, which is difficult to detect and dark matter is composed of weakly interacting massive particles (WIMPs), which do not interact with light or other forms of electromagnetic radiation and also dark matter is difficult to measure and detect. So it sums up to the statement that the nature of dark matter remains a mystery, thus this is the central idea of the passage. **Hence, option b is correct.**

Passage states that the search for WIMPs has so far yielded no conclusive evidence. So it implies that it has led to ambiguous manifestations. So this is an idea discussed in the passage but not a central idea. **So option c is incorrect.**

It is stated in the passage that recent simulations may provide new avenues for experimental exploration. So again this is an idea in the passage but not the central idea. **Hence option d is incorrect.**

Q.3)

Ans) c

Exp) Option c is the correct answer.

The passage states that 'feudalism emerged as the dominant economic, social and political system, which was characterized by a hierarchical system of land ownership and control'. It implies that land ownership decided the social stratum. **Hence statement 1 is correct.**

In the passage, it's mentioned that monasteries and religious orders were **often** the only sources of education and healthcare. So it implies that sometimes there were other sources of education and health care. **Hence statement 2 is incorrect.**

Passage states that feudalism emerged as the dominant, economic, social and political system. So it implies that other economic and political systems of medieval Europe were Trivial. **Hence, statement 3 is correct.**

The passage states that 'The feudal system was accompanied by a complex web of social customs and traditions that regulated the behavior of different classes of people'. It implies that feudalism regulated the behaviour of the people. Statement 4 says the same thing, just the words have been rephrased. (Tab on demeanour \Rightarrow regulating behaviour). **Hence statement 4 is correct.**

Q.4)

Ans) a

Exp) Option a is the correct answer.

The number of 2 and number of 5 determine the number of zeros in any given expression as zeroes are formed by 2×5 .

In such a given expression, the number of 5 is less than the number of 2. So we need to find the number of 5 in the given expression to find the number of zeroes.

For this we take the numbers which are multiple of 5.

$$100^{11} \times 95^6 \times 90^{11} \times \dots \times 75^{26} \times 70^{31} \times \dots \times 50^{51} \times \dots \times 25^{76} \times \dots \times 5^{96}$$

This can be written as

$$(5 \times 5^4)^{11} (5 \times 19)^6 \dots (5 \times 5^2)^{51} \dots (5 \times 5)^{76} \dots 5^{96} \quad \times$$

$$(5 \times 18)^{11} \dots (5 \times 5^3)^{26} \dots (5 \times 5^2)^{51} \dots (5 \times 5)^{76} \dots 5^{96}$$

Now add the powers of 5

$$(1+1) + 6 + 11 + 16 + 21 + (26+26) + 31 + 36 + 41 + 46 + (51+51) + 56 + 61 + 66 + 71 + (76+76) + 81 + 86 + 91 + 96$$

$$= (1+6+11+ \dots + 91+96) + (1+26+51+76)$$

Sum of an AP, $S_n = n/2(a+l)$ where S_n = sum of n numbers, n equals number of terms, a is the first number, l is the last number.

$$S_1 + S_2 = \{20/2(1+96)\} + \{4/2(1+76)\} = 970 + 154 = 1124$$

Q.5)

Ans) c

Exp) Option c is the correct answer.

Given:

Gaurav and Ranjit Met at 9 AM and left at 10 AM. At Noon (12 PM) their distance is 60 KMs.

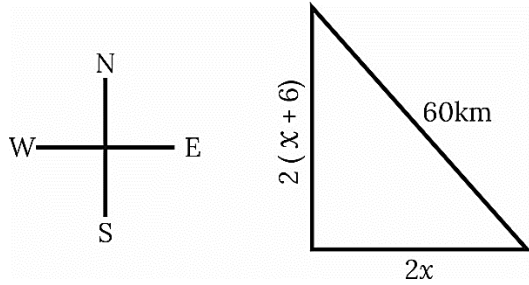
Their speed difference was 6 km/h

So total travel time = 2 hours

Let's assume the slower person was moving at x km/h. Hence distance traveled by slower person is 2x km

The faster person's speed will be (x+6) km/h. Hence, the distance traveled by the slower person is 2(x+6) km

Let's draw the diagram with help of the above data



As per Pythagoras theorem,

$$60^2 = (2x)^2 + (2x + 12)^2$$

Let's take 4 common from both sides, hence

$900 = (x)^2 + (x + 6)^2$ or $30^2 = (x)^2 + (x + 6)^2$ [Hint: For such problems, never attempt to solve the whole quadratic equation as it will be time-consuming. Just eliminate the options quickly as we have done below)

From the above equation, it's clear that x can't be more than 24 km/h (as the speed of one person will become 30). Let's see the available options,

Option (a) 13 km/h : $13 + (19)^2$ can't be 900 (Hint: square of units digit will not be divisible by 10, hence eliminated without calculating complete problem.)

Option (b) 14 km/h: $(14)^2 + (20)^2$ can't be 900 (Hint: square of units digit will not be divisible by 10, hence eliminated without calculating complete problem.)

