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(1) Statement and Assumptions

Directions (Questions 1 to 50): In each of the following questions, one or more statements are followed by some assumptions. Read the statements carefully and determine which assumption/assumptions is/are implicit in the statement.

1. **Statement:** The government has decided to introduce a new tax regime that rewards compliance while severely penalising evasion, with retrospective application in select cases.

Assumptions:

- I. Taxpayers generally prefer lower effective tax rates over complex compliance procedures.
- II. Retrospective application is necessary to deter large-scale organised evasion that has already occurred.

Option:

- (1) Only I is implicit
- (2) Only II is implicit
- (3) Both I and II are implicit
- (4) Neither I nor II is implicit
- (5) Question not attempted

Ans: (2)

Explanation:

❖ **Assumption I is not implicit.** The statement talks about rewarding compliance and penalising evasion but does not assume or imply anything about taxpayers preferring lower tax rates over simpler/complex procedures. This assumption is unrelated to the core logic of the policy.

❖ **Assumption II is implicit.** The decision to implement a provision with retrospective effect in some cases can only be made with the assumption that large-scale organized tax evasion had occurred in the past, which needed to be prevented and acted upon. Without such a belief, there would be no need or justification for a retrospective provision.

2. **Statement:** Despite repeated warnings, universities continue to produce graduates with degrees that have little relevance to the emerging gig economy and AI-driven job market.

Assumptions:

- I. University curricula are largely static and resistant to rapid technological changes.
- II. The gig economy and AI-driven jobs represent the dominant future employment landscape.

Option:

- (1) Only I is implicit
- (2) Only II is implicit
- (3) Both I and II are implicit
- (4) Neither I nor II is implicit
- (5) Question not attempted

Ans: (1)

Explanation:

❖ **Assumption I is implicit.** The statement mentions that universities are producing graduates who have little connection to the emerging gig economy and the AI-based job market. This statement is based on the assumption that university curricula are not being adequately updated to align with current technological shifts and new employment requirements. If curricula were evolving in step with rapidly changing needs, there would not be such a disconnect between graduates and these new employment sectors. Therefore, this assumption is implicit in the statement.

❖ **Assumption II is not implicit.** The statement merely highlights the limited connection graduates have with the gig economy and the AI-based job market. It does not rely on the assumption that these sectors will become the primary source of employment in the future. The need for universities to prepare for an emerging sector is distinct from that sector becoming the mainstay of future employment. Therefore, this assumption is not implicit in the statement.



(2) Statement and Argument

Directions (Questions No. 1 to 50): In each of the following questions, a statement is given, followed by some arguments. Read the statement carefully and consider all the arguments, and determine which of the argument(s) is/are strong with respect to the statement.

1. **Statement:** India should ban the export of all agricultural commodities during periods of domestic inflation.

Argument:

- I. Banning exports during inflation will ensure adequate domestic supply, stabilize prices, and protect vulnerable sections of the population.
- II. Such a ban will damage India's credibility as a reliable global supplier, leading to long-term loss of export markets and adversely affecting farmers' income.

Option:

- (1) Only Argument I is strong
- (2) Only Argument II is strong
- (3) Both I and II are strong
- (4) Neither I nor II is strong
- (5) Question not attempted

Ans: (3)

Explanation:

- ❖ **Argument I is strong:** This argument presents a practical and immediate solution during a period of inflation. Restricting exports will increase the supply of agricultural commodities in the country, which will help control prices and provide relief to poor and vulnerable sections.
- ❖ **Argument II is strong:** This argument correctly highlights the long-term effects. Repeatedly imposing export restrictions may damage India's image as a reliable supplier. This can lead to the loss of foreign markets, a decline in exports, and ultimately have a negative impact on farmers' income.

2. **Statement:** All coaching institutes for competitive examinations should be required to publish their success rates transparently.

Argument:

- I. Transparency in success rates will help students make informed choices and reduce exploitation by institutes that make false claims.
- II. Publishing success rates is impractical because success depends on multiple factors including student effort, and it may discourage new institutes from entering the market.

Option:

- (1) Only Argument I is strong
- (2) Only Argument II is strong
- (3) Both I and II are strong
- (4) Neither I nor II is strong
- (5) Question not attempted

Ans: (1)

Explanation:

- ❖ **Argument I is strong:** Many coaching institutes advertise impressive results that students cannot easily verify. If institutes are required to publish their actual success rates, students can compare them more fairly and make better decisions about where to spend their time and money. This increases transparency, reduces misleading claims, and helps protect students from being misled.
- ❖ **Argument II is weak:** Publishing success rates is not difficult because institutes can easily report how many students cleared the exam. Student effort matters, but coaching quality and guidance also play an important role. Also, there is no strong reason to believe that transparency will discourage new institutes; instead, it can help good institutes earn students' trust.



(3) Statements and Conclusion

Directions (Questions No. 1 to 50): In each of the following questions, a statement is given followed by some conclusions, numbered as I, II, III, etc. Read the statement carefully and determine which of the conclusion(s) logically follow(s) from the statement.

1. **Statement:** No employee who has received a major disciplinary penalty is eligible for promotion during the next five years. Some employees receiving major penalties have challenged the decision in court.

Conclusions:

- I. Some employees who challenged the decision in court are not eligible for promotion during the next five years.
- II. Every employee who challenges a disciplinary decision in court becomes ineligible for promotion.

Option:

- (1) Only conclusion I follows
- (2) Only conclusion II follows
- (3) Both conclusion I & II follow
- (4) Neither conclusion I nor conclusion II follow
- (5) Question not attempted

Ans: (1)

Explanation:

- ❖ **Conclusion I Follows:** The statements state that some employees who received major disciplinary penalties have challenged those decisions in court. Since any employee who has received a major disciplinary penalty is not eligible for promotion for the next five years, these employees also come under that rule. Therefore, it logically follows that the employees who challenged the decision in court are not eligible for promotion during the next five years.
- ❖ **Conclusion II does not follow:** It states that every employee who challenges a disciplinary decision becomes ineligible for promotion. However, the statement provides information only about employees who have received a major disciplinary penalty. There is no basis to extend this rule to employees challenging minor penalties or any other disciplinary decisions. Therefore, this conclusion does not logically follow from the given statement.

2. **Statements:** Every major scientific breakthrough in the last century was preceded by significant government funding in basic research. Private sector funding focuses primarily on applied research.

Conclusions:

- I. Government funding in basic research is indispensable for major breakthroughs.
- II. Private funding alone can never lead to major scientific breakthroughs.

Option:

- (1) Only I follows
- (2) Only II follows
- (3) Both I & II follow
- (4) Neither I nor II follow
- (5) Question not attempted

Ans: (1)

Explanation:

- ❖ **Conclusion I follows:** The first statement explicitly states that every major scientific breakthrough in the last century was preceded by significant government funding in basic research. Because every single breakthrough required this funding to happen, it is logically correct to conclude that government funding in basic research is indispensable (absolutely necessary) for these breakthroughs to occur.
- ❖ **Conclusion II does not follow:** This conclusion is too absolute. The statements indicate that private funding primarily focuses on applied research, but they do not suggest that private funding can never support major scientific breakthroughs. The word "never" goes beyond the information given, so the conclusion does not logically follow.

3. **Statements:** No democracy with deep social inequality has achieved long-term political stability. Several Latin American countries exhibit both deep inequality and periodic political instability.

Conclusions:

- I. Deep social inequality causes political instability in democracies.
- II. Long-term stability in democracies requires addressing social inequality.



(4) Statement and Courses of Action

Directions (Questions No. 1 to 50): In each of the following questions, a statement is given followed by some courses of action, numbered as I, II, III, etc. Read the statement carefully and determine which of the course(s) of action logically follow(s) from the statement.

1. **Statement:** An internal audit has revealed that despite the availability of sufficient funds, nearly 35% of infrastructure projects sanctioned under a rural development scheme remain incomplete due to repeated changes in project specifications by local authorities.

Courses of Action:

- I. The power of local authorities to modify project specifications should be withdrawn altogether.
- II. A mechanism for scrutiny and approval of substantial specification changes should be instituted.