Option (c) 18 km/h: $(18)^2 + (24)^2$ is 900, Hence this is the correct answer.

Option (d) 26 km/h : Option eliminated as speed is more than 24 km/h.

Q.6)

Ans) a

Exp) Option a is the correct answer.

Let's draw a stepwise family tree based on the given information:

Code used in the figure given below:

- ↔ : Sibling
- : Children
- ↔ : Marriage

Step 1: Draw a sub-tree based on the following statements:

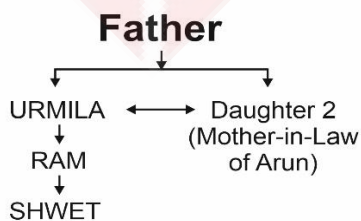
Ram is the son of Urmila.

Urmila has a granddaughter named Shwet.

Ram is the only child of Urmila.

Urmila's father has two daughters only.

Arun's mother-in-law is the sibling of Ram's mother



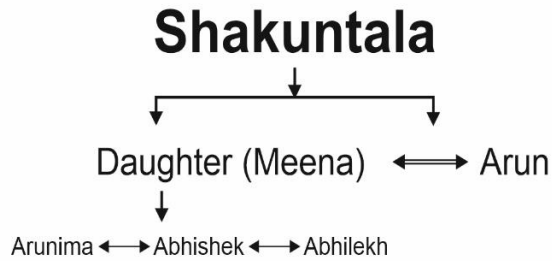
Step 2: Draw a sub-tree based on the following statements:

Abhishek is the son of Shakuntala's daughter.

Abhishek has one brother Abhilekh and one sister Arunima.

Abhilkeh's mother is Meena.

Arun is married to Meena.



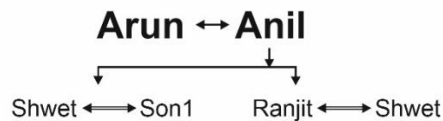
Step 3: Draw a sub-tree based on the following statements:

Arun has a brother named Anil.

Anil has two sons.

Ranjit is the son of Anil.

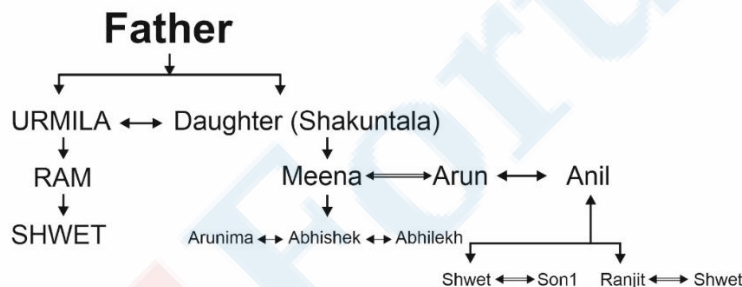
Shwet is married to one of Anil's son.



Shwet is married to which son is not known.
Hence it can be either of Son1/Ranjit

Conclusion step: Combine all three steps. The common person in step 1 and step 2 is Arun. From step 2 it's clear that Arun's mother in law is Shakuntla.

From step 2 and 3, Arun is the common factor (Brother of Anil), So let's combine all three steps and draw a full family tree:



From the above family tree it's clear that option a i.e. Shakuntla and Urmila are sisters. Rest all other options (listed below are incorrect)

Ranjit and Arnumia are not siblings, they are cousins.

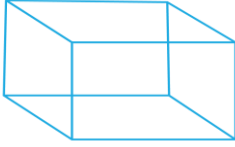
Ram and Meena are not siblings. He is her cousin.

Ranjit is not grandson of Urmila.

Q.7)

Ans) b

Exp) Option b is the correct answer



Required possibilities are:

Case I: All faces of same colour

Two possibilities are there,

1 – All Black

2 – All white

Case II: Any two faces are of the same colour and the remaining 4 faces are of the other colour.

1 - 2 adjacent faces black or white, and the remaining 4 faces are white or black (2 cases).

2 - 2 opposite faces are black or white, and the remaining 4 faces are white or black correspondingly (2 cases).

Case III: 3 sides are black and the other 3 sides are white.

1 - The 3 white-coloured faces are adjacent to one another (2 cases).

2 - Two of the three white-coloured faces are opposite to each other (2 cases).

Case IV: Exactly one face is painted black or red (2 cases).

Total number of cases: - 10 cases

Q.8)

Ans) b

Exp) Option b is the correct answer.

If S and P are in the three-seater, then to satisfy the given conditions, the following distribution of people should be followed.

Four-Seater – R, U, V, _

Three-Seater – S, P, _

Two-Seater – X, _

So, U and V should be in the four-seater with R.

Q.9)

Ans) c

Exp) Option c is the correct answer.

If S, T and W sit in the three-seater, then to satisfy the given conditions, the following should be the distribution of people in three different kinds of seats.

Four-Seater – R, U, V, P/Q

Three-Seater – S, T, W

Two-Seater – X, Q/P

So, X must be seated with either P or Q.

Q.10)

Ans) d

Exp) Option d is the correct answer.