Option:

- (1) Only I follows
- (2) Only II follows
- (3) Both I and II follow
- (4) Neither I nor II follows
- (5) Question not attempted

Ans: (2)

Explanation:

❖ **Course of Action I does not follow:** Taking away the power of local authorities to make any changes in project plans is too extreme. Sometimes changes are necessary because of local conditions, unexpected problems, or public needs. Completely removing this power may create difficulties in completing projects effectively.

❖ **Course of Action II follows:** This is a practical and balanced solution. Instead of stopping all changes, it ensures that any modification is properly checked and approved. This will increase accountability and help prevent unnecessary changes that are causing delays in infrastructure projects.

2. **Statement:** Despite the enactment of the Forest Rights Act, 2006, many tribal communities continue to face displacement due to development projects without proper recognition of their community forest rights.

Courses of Action:

- I. All development projects in forest areas should require mandatory Gram Sabha consent before any land diversion.
- II. The Ministry of Tribal Affairs should be empowered to veto projects that violate FRA provisions.

Option:

- (1) Only I follows
- (2) Only II follows
- (3) Both I and II follow
- (4) Neither I nor II follows
- (5) Question not attempted

Ans: (1)

Explanation:

❖ **Course of Action I follows:** The Forest Rights Act (FRA), 2006 was enacted to recognize and protect the forest rights of tribal communities. Since the problem is that these rights are being ignored during development projects, making Gram Sabha consent mandatory would ensure that tribal communities are consulted and their rights are properly considered before any land diversion.

❖ **Course of Action II does not follow:** Giving the Ministry of Tribal Affairs absolute veto power over development projects creates a severe structural imbalance in federal governance.. Such projects involve multiple ministries and state governments, and a unilateral veto could create administrative delays and conflicts rather than addressing the root problem of poor implementation of FRA provisions.

**(5) Analytical Reasoning/ Critical Reasoning**

1. A policy analyst argues: "Whenever a city increases investment in public transport, traffic congestion decreases. City X increased investment in public transport last year. Therefore, traffic congestion in City X must have decreased." Which of the following, if true, most weakens the argument?

- (1) Public transport fares in City X were reduced last year.
- (2) The number of private vehicles in City X increased sharply last year.
- (3) City X has a larger population than neighboring cities.
- (4) Public transport investment was higher in City X than in City Y.
- (5) Question not attempted

Ans: (2)**Explanation:**

- ❖ If many new private vehicles are added to the roads at the same time, the reduction in traffic caused by people using public transport may not be enough. The extra cars can fill up the space that was freed, so traffic congestion may stay the same or even become worse.
- ❖ Therefore, the increase in private vehicles provides a strong reason why the investment in public transport might not reduce traffic jams. **Therefore, option (2) weakens the argument the most.**

2. Seven people P, Q, R, S, T, U, V live on seven different floors of a building (1 being lowest, 7 highest).
- Only two people live between T and V.
 - P lives immediately above S.
 - Q lives on an odd-numbered floor above R.
 - U lives on floor 4.
 - More than three people live between P and Q.
 - R does not live on the lowest floor.

Who lives on the topmost floor?

- (1) P
- (2) T
- (3) Q
- (4) V
- (5) Question not attempted

Ans: (3)**Explanation:**

7	Q
6	V/T
5	R
4	U
3	T/V
2	P
1	S

3. **Directions:** The question below is followed by two statements, I and II. You must decide whether the data provided in the statements are sufficient to answer the question.

Question: On which day of the week did Vikram take charge as the District Collector of Jaipur?

Statement I: Vikram took charge on an even-numbered date of the month, and the month started on a Tuesday.

Statement II: Vikram took charge exactly three days after the state governance review meeting, which occurred on the 11th day of that month.

Option:

- (1) Statement I alone is sufficient to answer the question, but Statement II alone is not sufficient.
- (2) Statement II alone is sufficient to answer the question, but Statement I alone is not sufficient.
- (3) Both Statement I and Statement II together are necessary to answer the question.
- (4) Both Statement I and Statement II together are not sufficient to answer the question.
- (5) Question not attempted

Ans: (3)**Explanation:**

- ❖ **Statement I alone: X** It only tells us that Vikram took charge on an even-numbered date and that the month started on a Tuesday. The exact date is not known, so the day of the week cannot be determined.

**(6) Number/Letter sequences**

1. Study the following arrangement carefully and answer the questions (131 & 132) given below:

F 4 © T 2 E % M P 5 W 9 @ L Q R 6 U H 3 Z 7 Ø A T
B 8 V # G \$ Y D

What should come in place of question mark (?) in the following series based on the above arrangement?

TEM 59L RU3 ?

- (1) 7AB
- (2) 7AT
- (3) Ø78
- (4) ABV
- (5) Question not attempted

Ans: (1)

Explanation:

Step	TEM	59L	RU3	7AB
Take 1st Character	T	5	R	7
Skip next Character	2	W	6	Ø
Take 2nd Character	E	9	U	A
Skip next Character	%	@	H	T
Take 3rd Character	M	L	3	B
Transition to next unit (Skip next Character)	P	Q	Z	-
❖ 7 → Ø → A → T → B = 7AB				

2. How many such consonants are there in this arrangement, each of which is immediately preceded by a number but not immediately followed by a number?

F 4 © T 2 E % M P 5 W 9 @ L Q R 6 U H 3 Z 7 Ø A T
B 8 V # G \$ Y D

- (1) Four
- (2) Three
- (3) One
- (4) Two
- (5) Question not attempted

Ans: (3)

Explanation:

Consonant	Preceded By Number	Followed By
W	5	9
Z	3	7
V	8	#
Only V satisfies the condition		

3. Complete the following series:

FAG GAF HAI IAH ____

- (1) HAL
- (2) JAK
- (3) JAI
- (4) HAK
- (5) Question not attempted

Ans: (2)

Explanation:

- ❖ The middle letter is fixed as A in all terms.
- ❖ The first and third letters are consecutive letters in the alphabet, but they reverse their positions in every alternate term.
- ❖ Step-by-Step:
 - FAG - First letter F, Third letter G (F+1 = G)
 - GAF - Reversed: G ... F
 - HAI - Next pair: H ... I (H+1 = I)
 - IAH - Reversed: I ... H
 - Next - Following the pattern: J ... K (J+1 = K)
 - J A K

4. Complete the following series:

KM5 IP8 GS11 EV14

- (1) BY17
- (2) BX17
- (3) CZ17
- (4) CY17
- (5) Question not attempted

Ans: (4)

Explanation:

1st element (-2)	2nd element (+3)	3rd element (+3)
K (11)	M (13)	5
I (9)	P (16)	8

**(7) Coding-Decoding**

1. If PAPERS is coded as 69, then SMOOTH is coded as?

- (1) 84
(2) 67
(3) 71
(4) 98
(5) Question not attempted

Ans: (1)

Explanation:

- ❖ The code is the sum of the position of letters and then 6 is subtracted from it.
- ❖ P - 16, A - 1, P - 16, E - 5, R - 18, S - 19
- ❖ Sum = $16 + 1 + 16 + 5 + 18 + 19 = 75 - 6 = 69$
- ❖ S - 19, M - 13, O - 15, O - 15, T - 20, H - 8
- ❖ Sum = $19 + 13 + 15 + 15 + 20 + 8 = 90 - 6 = 84$

2. In a code language, 'DANGER' is written as '52158619', 'SAFE' is written as '20276'. What is the code for 'GUIDE' in that code language?

- (1) 8221046
(2) 7221076
(3) 8221056
(4) 6221056
(5) Question not attempted

Ans: (3)

Explanation:

The given code is created by adding 1 to the position value of each letter.

DANGER → 52158619

$$D(4) + 1 = 5$$

$$A(1) + 1 = 2$$

$$N(14) + 1 = 15$$

$$G(7) + 1 = 8$$

$$E(5) + 1 = 6$$

$$R(18) + 1 = 19$$

Therefore, code = 5 2 15 8 6 19 = 52158619

SAFE → 20276

$$S(19) + 1 = 20$$

$$A(1) + 1 = 2$$

$$F(6) + 1 = 7$$

$$E(5) + 1 = 6$$

Therefore, code = 20 2 7 6 = 20276

Now, GUIDE:

$$G(7) + 1 = 8$$

$$U(21) + 1 = 22$$

$$I(9) + 1 = 10$$

$$D(4) + 1 = 5$$

$$E(5) + 1 = 6$$

Therefore, code = 8 22 10 5 6 = 8221056

3. In a certain code language, 'SAPLING' is written as 'VXSILKJ'. How will 'MANIFEST' be written in the same language?

- (1) PBVQXQFI
(2) PXQFIBVQ
(3) FIBPXQVQ
(4) PIBVQXVF
(5) Question not attempted

Ans: (2)

Explanation:

अक्षरों में क्रमशः +3, -3, +3, -3... का पैटर्न अपनाया गया है।

$$❖ S + 3 = V$$

$$❖ A - 3 = X$$

$$❖ P + 3 = S$$

$$❖ L - 3 = I$$

$$❖ I + 3 = L$$

$$❖ N - 3 = K$$

$$❖ G + 3 = J$$

अब, MANIFEST के लिए:

$$❖ M + 3 = P$$

$$❖ A - 3 = X$$

$$❖ N + 3 = Q$$

$$❖ I - 3 = F$$

$$❖ F + 3 = I$$

$$❖ E - 3 = B$$

$$❖ S + 3 = V$$

$$❖ T - 3 = Q$$

अतः, MANIFEST → PXQFIBVQ

4. In a certain code language, "BRAVE" is coded as 3192236, and "HONEST" is coded as 9161562021. How will "MORAL" be coded?

- (1) 144151812
(2) 144151912
(3) 145152013
(4) 141619213
(5) Question not attempted

**(8) Problems relating to Relations**

1. If $A + B$ means A is the mother of B, $A - B$ means A is the brother of B, $A \% B$ means A is the father of B, $A \times B$ means A is the sister of B, Which of the following shows that P is the maternal uncle of Q?

- (1) $Q - N + M \times P$
- (2) $P + S \times N - Q$
- (3) $P - M + N \times Q$
- (4) $Q - S \% P$
- (5) Question not attempted

Ans: (3)**Explanation:**

- ❖ $P - M \Rightarrow P$ is the brother of M.
- ❖ $M + N \Rightarrow M$ is the mother of N.
- ❖ $N \times Q \Rightarrow N$ is sister of Q.
- ❖ Since N and Q are siblings, M is also the mother of Q.
- ❖ So: $M \Rightarrow$ mother of Q
- ❖ $P \Rightarrow$ brother of M
- ❖ Therefore, P is the maternal uncle of Q.

2. A family consists of 6 members P, Q, R, X, Y, Z. Q is the son of R but R is not the mother of Q. P and R are a married couple. Y is the brother of R, X is the daughter of P. Z is the brother of P. How many female members are there in the family?

- (1) 1
- (2) 2
- (3) 3
- (4) 4
- (5) Question not attempted

Ans: (2)**Explanation:**

- ❖ Family members: P, Q, R, X, Y, Z (6 members)
- ❖ **Q is the son(male)** of R but R is not the mother of Q.
- ❖ So, R is the father of Q = **R is male**
- ❖ P and R are a married couple.
- ❖ Since R is male, **P is female** (wife of R).
- ❖ Y is the brother of R = **Y is male**.
- ❖ X is the daughter of P = **X is female**.
- ❖ Z is the brother of P = **Z is male**.
- ❖ Therefore, the female members of the family are only P and X, i.e. 2.

3. S is the daughter of the only son of K. N is the mother of D. Y's only son, A, is married to N. K is the paternal grandfather of D. How is K related to A?

- (1) Brother
- (2) Son
- (3) Father
- (4) Paternal Uncle
- (5) Question not attempted

Ans: (3)**Explanation:**

- ❖ S is the daughter of the only son of K $\Rightarrow$ K has only one son.
- ❖ N is the mother of D.
- ❖ Y's only son, A, is married to N $\Rightarrow$ A is N's husband.
- ❖ Therefore, A is the father of D.
- ❖ K is the paternal grandfather of D.
- ❖ Paternal grandfather = father of D's father.
- ❖ Since A is D's father $\Rightarrow$ K must be A's father.

4. There are eight members in the family. Binesh and Priyanka are siblings. Anchal is Kajal's granddaughter, Kajal is Priyanka's mother-in-law. Ziya is a married woman and is older than Tony. Tony is the son of Sachin, who is the brother-in-law of Binesh. Sunil is the eldest male in the family. Anchal is not Ziya's daughter. So how is Binesh related to Ziya?

- (1) Son
- (2) Husband
- (3) Brother-in-law
- (4) Son-in-law
- (5) Question not attempted

Ans: (2)**Explanation:**

- ❖ Binesh and Priyanka are siblings.
- ❖ Anchal is Kajal's granddaughter. Kajal is Priyanka's mother-in-law; therefore, Priyanka is married to Kajal's son, Sachin.
- ❖ Tony is Sachin's son; hence, Tony is also Priyanka's son.
- ❖ Sachin is Binesh's brother-in-law, meaning Sachin is married to Binesh's sister, Priyanka.
- ❖ Ziya is a married woman and is older than Tony.

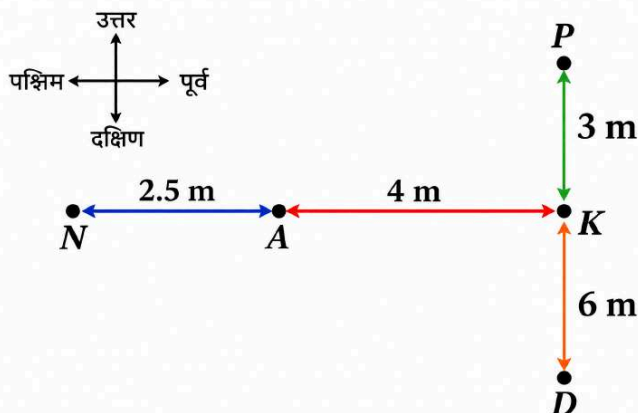
**(9) Direction sense test**

1. On a stage, D, N, A and P are standing as described below facing North. N is 2.5 m to the west of A. K is 4 m to the right of A. D is 6 m to the south of K. P is 9 m to the north of D. If a boy walks from N, meets A followed by K, D and then P, how many metres has he walked if he has travelled the straight distance all through?

- (1) 15 m
- (2) 18 m
- (3) 21.5 m
- (4) 22.5 m
- (5) Question not attempted

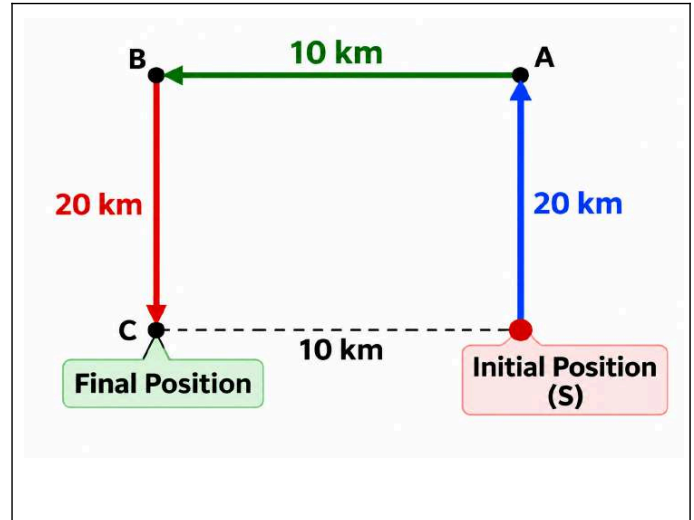
Ans: (3)**Explanation:**

- Required distance = NA + AK + KD + DP = 2.5 + 4 + 6 + (6 + 3) = 21.5 m



2. A man drove his car towards North, then turned left and drove 10 km and again turned left and covered 20 km. He found himself 10 km West of his starting point. How far did he drive northward initially?