Let's assume that Suman does 100 units of work in 2 days,

So, Raman does 100 units of work in 3 days.

Implies units of work Suman does in 1 day = $100/2 = 50$ units---(1)

Units of work Raman does in 1 day = $100/3$ units -----(2)

Given, Raman can do as much work in 4 days as much Aman can do in 5 days.

So, units of work which Raman can do in 4 days $= (100/3) \times 4 = 400/3$ units = the units of work which Aman can do in 5 days.

So, Aman can do $400/3$ units in 5 days.

Hence in 1 day, Aman can do $400/15$ units = $80/3$ units -----(3)

So, now the number of units of work by all three in one day = $[(50 + (100/3) + (80/3))] = 110$ units per day.

Given, it takes 20 days to complete a piece of work.

Hence the unit of work was = $110 \times 20 = 2200$ units of work

Given Speed of work of Raman from equation 2 is $100/3$ units per day.

So, using unitary method, the time taken to complete 2200 units of work $2200 / (100/3) = 66$ days.

Q.11)

Ans) d

Exp) Option d is the correct answer.

The passage states that ‘subjective experiences of individuals have now been granted equal footing with objective phenomena’. So it assumes that the subjective world and the objective world coexist. **Hence statement 1 is a valid assumption.**

In the passage it’s mentioned that ‘many have come to **cross examine the potency of science** and its ability to provide us with objective knowledge about the world’. It assumes that the validity of science is questionable. **Hence statement 2 is a valid assumption.**

The passage states that ‘postmodernists argue that scientific knowledge is itself shaped by societal factors and is thus not truly objective. It’s an argument put forward by a postmodernist. It’s not the assumption made in the passage. **Hence, statement 3 is an invalid assumption.**

In the passage it is stated that “the notion of reality itself has become an elusive and malleable concept,” so it assumes that the concept of reality is difficult to understand. **Hence, statement 4 is a valid assumption.**

Q.12)

Ans) c

Exp) Option c is the correct answer.

The passage begins with ‘No longer is the objective world the only reality that we can comprehend, for the subjective experiences of individuals have now been granted equal footing with objective phenomena in the post modernist world.’, so this is one of the ideas which is being discussed in the passage about the post-modernist world but this is not the crux of the passage. **Hence, option a is incorrect.**

Option b is also one of the aspects which is being questioned by the postmodernist movement. So this is also not the crux of the passage. **Hence, option b is incorrect.**

The passage discusses how the postmodernist movement has brought about a significant shift in the way we perceive reality, truth, science and knowledge. The central argument of the passage is that the postmodernist movement has challenged traditional notions of reality, truth, science and knowledge and has led to a fundamental questioning of their validity. Option c accurately reflects this central idea and is therefore the correct answer. The passage explains how each one of them is being questioned. **Hence, option c is correct.**

Option d is again one of the aspects which is being questioned in the passage. This again is not the crux of the passage. **Hence, option d is incorrect.**

Q.13)

Ans) c

Exp) Option c is the correct answer.

The passage states that one of the challenges is the issue of illegal immigration wherein people migrate in search of livelihood, so issuing work permits to the people migrating in search of job would help in identifying legal migrants and thus reducing the tensions along the border. Thus statement 1 could be the rational and practical application. **Hence, the statement 1 is correct.**

The passage mentions that ‘Another challenge is cross-border terrorism, which requires close coordination between various security agencies’. So strengthening national intelligence agencies can be the rational and practical implication but giving them power to prosecute the guilty would not be in favor of justice as prosecution is the prerogative of police and giving too much power to one agency is undemocratic. **Hence statement 2 is incorrect.**

In the passage it’s stated that ‘India has logistical challenges in terms of surveillance and patrolling’, so developing border infrastructure such as roads and helipads will help in monitoring the border. Hence, the statement 3 could be the rational and practical implication. **Hence, the statement 3 is correct.**

The passage states that ‘The challenges of border management in India are further complicated by the presence of various ethnic and linguistic groups in the border regions’ profiling of ethnic and linguistic minorities would lead to unnecessary targeting them. Hence statement four cannot be a rational and practical implication. **Hence, the statement 4 is incorrect.**

In the passage, it’s mentioned that ‘Utilizing robotics in monitoring the vast and diverse terrain of the border areas is an urgent necessity no nation can afford to overlook’, so utilizing unmanned aerial vehicles in difficult terrain could be a practical and rational implication. **Hence, statement 5 is correct.**

Q.14)

Ans) a

Exp) Option a is the correct answer.

The passage states that ‘old colonial empires were weakened in the wake of world war II and their legitimacy was increasingly called into question’, wherein they were confronted with new reality’. And this led to nationalist movements and hence decolonisation. Implies decolonisation is the result of weakening of colonial empires, not vice versa. **Hence Option 1 is incorrect.**

Same logic holds for questioning of legitimacy of colonies in wake of war, which culminated in the form of decolonisation, so this again is the cause of decolonisation, not it’s outcome. **Hence Option 3 is incorrect.**

In the passage it’s stated that Decolonisation reshaped global political landscape. Implies it led to Revamping of global political landscape. **Hence Option 2 is correct.**

The passage states that ‘ decolonization brought forth a triumph for anti-colonial forces and a step forward for global justice and equality’. Implies it led to conquest for anti-colonial forces and plunge towards global justice and equality. **Hence Options 4 and 5 are correct.**

Q.15)

Ans) c

Exp) Option c is the correct answer.

The passage mentions that decolonisation was marked by challenges and contradictions. “On the one hand, decolonization brought forth a triumph for anti-colonial forces and a step forward for global justice and equality. On the other hand, it was often a messy and violent process, marked by conflict and instability” so Option 1 represents a contradiction not the challenge, **hence Option 1 is incorrect.**

In the passage it’s mentioned that ‘The question of how to transfer of power from colonial regimes to new nationalist governments confronted all’, it implies it was a challenge. Confronted is another word for challenged. **Hence Option 2 is correct.**

The passage states that ‘The legacy of colonialism in itself was a challenge’ and poverty, inequality, and political instability were the legacy, so they are the challenges. **Hence Option 3 is correct.**

The passage mentions that transfer of power was difficult as ‘the nationalist movements were often deeply divided and lacked the institutional capacity to govern effectively’. It implies it was a challenge of decolonisation. **So Option 4 is correct.**

Q.16)

Ans) c

Exp) Option c is the correct answer

Marked price = Rs. 25000
Formula for successive discounts is

$$\text{Total Discount} = D1 + D2 - \frac{D1 \times D2}{100}$$

$$= 20 + 10 - \frac{20 \times 10}{100}$$

$$= 30 - 2$$

$$= 28\%$$

Since 100% = 25000

After applying 28% discount, 72% of 25000 = 18000.

Amount spent on repair = 3000.

Total cost price is = 18000 + 3000 = 21000.

Given that selling price is 28000.

Since SP > CP it is profit.

$$\text{Profit} = \text{SP} - \text{CP} = 28000 - 21000 = \text{Rs } 7000$$

$$\text{Profit}\% = \left(\frac{\text{Profit}}{\text{CP}}\right) \times 100$$

$$= \left(\frac{7000}{21000}\right) \times 100$$

$$= 33.33\%$$

Q.17)

Ans) c

Exp) Option c is the correct answer

For Athlete A:

1) Swimming: $2.5 \text{ km} / 4 \text{ km/h} = 0.625 \text{ h}$

2) Cycling: $40 \text{ km} / 36 \text{ km/h} = 1.111 \text{ h}$

3) Running: $10 \text{ km} / 12 \text{ km/h} = 0.833 \text{ h}$

4) Transition time: $2 * 10 \text{ min} = 20 \text{ min} = 0.333 \text{ h}$
Total time for Athlete A: $0.625 + 1.111 + 0.833 + 0.333 = 2.902 \text{ hours}$

For Athlete B:

1) Swimming: $2.5 \text{ km} / 5 \text{ km/h} = 0.5 \text{ h}$

2) Cycling: $40 \text{ km} / 30 \text{ km/h} = 1.333 \text{ h}$

3) Running: $10 \text{ km} / 15 \text{ km/h} = 0.667 \text{ h}$

4) Transition time: $2 * 10 \text{ min} = 20 \text{ min} = 0.333 \text{ h}$
Total time for Athlete B: $0.5 + 1.333 + 0.667 + 0.333 = 2.833 \text{ hours}$

So, Athlete B finishes the race ahead of Athlete A by a margin of $2.902 - 2.833 = 0.069 \text{ hours}$

To express the margin in minutes, we can multiply by 60

$$0.069 \times 60 \text{ minutes}$$

Or

To express the margin in seconds, we can multiply by 60

$$0.069 \times 60 \times 60 \text{ seconds}$$

$$= 248.4 \text{ seconds}$$

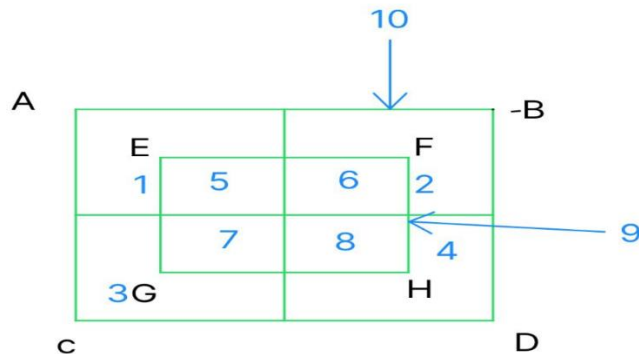
$$= \text{Roughly } 4 \text{ minutes and } 8 \text{ seconds}$$

Q.18)

Ans) b

Exp) Option b is the correct answer.

Based on the question provided, we need to determine the total number of squares in the given figure:



Upon counting, we have identified 8 squares, and we have found 2 additional squares, namely ABCD and EFHG. So, the total number of squares in the given figures is 10.

Q.19)

Ans) b

Exp) Option b is the correct answer.