- (1) 20 km
- (2) 25 km
- (3) 10 km
- (4) 15 km
- (5) Question not attempted

Ans: (1)**Explanation:**

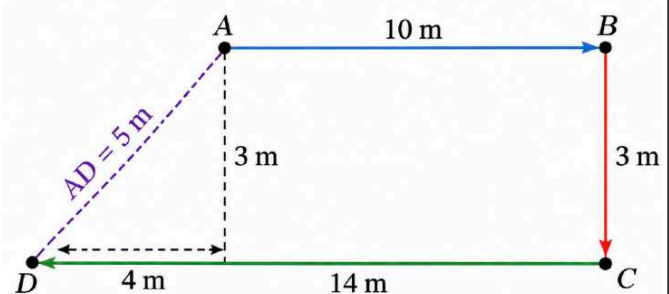
3. Raja walked 10 m from A to B in the East. Then he turned to the right and walked 3 m. Again, he turned to the right and walked 14 m.

How far is Raja from A?

- (1) 14m
- (2) 12m
- (3) 8m
- (4) 5m
- (5) Question not attempted

Ans: (4)**Explanation:**

- Required distance AD = $\sqrt{(4^2 + 3^2)} = \sqrt{(16 + 9)} = \sqrt{25} = 5$ m.



4. Some boys are sitting in three rows all facing North such that B is in the middle row. C is just to the right of B but in the same row. D is just behind C while A is in the North of B. In which direction of A is D?

- (1) South-East
- (2) South-West
- (3) North-West
- (4) North-East
- (5) Question not attempted

**(10) Logical Venn diagram****1. Statements:**

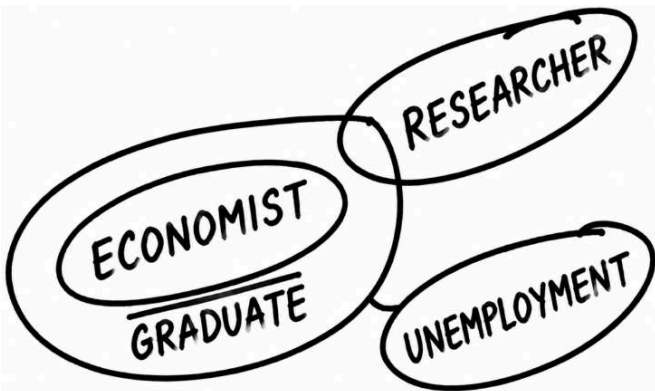
- (A) All economists are graduates.
 (B) Some graduates are researchers.
 (C) No researcher is unemployed.

Which conclusion definitely follows?

- (1) Some economists are researchers.
 (2) Some graduates are not unemployed.
 (3) No economist is unemployed.
 (4) All researchers are graduates.
 (5) Question not attempted

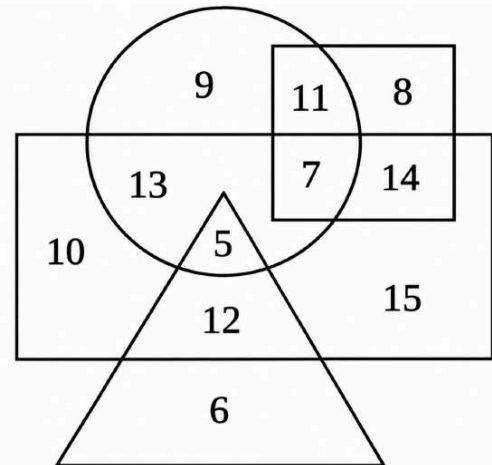
Ans: (2)

Explanation:



- Since **some graduates are researchers**, and **no researcher is unemployed**, it follows that: **Some graduates are not unemployed**. So 2 definitely follows. ✓
- 1. **Some economists are researchers.** ✗: No direct connection is given between economists and researchers.
- 3. **No economist is unemployed.** ✗: Economists are graduates, but graduates may or may not be unemployed.
- 4. **All researchers are graduates.** ✗: The statement says some graduates are researchers, not all researchers are graduates

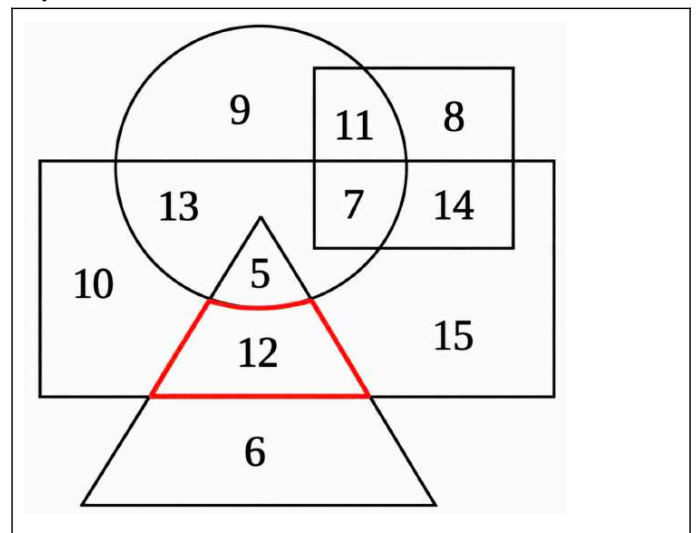
2. In the given diagram, the rectangle represents doctors, the triangle represents surgeons, the circle represents researchers, and the square represents hospital staff. Identify the region representing surgeons who are doctors but not researchers.



- (1) 12
 (2) 5
 (3) 15
 (4) 6
 (5) Question not attempted

Ans: (1)

Explanation:



3. **Statements:** All benches are desks. Some desks are roads. All roads are pillars.

Conclusions:

- I. Some pillars are benches.
 II. Some pillars are desks.
 III. Some roads are benches.
 IV. No pillar is bench.

Option:

- (1) None follows
 (2) Only either I or IV, and III follow
 (3) Only either I or IV follows
 (4) Only either I or IV, and II follow
 (5) Question not attempted

**(11) Ranking and Sitting Arrangement**

1. In a row of 40 boys, when Kushal was shifted to his left by 4 places, his place from the left end of the row became 10. What is the position of Suraj from the right end of the row, if Suraj was three places to the right of Kushal's original position?
- (1) 22
(2) 23
(3) 24
(4) 25
(5) Question not attempted

Ans: (3)**Explanation:**

Total boys in the row = 40.

- ❖ Kushal shifts 4 places to his left, and his new position from the left end becomes 10.
- ❖ Therefore, Kushal's original position from the left = $10 + 4 = 14$ th.
- ❖ Suraj is 3 places to the right of Kushal's original position $\Rightarrow$ Suraj's position from the left = $14 + 3 = 17$ th.
- ❖ Suraj's position from the right end = $40 - 17 + 1 = 24$ th.

2. Three persons A, B and C are standing in a queue. There are 5 people between A and B and 8 people between B and C. If there are three people ahead of C and 21 people behind A, then what could be the minimum number of persons in the queue?
- (1) 28
(2) 29
(3) 30
(4) 31
(5) Question not attempted

Ans: (1)**Explanation:**

- ❖ There are 3 people ahead of C, so C is at position 4 from the front of the queue.
- ❖ There are 8 people between B and C, so the positions of B and C differ by 9.
- ❖ B must be at position 13.
- ❖ There are 5 people between A and B, so the positions of A and B differ by 6.
- ❖ Possible positions for A: 7 or 19.
- ❖ There are 21 people behind A, so total persons

$N = \text{position of A} + 21.$

- ❖ Case 1: A at position 19 $\Rightarrow N = 19 + 21 = 40.$
- ❖ Case 2: A at position 7 $\Rightarrow N = 7 + 21 = 28.$
- ❖ Therefore, the minimum possible is 28.

3. In a queue, Preeti is fourteenth from the front and Priyanka is eleventh from the end, while Pritika is exactly in between Preeti and Priyanka. If Preeti is ahead of Priyanka and there are 36 girls in the queue, how many girls are there between Preeti and Pritika?
- (1) 3
(2) 5
(3) 7
(4) 9
(5) Question not attempted

Ans: (2)**Explanation:**

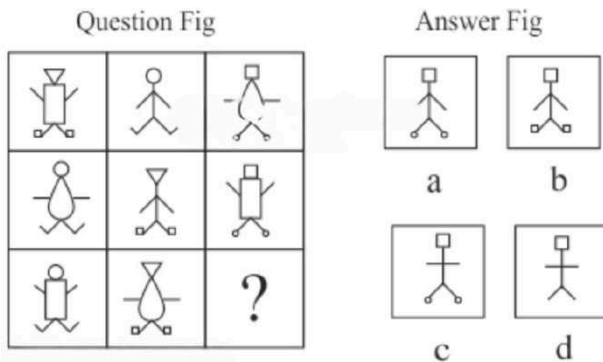
- ❖ Total girls in the queue = 36.
- ❖ Preeti is 14th from the front = position 14.
- ❖ Priyanka is 11th from the end = position from front = $36 - 11 + 1 = 26.$
- ❖ Preeti (14) is ahead of Priyanka (26).
- ❖ Pritika is exactly in between Preeti and Priyanka = her position is the midpoint = $(14 + 26) / 2 = 20.$
- ❖ Girls between Preeti (14) and Pritika (20) are in positions 15 to 19 = 5 girls.

4. In the parade, seven persons are standing in a row. Kuldeep is standing left to Anirudh but right to Brijesh. Jasdeep is standing right to Gunjesh and left to Brijesh. Similarly, Karan is standing right to Anirudh and left to Randhir. Find out who is standing in the middle.
- (1) Anirudh
(2) Karan
(3) Kuldeep
(4) Gunjesh
(5) Question not attempted

Ans: (3)**Explanation:**

**(12) Shapes and their sub sections**

1. Find the Answer figure which completes the Question figure matrix.



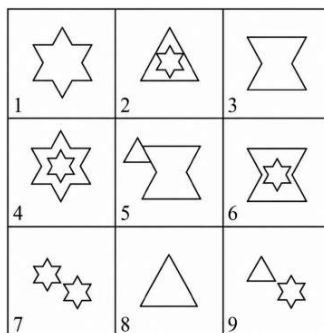
- (1) b
(2) d
(3) a
(4) c
(5) Question not attempted

Ans: (3)

Explanation:

- ❖ There are 3 types of faces, 3 types of bodies, 3 types of hands and 3 types of legs each of which is used only once in a single row.

2. In each of the following questions a figure, group the given figures into different classes on the basis of their orientation, shape etc.



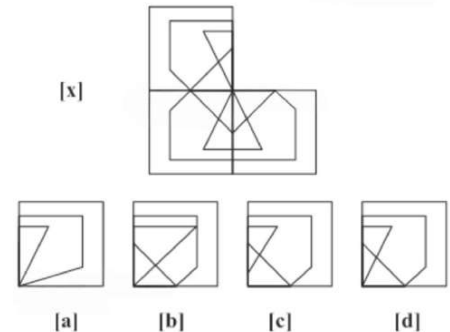
- (1) (2,3,6), (4,5,7), (1,8,7)
(2) (1,3,5), (2,4,9), (5,6,7)
(3) (1,3,8), (2,4,6), (5,7,9)
(4) (3,4,5), (2,6,8), (1,7,9)
(5) Question not attempted

Ans: (3)

Explanation:

- ❖ Group 1: (1, 3, 8) = Single shape
❖ Group 2: (2, 4, 6) = One shape inside another
❖ Group 3: (5, 7, 9) = Two separate figures placed together

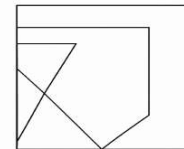
3. Complete the pattern in figure [x] by selecting one of the figures from the four alternatives given below:



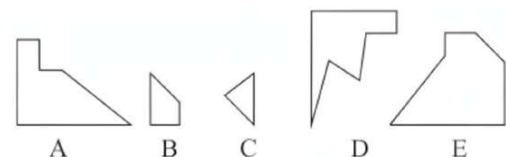
- (1) c
(2) a
(3) d
(4) b
(5) Question not attempted

Ans: (3)

Explanation:



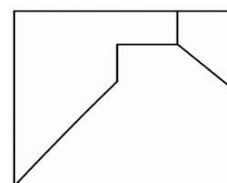
4. Select the alternative which represents three out of the five alternative figures which when fitted into each other would form a complete square.



- (1) ABC
(2) BDE
(3) ABE
(4) CDE
(5) Question not attempted

Ans: (3)

Explanation:





Mathematics

**(1) Ratio, Proportion and Partnership**

1. The ratio of the number of students studying in schools A, B, and C is 6:8:7, respectively. If the number of students studying in each of the schools is increased by 25%, 50%, and 100% respectively, what will be the new ratio of the number of students in schools A, B, and C?

- (1) 14:18:22
 (2) 15:24:28
 (3) 16:18:24
 (4) 12:15:20
 (5) Question not attempted

Ans: (2)

Explanation:

- Let the initial number of students be

$$A = 6x, B = 8x, C = 7x$$

- Formula used

$$\Rightarrow \text{New value} = \text{Original value} \times (100 + \text{Increase}\%)/100$$

- New number of students

$$\Rightarrow A = 6x \times 125/100 = 30x/4$$

$$\Rightarrow B = 8x \times 150/100 = 48x/4$$

$$\Rightarrow C = 7x \times 200/100 = 56x/4$$

- Required ratio

$$\Rightarrow 30x/4 : 48x/4 : 56x/4$$

$$\Rightarrow 30 : 48 : 56$$

$$\Rightarrow 15 : 24 : 28$$

Hence, the correct answer = 15 : 24 : 28

2. Visitors to a fair were charged ₹ 15 each on the 1st day, ₹ 12 on the 2nd, and ₹ 9 on the 3rd day, and the total attendance on the three days was in the ratio 5:8:13, respectively. What will be the average charge per person for the whole fair?

- (1) ₹ 13.26
 (2) ₹ 19.39
 (3) ₹ 21.40
 (4) ₹ 11.07
 (5) Question not attempted

Ans: (4)

Explanation:

- Let the attendance be

$$1\text{st day} = 5x, 2\text{nd day} = 8x, 3\text{rd day} = 13x$$

- Formula used

$$\Rightarrow \text{Average charge} = \text{Total charges collected} /$$

Total attendance

- Total charges collected

$$\Rightarrow 15 \times 5x + 12 \times 8x + 9 \times 13x$$

$$\Rightarrow 75x + 96x + 117x$$

$$\Rightarrow 288x$$

- Total attendance

$$\Rightarrow 5x + 8x + 13x$$

$$\Rightarrow 26x$$

- Average charge per person

$$\Rightarrow 288x/26x$$

$$\Rightarrow 288/26$$

$$\Rightarrow ₹11.07$$

Hence, the correct answer = ₹11.07

3. The ratio of the incomes of A & B is 3:4. The ratio of their expenditures is 4:5. What will be the ratio of their savings if A's savings are one-fifth of his income?

- (1) 5:9
 (2) 3:5
 (3) 2:5
 (4) 3:6
 (5) Question not attempted

Ans: (2)

Explanation:

- Let the income and expenditure be

$$A's \text{ income} = 3x, B's \text{ income} = 4x$$

$$A's \text{ expenditure} = 4y, B's \text{ expenditure} = 5y$$

- Formula used

$$\Rightarrow \text{Savings} = \text{Income} - \text{Expenditure}$$

- A's savings

$$A \text{ saves } 1/5 \text{ of his income}$$

$$\Rightarrow 3x - 4y = 3x/5$$

$$\Rightarrow 15x - 20y = 3x$$

$$\Rightarrow 12x = 20y$$

$$\Rightarrow y = 3x/5$$

- Savings ratio

$$\Rightarrow A's \text{ savings} : B's \text{ savings}$$

$$\Rightarrow (3x - 4y) : (4x - 5y)$$

$$\Rightarrow [3x - 4(3x/5)] : [4x - 5(3x/5)]$$

$$\Rightarrow 3x/5 : x$$

$$\Rightarrow 3 : 5$$

Hence, the correct answer = 3 : 5

**(2) Profit and Loss**

1. A man bought a horse and a carriage for ₹ 3000. He sold the horse at a gain of 20% and the carriage at a loss of 10%, thereby profit 2% on the whole. Find the cost of the horse.