Let the total number of villagers in the village be represented by 'x'. Then:

Number of villagers who have their own cows = $x/3$ Number of villagers who grow vegetables = $x/4$ Number of villagers who are skilled in weaving = $x/2$ Number of villagers who are under 30 years of age = $3x/4$

Option a is incorrect: All the villagers who have their own cows grow vegetables: This statement is not necessarily true because there is no information given about the relationship between owning cows and growing vegetables.

Option b is correct: Some villagers under 30 years of age are skilled in weaving: This statement is certainly correct since the number of villagers who are under 30 years of age is greater than the number of villagers who are skilled in weaving, so there must be some villagers under 30 years of age who are skilled in weaving.

Option c is incorrect: Only half of the villagers who grow vegetables are skilled in weaving. It is possible that more than half of the villagers who grow vegetables are skilled in weaving, or that less than half are skilled in weaving. The information given in the problem does not allow us to make any inference about the relationship between growing vegetables and being skilled in weaving.

Option d is incorrect: No villager under 30 years of age has his own cow. It is possible that some villagers under 30 years of age have their own cows, since one-third of the villagers have their own cows and three-fourths of the villagers are under 30 years of age. In fact, it is possible that all of the villagers who have cows are under 30.

Q.20)

Ans) c

Exp) Option c is the correct answer.

Let the four digits are A, B, C, D

 $A = B + C$

$$B = 2D$$

$$C = B - 1$$

$$D = \frac{1}{5}(A+B)$$

$$5D = A+B$$

$$5D = A + 2D$$

$$3D = A, D = \frac{A}{3}$$

$$B = \frac{2A}{3}, \frac{A}{3} = C$$

Hence the four digits are $A, \frac{2A}{3}, \frac{A}{3}, \frac{A}{3}$

The value of A has to be such that–

1) It is less than 10

2) It is divisible by 3

So, the value of A can be 3, 6, 9. Putting $A = 3$, Value of B is 2, C is 1, $D = 1$, these value satisfies all the given conditions.

Putting $A = 6$, Value of B is 4, C is 2, D is 2. These values do not satisfy the given conditions.

Putting $A = 9$, Value of B is 6, C is 3, $D = 3$. This again does not satisfy the given conditions.

So, the number of possible passcode is just one i.e. 3211.

Q.21)

Ans) d

Exp) Option d is the correct answer.

In the passage it's mentioned that 'As the night wears on, the rustling continues, the creatures below unaware of the watchful eye above' so it implies that small creatures are unaware of the threat. **Hence option a is incorrect.**

The passage mentions the owl's keen senses, which suggest that it is a predator that preys on small animals, but the passage does not explicitly state that the owl preys on the creatures in the underbrush. **Hence option b is incorrect.**

Additionally, there is no evidence in the passage to suggest that the small creatures and the owl can't coexist peacefully, as the owl is described as a solitary predator. **Hence option c is incorrect.**

The passage mentions that 'The small creatures are nocturnal and only come out at night to forage for food. This inference is supported by the passage's description of the creatures scurrying about at night in search of food and shelter.' **Hence option d is correct.**

Q.22)

Ans) d

Exp) Option d is the correct answer.

The passage states that despite the advances in neuroscience and psychology, we struggle to analyze the intricacies of consciousness and workings of the brain. It implies that it is difficult to comprehend the interfaces and workings of the brain, but it cannot be implied that research in neuroscience and psychology have been of feeble help, as feeble means 'faint'. **Hence, option a is incorrect.**

In the passage it's stated that "while others argue that it is more akin to a network of complex, interrelated systems", from this it is implied that activities of the brain are strenuous. But the option states that they are unemphatic, which is opposite to complex. **Hence Option b is incorrect.**

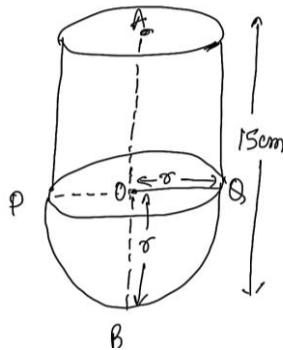
Passage states that 'the mind is like an iceberg, with only a small fraction of its activity visible above the surface', but minuscule means extremely small. **Hence, option c is incorrect.**

The passage concludes that 'The fiber of the mind is a perplex that may never be resolved, and yet it is a puzzle that we are compelled to continue to explore'. It implies that The nature of the mind is a puzzle that on no account can be fully solved. Therefore, **option d is the best choice as it accurately reflects the main idea of the passage.**

Q.23)

Ans) c

Exp) Option c is the correct answer.



Given, the diameter of the hemispherical bowl is 14cm, implies $PQ = 14\text{cm}$,

So the radius of hemispherical bowl (r) = 7 cm

Now, the volume of the hemispherical bowl = $(\frac{2}{3})\pi r^3 = (\frac{2}{3})\pi (7)^3 = 718.66$ cubic cm.---(1)

For the cylinder above,

Height of the cylindrical portion of the mug is $(15-7) = 8$ cm

Radius of the cylindrical portion is also $OQ = 7$ cm.