- (1) ₹ 1150
 (2) ₹ 1200
 (3) ₹ 1250
 (4) ₹ 1300
 (5) Question not attempted

Ans: (2)**Explanation:**

- **Let the cost prices be**
 Cost price of horse = ₹x
 Cost price of carriage = ₹(3000 - x)
- **Formula used**
 $\Rightarrow \text{Overall profit} = \text{Profit on horse} - \text{Loss on carriage}$
- **According to the question**
 $\Rightarrow 20\% \text{ of } x - 10\% \text{ of } (3000 - x) = 2\% \text{ of } 3000$
 $\Rightarrow x/5 - (3000 - x)/10 = 60$
 $\Rightarrow 2x - 3000 + x = 600$
 $\Rightarrow 3x = 3600$
 $\Rightarrow x = ₹1200$

Hence, the correct answer = ₹1200

2. Ranjan purchased 120 tables at a price of 110 per table. He sold 30 tables at a profit of 12 per table and 75 tables at a profit of 14 per table. The remaining tables were sold at a loss of 7 per table. What is the average profit per table?

- (1) ₹ 10.645
 (2) ₹ 10.875
 (3) ₹ 10.965
 (4) ₹ 10.985
 (5) ₹ Question not attempted

Ans: (2)**Explanation:**

- **Formula used**
 $\Rightarrow \text{Average profit} = \text{Total profit} / \text{Total number of tables}$
- **Profit on first 30 tables**
 $\Rightarrow 30 \times 12$
 $\Rightarrow ₹360$
- **Profit on next 75 tables**
 $\Rightarrow 75 \times 14$

 $\Rightarrow ₹1050$

- **Remaining tables**

 $\Rightarrow 120 - (30 + 75)$ $\Rightarrow 15 \text{ tables}$

- **Loss on remaining tables**

 $\Rightarrow 15 \times 7$ $\Rightarrow ₹105$

- **Total profit**

 $\Rightarrow 360 + 1050 - 105$ $\Rightarrow ₹1305$

- **Average profit per table**

 $\Rightarrow 1305/120$ $\Rightarrow ₹10.875$ **Hence, the correct answer = ₹10.875**

3. By selling an article, Mahesh earned a profit equal to one-fourth of the price he bought it. If he sold it for 375, what was the cost price?

- (1) ₹ 265
 (2) ₹ 275
 (3) ₹ 285
 (4) ₹ 300
 (5) Question not attempted

Ans: (4)**Explanation:**

- **Formula used**
 $\Rightarrow \text{S.P.} = \text{C.P.} + \text{Profit}$
- **Given profit**
 Profit = $1/4$ of C.P.
 $\Rightarrow \text{S.P.} = \text{C.P.} + 1/4 \text{ C.P.}$
 $\Rightarrow \text{S.P.} = 5/4 \text{ C.P.}$
- **Cost price**
 $\Rightarrow 5/4 \text{ C.P.} = 375$
 $\Rightarrow \text{C.P.} = 375 \times 4/5$
 $\Rightarrow ₹300$

Hence, the correct answer = ₹300

4. The cash difference between the selling prices of an article at a profit of 4% and 6% is 3. What is the ratio of the two selling prices?

- (1) 51:52
 (2) 52:53
 (3) 51:53
 (4) 52:54
 (5) Question not attempted

**(3) Percentage**

1. A man buys a house for ₹5 lakh and rents it. He puts $\frac{1}{8}$ of each month's rent aside for repairs, pays ₹3000 as annual taxes and realises 12% on his investment thereafter. What will be the monthly rent of the house?

- (1) ₹6000
(2) ₹5000
(3) ₹3000
(4) ₹9000
(5) Question not attempted

Ans: (1)

Explanation:

- **Given**

Cost of house = ₹5,00,000
Annual tax = ₹3,000
Repair expense = $\frac{1}{8}$ of rent
Return on investment = 12%

- **Let the annual rent be**

⇒ ₹x

- **Net annual income** = Annual rent - Repair expense - Taxes

$$\begin{aligned} \Rightarrow x - x/8 - 3000 &= 12/100 \times 500000 \\ \Rightarrow x - x/8 - 3000 &= 60000 \\ \Rightarrow 7x/8 &= 63000 \\ \Rightarrow x &= \text{₹72,000} \end{aligned}$$

- **Hence, monthly rent** = Annual rent / 12

$$\begin{aligned} \Rightarrow 72000/12 \\ \Rightarrow \text{₹6,000} \end{aligned}$$

Hence, the correct answer = ₹6,000

2. Maya's Mathematics Test had 80 questions, i.e., 20 arithmetic, 30 algebra and 30 geometry questions. Although she answered 75% of the arithmetic, 50% of the algebra and 60% of the geometry questions correctly, she did not pass the test because she got less than 65% of the questions right. How many more questions would she have needed to answer correctly to earn a 65% passing grade?

- (1) 5
(2) 4
(3) 3
(4) 6
(5) Question not attempted

Ans: (2)

Explanation:

- **Given**

Total questions = 80

Arithmetic = 20

Algebra = 30

Geometry = 30

Passing percentage = 65%

- **Correctly answered questions** = Arithmetic +

Algebra + Geometry

$$= 75\% \text{ of } 20 + 50\% \text{ of } 30 + 60\% \text{ of } 30$$

$$= 15 + 15 + 18 = 48$$

- **Questions required to pass** = 65% of total questions

$$= 65/100 \times 80 = 52$$

- **Hence, additional correct answers required** =

$$52 - 48 = 4$$

Hence, the correct answer = 4

3. Due to a reduction of 20% in the price of sugar, a man can buy 1 kg more for ₹100. What is the original and reduced rate of sugar respectively?

- (1) ₹25 per kg and ₹20 per kg
(2) ₹20 per kg and ₹25 per kg
(3) ₹35 per kg and ₹30 per kg
(4) ₹30 per kg and ₹35 per kg
(5) Question not attempted

Ans: (1)

Explanation:

- **Given**

Reduction in price = 20%

Total amount = ₹100

Extra quantity purchased = 1 kg

- **Let the original rate be**

= ₹x per kg

- **Reduced rate** = 80% of original rate

$$\begin{aligned} &= (80/100) \times x \\ &= 4x/5 \end{aligned}$$

- **According to the question**

$$100/(4x/5) - 100/x = 1$$

$$\Rightarrow 125/x - 100/x = 1$$

$$\Rightarrow 25/x = 1$$

$$\Rightarrow x = 25$$

- **Hence, reduced rate** = $4/5 \times 25$

$$= \text{₹20 per kg}$$

Hence, the correct answer = ₹25 per kg and ₹20 per kg

**(4) Simple and Compound Interest**

1. The simple interest accrued on an amount of ₹ 4000 at the end of 5 years is ₹ 2000. What would be the simple interest accrued on an amount of ₹ 9000 at the same rate and for the same period?

- (1) ₹ 3500
 (2) ₹ 3000
 (3) ₹ 4000
 (4) ₹ 4500
 (5) Question not attempted

Ans: (4)

Explanation:

- **Given**
 Principal = ₹4000
 Time = 5 years
 Simple Interest = ₹2000
- **Rate of interest** = $(SI \times 100)/(P \times T)$
 $= (2000 \times 100)/(4000 \times 5)$
 $= 10\% \text{ per annum}$
- **Simple interest on ₹9000** = $(P \times R \times T)/100$
 $= (9000 \times 10 \times 5)/100$
 $= ₹4500$
- **Hence, the simple interest accrued = ₹4500**
Hence, the correct answer = ₹4500

2. A certain sum of money becomes 4 times of itself in 30 years at simple interest. In how many years will it become double of itself at the same rate of simple interest?

- (1) 8 years
 (2) 10 years
 (3) 12 years
 (4) 14 years
 (5) Question not attempted

Ans: (2)

Explanation:

- **Given**
 Time = 30 years
 Amount = 4 times the principal
- **Let the principal be**
 $= P$
- **Simple interest in 30 years** = Amount - Principal
 $= 4P - P$
 $= 3P$
- **Rate of interest** = $(SI \times 100)/(P \times T)$

$$= (3P \times 100)/(P \times 30)$$

$$= 10\% \text{ per annum}$$

- **For the amount to become double**

$$\text{Simple interest} = 2P - P$$

$$= P$$

- **Hence, required time** = $(SI \times 100)/(P \times R)$

$$= (P \times 100)/(P \times 10)$$

$$= 10 \text{ years}$$

Hence, the correct answer = 10 years

3. The simple interest on a sum of money is $1/4$ of the principal. What will be the rate per cent and time, if both are numerically equal.

- (1) 5% and 5 years
 (2) 6% and 6 years
 (3) 7% and 7 years
 (4) 8% and 8 years
 (5) Question not attempted

Ans: (1)

Explanation:

- **Given**
 Simple interest = $1/4$ of the principal
 Rate = Time (numerically)
- **Let the rate and time be**
 $= R$
- **Simple interest** = $(P \times R \times T)/100$
 $= (P \times R \times R)/100$
 $= PR^2/100$
- **According to the question**
 $PR^2/100 = P/4$
 $\Rightarrow R^2/100 = 1/4$
 $\Rightarrow R^2 = 25$
 $\Rightarrow R = 5$
- **Hence, rate and time = 5% and 5 years**
Hence, the correct answer = 5% and 5 years

4. Farmer borrowed ₹ 5000 at 12% simple interest per annum. At the end of three years, he cleared the account by paying ₹6,200 and a goat. What will be the cost of the goat.

- (1) ₹ 375
 (2) ₹ 485
 (3) ₹ 600
 (4) ₹ 525
 (5) Question not attempted

**(5) Perimeter and Area of Plane figures**

1. The length of a rectangle is increased by 25%. By what per cent must the breadth be decreased so that the area remains the same?

- (1) 18%
 (2) 20%
 (3) 22%
 (4) 23%
 (5) Question not attempted

Ans: (2)

Explanation:

- **Given**
 Length is increased by = 25%
 Area remains unchanged
- **Let the original length and breadth be**
 = L and B
- **Original area** = $L \times B$
 = LB
- **New length** = 125% of L
 = $5L/4$
- **Let the new breadth be**
 = b
- **Since the area remains unchanged**
 $L \times B = 5L/4 \times b$
 $\Rightarrow B = 5b/4$
 $\Rightarrow b = 4B/5$
 = **80% of B**
- **Hence, decrease in breadth** = $100\% - 80\%$
 = **20%**

Hence, the correct answer = 20%

2. A rectangular grassy plot 90 m × 50 m has a gravel path 2 m wide all round it on the inside. What will be the cost of gravelling the path at 75 paise per sq. metre?

- (1) ₹376
 (2) ₹394
 (3) ₹408
 (4) ₹539
 (5) Question not attempted

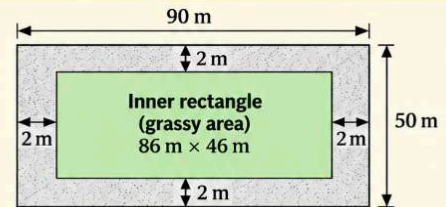
Ans: (3)

Explanation:

● **Given**

Length of plot = 90 m
 Breadth of plot = 50 m
 Width of path (inside) = 2 m
 Cost of gravelling = 75 paise per m^2

● **Diagram**



● **Area of the whole plot**

$$A_1 = 90 \times 50 \\ = 4500 m^2$$

● **Dimensions of the inner rectangle**

$$\text{Length} = 90 - 4 = 86 m \\ \text{Breadth} = 50 - 4 = 46 m$$

● **Area of the inner rectangle**

$$A_2 = 86 \times 46 \\ = 3956 m^2$$

● **Area of the path**

$$A = A_1 - A_2 \\ = 4500 - 3956 \\ = 544 m^2$$

● **Cost of gravelling the path**

$$\text{Cost} = 544 \times \frac{75}{100} \\ = 408 \\ = ₹408$$

Hence, the correct answer = ₹408

3. The perimeters of two squares are 48 cm and 28 cm.

What will be the perimeter of a third square whose area is equal to the difference of the areas of the two squares?

- (1) $4\sqrt{95}$ cm
 (2) $4\sqrt{85}$ cm
 (3) $4\sqrt{75}$ cm
 (4) $4\sqrt{65}$ cm
 (5) Question not attempted

Ans: (1)

Explanation:

● **Given**

Perimeter of first square = 48 cm
 Perimeter of second square = 28 cm

- **Side of first square** = $48/4$
 = 12 cm
- **Side of second square** = $28/4$

**(6) Data Analysis (Tables, Bar diagram, Line graph, Pie-chart)****For questions number (1 - 2)**

Study the following table carefully and answer the questions(1-2) given below:

N = Candidates appearing (in lakhs) for An Entrance Examination From Six Different States A,B,C,D,E,F

P = Percentage of candidates clearing the exam

STAT E → YEA R ↓	A (N, P)	B (N, P)	C (N, P)	D (N, P)	E (N, P)	F (N, P)
2015	1.20, 50	1.00, 40	1.25, 48	1.50, 36	1.40, 45	1.30, 30
2016	1.50, 40	1.25, 32	1.40, 50	1.60, 25	1.20, 60	1.10, 40
2017	1.80, 45	1.50, 40	1.60, 25	1.40, 50	1.50, 40	1.20, 35
2018	2.00, 30	1.75, 48	1.50, 40	1.80, 50	1.60, 25	1.40, 45
2019	1.60, 50	1.40, 45	1.80, 40	2.00, 30	1.50, 48	1.60, 25

1. What is the ratio of the number of candidates clearing the entrance examination from State A to State C in the year 2015?

- (1) 10:12
(2) 12:10
(3) 5:6
(4) 1:1
(5) Question not attempted

Ans: (4)

Explanation:

- **Given**

Candidates appearing in State A = 1.20 lakh
Percentage of candidates clearing in State A = 50%
Candidates appearing in State C = 1.25 lakh
Percentage of candidates clearing in State C = 48%

- **Candidates clearing from State A**
= $1.20 \times 50 \div 100$

= 0.60 lakh

- **Candidates clearing from State C**

= $1.25 \times 48 \div 100$

= 0.60 lakh

- **Required Ratio**

= 0.60 : 0.60

= 1 : 1

Hence, the correct answer = 1 : 1

2. What is the total number of candidates not clearing the entrance examination from State B and State F together in the year 2018?

- (1) 1.23 lakh
(2) 1.37 lakh
(3) 1.68 lakh
(4) 1.71 lakh
(5) Question not attempted

Ans: (3)

Explanation:

- **Given**

State B: N = 1.75 lakh, P = 48%

State F: N = 1.40 lakh, P = 45%

- **Candidates clearing from State B**

= $1.75 \times 48 \div 100$

= 0.84 lakh

- **Candidates not clearing from State B**

= $1.75 - 0.84$

= 0.91 lakh

- **Candidates clearing from State F**

= $1.40 \times 45 \div 100$

= 0.63 lakh

- **Candidates not clearing from State F**

= $1.40 - 0.63$

= 0.77 lakh

- **Total candidates not clearing (B + F)**

= $0.91 + 0.77$

= 1.68 lakh

Hence, the correct answer = 1.68 lakh

**(7) Mean (Arithmetic, Geometric and Harmonic), Median and Mode**

1. Out of nine persons, 8 persons spent Rs. 30 each for their meals. The ninth one spent Rs. 20 more than the average expenditure of all the nine. What was the total money spent by all of them?