So volume of the cylindrical portion = $\pi r^2 h = (\frac{22}{7})\pi (7)^2 (8) = 1232$ cubic cm.-----(2)

Using equation 1 and 2,

Volume of the coffee mug is Sum of volume of cylindrical portion and that of hemispherical bowl = $1232 + 718.66 = 1950.66$ cubic cm

Q.24)

Ans) d

Exp) Option d is the correct answer.

Name	Rasgulla	Burfy	Kalakand	Peda
Seema	✓	✓	✗	✗
Cheenu	✗	✗	✓	✗
Lalita	✓	✓	✗	✓
Teena	✓	✗	✗	✓
Somi	✓	✓	✗	✗

Q.25)

Ans) c

Exp) Option c is the correct answer.

Name	Rasgulla	Burfy	Kalakand	Peda
Seema	✓	✓	✗	✗
Cheenu	✗	✗	✓	✗
Lalita	✓	✓	✗	✓
Teena	✓	✗	✗	✓
Somi	✓	✓	✗	✗

Q.26)

Ans) a

Exp) Option a is the correct answer.

Let's write the numbers in term of their factors,

$$12^{48} = (3 \times 4)^{48} = 3^{48} \times 4^{48} \text{-----(1)}$$

$$32^{32} = (4 \times 4 \times 2)^{32} = 4^{64} \times 2^{32} \text{-----(2)}$$

$$54^{18} = (3 \times 3 \times 3 \times 2)^{18} = 3^{54} \times 2^{18} = 3^{54} \times 2^{(2 \times 9)} = 3^{54} \times 4^9 \text{-----(3)}$$

$$108^{12} = (2 \times 2 \times 3 \times 3 \times 3)^{12} = 3^{36} \times 2^{24} \text{-----(4)}$$

From equation 1 and 3 it's evident that equation 1 is greater than equation 3.

From equation 1 and 4 it is evident that equation 1 is greater than equation 4.

So equation 2 and 1 have to be compared.

$$3^{48} \times 4^{48} = 3^{48} \times (2^2)^{48} = 3^{48} \times 2^{96} \text{-----1a}$$

$$4^{64} \times 2^{32} = (2^2)^{64} \times 2^{32} = 2^{(128+32)} = 2^{160} = 2^{96} \times 2^{54} \text{----2b}$$

Analyzing equation 1a and 2b we get that , now we have to compare

 3^{48} and 2^{54}

$$3^{48} = (3^3)^{16} = 27^{16} \text{----1c}$$

$$2^{54} = (2^3)^{18} = 8^{18} \text{-----2c}$$

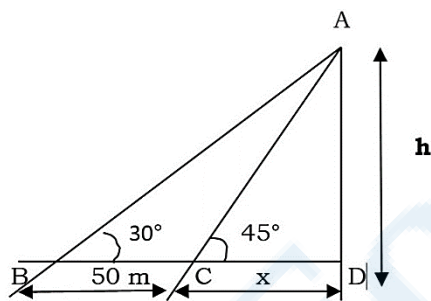
From 1c and 2c it is evident that 1c is greater.

Hence in the given numbers 12^{48} is the greatest.

Q.27)

Ans) c

Exp) Option c is the correct answer.



Let AD be the tower, BD be the initial shadow and CD be the final shadow.

Given that $BC = 50$ m, $\angle ABD = 30^\circ$, $\angle ACD = 45^\circ$,Let $CD = x$, $AD = h$ From the right $\triangle CDA$,

$$\tan 45^\circ = \frac{AD}{CD}$$

$$1 = \frac{h}{x} \text{ (eq. 1)}$$

From the right $\triangle BDA$,

$$\tan 30^\circ = \frac{h}{50 + x}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{50 + x} \text{ (eq. 2)}$$

From (eq. 1) and (eq. 2), we get

$$\sqrt{3}h = 50 + h$$

$$h = \frac{50}{0.732} = 68.30 \text{ m}$$

Q.28)

Ans) b

Exp) Option b is the correct answer.

Total No of Pens = 12

Total No of Green Pens = 7

Total No of Black Pens = 5

Given Condition: Number of Possible ways to draw 8 pens from the bag which contains at least 1 green and 1 black

No of Possible ways are $= (6,2) (5,3) (4,4)$

Case 1:

$${}^7C_6 \times {}^5C_2$$

$$\Rightarrow 7 \times 10$$

$$\Rightarrow 70$$

Case 2:

$$\Rightarrow {}^7C_5 \times {}^5C_3$$

$$\Rightarrow 7 \times 3 \times 5 \times 2$$

$$\Rightarrow 21 \times 10$$

$$\Rightarrow 210$$

Case 3:

$$\Rightarrow {}^7C_4 \times {}^5C_4$$

$$\Rightarrow 35 \times 5$$

$$\Rightarrow 175$$

$$\text{Total Ways} = 70 + 210 + 175$$

$$\Rightarrow 455.$$

Q.29)

Ans) d

Exp) Option d is the correct answer.

Price of wheat increases by 40 paise every year, while the price of rice increases by 15 paise every year.

In 2014, price of wheat = Rs. 4.20 = 420 paise

Price of rice = Rs. 6.30 = 630 paise

Let number of years = x

According to question,

$$420 + 40x = 40 + 630 + 15x$$

$$25x = 250, x = 10 \text{ years}$$

So, it will take 10 years for the price of wheat to be 40 paise above the price of rice.

$$2014 + 10 = 2024$$

Q.30)

Ans) b

Exp) Option b is the correct answer.

The passage states that as the world population continues to grow, there is an increase in man animal conflict, so the passage refers to the increase. Man animal conflict is not the outcome of the explosion of the human population. **Thus statement 1 is invalid assumption.**

Passage says that it is a challenge to accommodate the interest of men and humans. So it assumes that it is difficult to reconcile the interests of man and human. **Hence statement 2 is a valid assumption.**

The passage mentions that humans often view wild animals as a threat to their lives and livelihoods. But from this we can't assume that there is a shortage of livelihood opportunities for humans. **Hence statement 3 is an invalid assumption.**

Q.31)

Ans) a

Exp) Option a is the correct answer.

The passage states that geofencing is used at various reserves. Hence it is inferred that technology can be used. **Hence statement 1 is correct.**

The passage nowhere mentions that the existing conservation strategies are insufficient. **Hence statement 2 is incorrect.**

The passage does not state that conservation reserves should be created where Animals should be confined. **Hence, statement 3 is incorrect.**

The passage states that there is need for more research but from this we cannot infer that there is no research wing existing in the department. **Hence statement 4 is incorrect.**

Q.32)

Ans) d

Exp) Option d is the correct answer.

The passage states that 'The increase in the production of shale oil in the United States has contributed to the oversupply of oil in the global market and led to the decline in prices of traditional oil', so this assumes that it adversely affects the economies of oil producing nations. **Hence statement 1 is a valid assumption.**

In the passage it's mentioned that 'The COVID-19 has exacerbated the "weak" oil market'. It implies that the oil market was already weak before COVID 19. **Hence Statement 2 is a valid assumption.**

The passage states that 'But cutting oil production can result in layoffs and job losses in the oil industry.' So it assumes that reducing oil production will adversely affect the nation's economy. **Hence Statement 3 is a valid assumption.**

Q.33)

Ans) c

Exp) Option c is the correct answer.

The passage mentions that Some may argue that they cannot spare the price to cut production, as oil exports may be their primary source of revenue. This implies that Reducing oil production is unaffordable for many countries. **Statement 1 is correct.**

The passage mentions geopolitical factors determine the price of the oil but this does not mean that there is a geopolitical instability in the world. **Hence statement 2 is incorrect.**

In the Passage it is stated that 'But reducing oil production requires shutting down oil wells, which can be a complex and time-consuming process', so it implies that Oil production can't be turned on and off according to one's own whims and fancies. **Hence statement 3 is correct.**

The passage states that 'reducing production levels can result in a decline in the grade of oil', so it says that "it can", we can't be sure that it does impact the quality of oil. **Hence statement 4 is incorrect.**

Q.34)

Ans) c

Exp) Option c is the correct answer.

Option a is too broad and implies that all critical transitions can be prevented, which is not necessarily true. **Hence, option a is incorrect.**

Option b is a statement made in the passage, but it is not the most practical implication. **Hence, option b is incorrect.**

The passage discusses how statistical properties of the fluctuations in a system's dynamics can provide early warning signals for critical transitions in ecosystems. Specifically, the coefficient of variation of the fluctuations can increase as a system approaches a critical transition, serving as an early warning signal. **Hence, option c is correct.**

{Critical slowing down ==> can increase the autocorrelation and variance of the system dynamics ==> increase in the coefficient of variation of the fluctuations ==> it can serve as an early warning signal for a critical transition.}

Option d is also a statement/ fact stated in the passage, but it does not provide a practical implication. **Hence, option d is incorrect.**

Q.35)

Ans) b

Exp) Option b is the correct answer.

To solve this problem, we need to use some basic principles of calendar arithmetic.

First, note that April has 30 days, May has 31 days, June has 30 days, July has 31 days, August has 31 days, and September has 30 days.

Next, we can count the number of days from April 1st to September 10th.

April: $30 - 1 = 29$ days

May: 31 days

June: 30 days

July: 31 days

August: 31 days

September 10th: 10 days

The total number of days is therefore $29 + 31 + 30 + 31 + 31 + 10 = 162$ days.

Since 162 is not divisible by 7 (the number of days in a week). The remainder is 1. So we know that September 10th is exactly 23 weeks ($161 : 7$) after April 1st +1 day.

Since April 1st is a Tuesday, September 10th will be on Wednesday.

Q.36)

Ans) a

Exp) Option a is the correct answer.