- (1) ₹260
 (2) ₹290
 (3) ₹292.5
 (4) ₹407.5
 (5) Question not attempted

Ans: (3)

Explanation:

• **Given**

Expenditure of 8 persons = $8 \times 30 = 240$

• **Let**

Average expenditure of 9 persons = x

• **Total expenditure**

= $9x$

• **Expenditure of 9th person**

= $x + 20$

• **Equation**

$\Rightarrow 9x = 240 + (x + 20)$

$\Rightarrow 9x = 260 + x$

$\Rightarrow 8x = 260$

$\Rightarrow x = 32.5$

• **Total expenditure**

= 9×32.5

= Rs. 292.5

Hence, the correct answer = ₹292.5

2. For what value of n is $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ the geometrical mean (G.M.) of a and b ?

- (1) 1
 (2) 2
 (3) $-\frac{1}{2}$
 (4) $\frac{1}{2}$
 (5) Question not attempted

Ans: (3)

Explanation:

- दिया गया है

$$\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$$

यह a और b का गुणोत्तर माध्य (G.M.) है।

- गुणोत्तर माध्य

$$\sqrt{ab} = a^{1/2}b^{1/2}$$

- समीकरण

$$\Rightarrow \frac{a^{n+1} + b^{n+1}}{a^n + b^n} = a^{1/2}b^{1/2}$$

- क्रॉस गुणा करने पर

$$\Rightarrow a^{n+1} + b^{n+1} = a^{n+1/2}b^{1/2} + a^{1/2}b^{n+1/2}$$

- पुनर्व्यवस्थित करने पर

$$\Rightarrow a^{n+1/2}(a^{1/2} - b^{1/2}) = b^{n+1/2}(a^{1/2} - b^{1/2})$$

- सामान्य गुणक हटाने पर

$$\Rightarrow a^{n+1/2} = b^{n+1/2}$$

$$\Rightarrow (a/b)^{n+1/2} = 1$$

- हल करने पर

$$\Rightarrow n + \frac{1}{2} = 0$$

$$\Rightarrow n = -\frac{1}{2}$$

अतः सही उत्तर = $-\frac{1}{2}$

3. The median of numbers 10, 8, 2, 7, 3, 8, 5, 1 is k . If 10 is replaced by 1, then the new median is r . What will be the value of $(k - r)$?

- (1) 0
 (2) 1
 (3) 2
 (4) 3
 (5) Question not attempted

Ans: (3)

Explanation:

- **Given**

Numbers = 10, 8, 2, 7, 3, 8, 5, 1

- **Arranging the numbers in ascending order**

= 1, 2, 3, 5, 7, 8, 8, 10

- **Finding the median (k)**

Total number of observations = 8

Median = average of 4th and 5th terms

$$k = (5 + 7)/2$$

$$= 6$$

**(8) Permutation and Combination**

1. In how many different ways can the letters of the word MOTION be arranged so that the vowels occupy only the odd positions?

- (1) 18
- (2) 36
- (3) 54
- (4) 72
- (5) Question not attempted

Ans: (1)

Explanation:

- **Given**

Word = MOTION

⇒ Total letters = 6

⇒ Vowels = O, O, I = 3

⇒ Consonants = M, T, N = 3

- **Arrangement of Vowels**

⇒ Available odd positions = 1, 3, 5

⇒ Arrangement of vowels = $3!/2!$

⇒ Arrangement of vowels = 3

- **Arrangement of Consonants**

⇒ Available even positions = 2, 4, 6

⇒ Arrangement of consonants = $3!$

⇒ Arrangement of consonants = 6

- **Total Arrangements**

⇒ Total ways = 3×6

⇒ Total ways = 18

Hence, the correct answer = 18

2. There are six teachers. Out of them two are primary teachers, two are middle teachers and two are secondary teachers. They are to stand in a row, so as the primary teachers, middle teachers and secondary teachers are always in a set. The number of ways in which they can do So, is

- (1) 64
- (2) 52
- (3) 48
- (4) 42
- (5) Question not attempted

Ans: (3)

Explanation:

- **Given**

Total teachers = 6

⇒ Primary teachers = 2

⇒ Middle school teachers = 2

⇒ Secondary teachers = 2

- **Internal Arrangement of Each Pair of Teachers**

⇒ Arrangement of primary teachers = $2! = 2$

ways

⇒ Arrangement of middle school teachers = $2!$

= 2 ways

⇒ Arrangement of secondary teachers = $2! = 2$

ways

- **Arrangement of the Three Groups**

⇒ Arrangement of groups = $3! = 6$ ways

- **Total Arrangements**

⇒ Total ways = $2 \times 2 \times 2 \times 6$

⇒ Total ways = 48

Hence, the correct answer = 48

3. In an examination there are 4 multiple choice questions, and each question has 3 choices. What will be the number of ways in which a student fails to get all answers correct.

- (1) 81
- (2) 80
- (3) 91
- (4) 90
- (5) Question not attempted

Ans: (2)

Explanation:

- **Given**

Number of questions = 4

Options for each question = 3

- **Total Number of Possible Answers**

⇒ Each question has 3 options.

⇒ Total ways = 3^4

⇒ Total ways = 81

- **Ways in Which All Answers Are Correct**

⇒ Each question has only 1 correct answer.

⇒ Number of ways in which all answers are correct = 1

- **Ways in Which All Answers Are Not Correct**

⇒ $81 - 1 = 80$

Hence, the correct answer = 80

**(9) Probability (Simple Problems)**

1. Two dice are thrown together. What is the probability that the sum of the numbers on the two faces is divisible by 3 or 5 ?

- (1) 19/36
- (2) 17/36
- (3) 15/36
- (4) 13/36
- (5) Question not attempted

Ans: (1)

Explanation:

- **Given**

Two dice are thrown together.

⇒ Total possible outcomes = $6 \times 6 = 36$

- **Sum Divisible by 3**

⇒ Possible sums = 3, 6, 9, 12

- **Sum Divisible by 5**

⇒ Possible sums = 5, 10

- **Favourable Outcomes**

⇒ (1,2), (2,1), (1,5), (5,1), (1,4), (4,1), (2,3), (3,2), (2,4), (4,2),

⇒ (3,3), (3,6), (6,3), (4,5), (5,4), (4,6), (6,4), (5,5), (6,6)

⇒ Favourable outcomes = 19

- **Probability**

⇒ $P = \text{Favourable outcomes} / \text{Total outcomes}$

⇒ $P = 19/36$

Hence, the correct answer = 19/36

2. Four coins are tossed. What is the probability of getting at most three heads?

- (1) 11/16
- (2) 15/16
- (3) 13/16
- (4) 9/16
- (5) Question not attempted

Ans: (2)

Explanation:

- **Given**

Number of coins = 4

⇒ Each coin has 2 possible outcomes = H, T

- **Total Possible Outcomes**

⇒ Total ways = 2^4

⇒ Total ways = 16

- **Case of At Most 3 Heads**

⇒ At most 3 heads means 0, 1, 2, or 3 heads can occur.

⇒ Only the outcome with 4 heads (HHHH) will not be valid.

⇒ Favourable outcomes = $16 - 1$

⇒ Favourable outcomes = 15

- **Probability**

⇒ $P = \text{Favourable outcomes} / \text{Total outcomes}$

⇒ $P = 15/16$

Hence, the correct answer = 15/16

3. Two dice are thrown simultaneously. What is the probability of getting two numbers whose product (multiplication result) is even?

- (1) 1/2
- (2) 3/4
- (3) 3/8
- (4) 5/9
- (5) Question not attempted

Ans: (2)

Explanation:

- **Given**

Two dice are thrown together.

⇒ Total possible outcomes = $6 \times 6 = 36$

- **Event (E)**

⇒ The product of the two numbers should be even.

- **Favourable Outcomes**

⇒ The product will be even when at least one die shows an even number.

⇒ Outcomes in which both dice show odd numbers = (1,1), (1,3), (1,5), (3,1), (3,3), (3,5), (5,1), (5,3), (5,5)

⇒ Odd-Odd outcomes = 9

⇒ Favourable outcomes = $36 - 9$

⇒ Favourable outcomes = 27

- **Probability**

⇒ $P(E) = \text{Favourable outcomes} / \text{Total outcomes}$

⇒ $P(E) = 27/36$

⇒ $P(E) = 3/4$

Hence, the correct answer = 3/4