From the above clues, Lets create a relationship table:

Step 1: **The person who owns Mercedes is drinking blue lagoon. The person sitting on Scorpio is drinking green mojito. The person in Alto is drinking Black Coffee:** Based on these two clues, we can draw this:

Car	Mercedes	Scorpio	Alto			
Beverage	Blue L	Green M	Black C			

Step 2: **Ellen is standing next to the person who owns Safari. Fig is drinking Red bull.** It is also given the sequence of friend's name. so, we can say:

Name	Alice	Bob	Cirus	Dave	Ellen	Fig
Car				Safari		
Beverage						Red B

SFG – FRC for CSE 2024 | CSAT #1 – Solutions |

Step 3: **Alice does not own BMW or Alto.** So, Alice can have Mercedes, Scorpio or Ciaz. **Owner of Ciaz is standing at one end of the line.** So Ciaz can be either owned by Alice or Fig. In step 1, it's mapped that both Scorpio and Mercedes have beverages as Blue Lagoon and Green Mojito, Ciaz can only go at right corner. So now Alice is left with two vehicle option: Mercedes and Scorpio. It's also given **Cirus does not own Scorpio.** So Cirus can own Alto, BMW or Mercedes. Alto can be only given to Cirus, Bob or Ellen.

Name	Alice	Bob	Cirus	Dave	Ellen	Fig
Car	Merc/Scor	Alt	Alt/BMW/Mer c	Safari	Alt	Ciaz
Beverage	Blue/Green					Red B

Step 4: **The person drinking black coffee is standing next to the person drinking orange juice.** That means, Orange and Black will be in same sequence. And Black is paired with Alto, so Car and Beverage mapping will be

Car

Car	Mercedes	Scorpio		Alto		
Beverage	Blue L	Green M	Orange J	Black C		

If we combine step 3 and 4, Its clear that Bob can't own Alto, as Alice can't have orange. So now Only Cirus can have Alto. So, Bob will have Orange Juice. And BMW is the only car which is not mapped with any color so Bob will certainly own BMW. Yellow daisy is the only beverage, which is not mapped with any car so it will go with Safari.

Name	Alice	Bob	Cirus	Dave	Ellen	Fig
Car	Merc/Scor	BMW	Alto	Safari	Merc/Scor	Ciaz
Beverage	Blue/Green	Orange J	Black C	Yellow D	Blue/Green	Red B

Let's match the options with the table, the only correct combination is option a.

Q.37)

Ans) b

Exp) Option b is the correct answer.

The total cost of production by Company A = $\frac{15}{100} \times 25 = 3.75$ crore

The total cost of production by Company C = $\frac{22}{100} \times 25 = 5.5$ crore

Cost of production of mobile phones by company A = $\frac{2}{5} \times 3.75 = 1.5$ crore

Cost of production of mobile phones by company C = $\frac{4}{5} \times 5.5 = 4.4$ crore

∴ Required Total cost of the production of mobile phones by companies A and C = 1.5 + 4.4 = 5.9 crores

Q.38)

Ans) d

Exp) Option d is the correct answer.

Required % = $\frac{\frac{5}{100} \times \frac{1}{5} \times 25}{\frac{8}{100} \times \frac{5}{8} \times 25} \times 100 = \frac{0.25}{1.25} \times 100 = 20\%$

Q.39)

Ans) c

Exp) Option c is the correct answer.

The passage states that 'Despite various policies and initiatives undertaken by the government to encourage women to enter the workforce, the ratio has remained disappointingly low.' So it assumes that

'The government initiatives have not been successful to encourage women to participate in the workforce', **hence statement 1 is a valid assumption.**

The passage mentions 'deeply ingrained patriarchal mindset prevalent in the society. Women are often expected to take care of the household and the family, while men are considered the primary breadwinners'. So it assumes that women are to stay inside the house and take care of the family, and it does not want women to step outside. **Hence statement 2 is a valid assumption.**

The passage states that 'lack of "adequate" child care facilities and flexible work arrangements, makes it difficult for women to pursue their careers. From this we can't assume that Indian employers in general do it provide healthcare facilities. Adequate means not enough. **Hence statement 3 is an invalid assumption.**

In the passage it's stated that 'Even those who manage to complete their education often lack the necessary skills and training required for the job market.' So the skill set is mentioned here but not higher education'. **Hence statement 4 is an invalid assumption.**

Q.40)

Ans) d

Exp) Option d is the correct answer.

The passage mentions that 'Another factor that contributes to the low female workforce ratio is the inadequate education and training opportunities available to women' so 'Providing access to vocational training, apprenticeship and higher education can help women overcome the barriers'. **Hence Statement 1 is correct.**

Since statement 2 is a valid suggestion in general ,but telecommuting at the workplace is nowhere Implicitly or explicitly hinted at in the passage. **Hence statement 2 is incorrect.**

Statement 3 is a good suggestion, but not based on the passage, **Hence statement 3 is incorrect.**

Cultural norms and Patriarchal mindset have been mentioned as obstacles, so Statement 4 is a valid suggestion based on passage. **Hence Statement 4 is correct.**

The passage mentions discrimination in the workplace and obscene behavior as one of the factors, **so statement 5 is a valid suggestion based on the passage.**