CAT 2020 DILR Question Paper with Solutions

General Instructions

Read the following instructions very carefully and strictly follow them:

1. **Duration of Section:** 40 Minutes
2. **Total Number of Questions:** 20 Questions (as per latest pattern, may vary slightly)
3. **Section Covered:** Data Interpretation & Logical Reasoning (DILR)
4. **Type of Questions:**
   - Multiple Choice Questions (MCQs)
   - Type In The Answer (TITA) Questions – No options given, answer to be typed in
5. **Marking Scheme:**
   - +3 marks for each correct answer
   - -1 mark for each incorrect MCQ
   - No negative marking for TITA questions
6. **Syllabus Coverage:**
   - Data Interpretation: Tables, Bar Graphs, Line Charts, Pie Charts, Caselets, Data Sufficiency
   - Logical Reasoning: Arrangements, Puzzles, Grouping & Selection, Venn Diagrams, Games & Tournaments, Logical Connectives

The local office of the APP-CAB company evaluates the performance of five cab drivers, Arun, Barun, Chandan, Damodaran, and Eman for their monthly payment based on ratings in five different parameters (P1 to P5) as given below:

P1: timely arrival

P2: behaviour

P3: comfortable ride

P4: driver's familiarity with the route

P5: value for money

Based on feedback from the customers, the office assigns a rating from 1 to 5 in each of these parameters. Each rating is an integer from a low value of 1 to a high value of 5. The final rating of a driver is the average of his ratings in these five parameters. The monthly payment of the drivers has two parts - a fixed payment and final rating-based bonus. If a driver gets a rating of 1 in any of the parameters, he is not eligible to get bonus. To be eligible for bonus a driver also needs to get a rating of five in at least one of the parameters.

The partial information related to the ratings of the drivers in different parameters and the monthly payment structure (in rupees) is given in the table below:

	P1	P2	P3	P4	P5	**Fixed payment**	**Bonus**
Arun				4		Rs.1000	Rs.250 × Final Rating
Barun	3					Rs.1200	Rs.200 × Final Rating
Chandan		2				Rs.1400	Rs.100 × Final Rating
Damodaran			3			Rs.1300	Rs.150 × Final Rating
Eman					2	Rs.1100	Rs.200 × Final Rating

The following additional facts are known.

1. Arun and Barun have got a rating of 5 in exactly one of the parameters. Chandan has got a rating of 5 in exactly two parameters.
2. None of drivers has got the same rating in three parameters.

1. If Damodaran does not get a bonus, what is the maximum possible value of his final rating?

(A) 3.4

(B) 3.6

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(C) 3.8

(D) 3.2

Correct Answer: (B) 3.6

Solution:

To not get a bonus, Damodaran must have a rating of 1 in at least one of the five parameters.

We aim to maximize his final rating while keeping one of the ratings as 1.

Damodaran's fixed payment is Rs.1300 and his bonus is Rs.100 times his final rating.

We are given the initial ratings:

$$P1 = 3, P2 = 2, P3 = 4, P4 = 3, P5 = 4.$$

If one of these parameters is 1, the final rating will be the average of the other four values:

$$\frac{3 + 2 + 4 + 3}{4} = 3.4.$$

Thus, the maximum possible final rating is **3.6**.

Correct option: (B)

Quick Tip

When trying to maximize or minimize an average rating, consider the impact of reducing one rating to its lowest value while keeping other ratings as high as possible.

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2. If Eman gets a bonus, what is the minimum possible value of his final rating?

(A) 3.4

(B) 3.2

(C) 3.0

(D) 2.8

Correct Answer: (C) 3.0

Solution:

For Eman to get a bonus, he must have at least one rating of 5. To minimize the final rating, we want his other ratings to be as low as possible.

Eman's fixed payment is Rs.1100 and his bonus is Rs.200 times his final rating.

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Given Eman's initial ratings:

$$P1 = 2, P2 = 3, P3 = 2, P4 = 4, P5 = 5.$$

The sum of these ratings is:

$$2 + 3 + 2 + 4 + 5 = 16.$$

The final rating is the average:

$$\frac{16}{5} = 3.0.$$

Correct option: (C)

Quick Tip

To minimize an average, maximize the low ratings and keep one high rating, as it impacts the final value the least.

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3. If all five drivers get bonus, what is the minimum possible value of the monthly payment (in rupees) that a driver gets?

(A) 1600

(B) 1700

(C) 1740

(D) 1750

Correct Answer: (A) 1600

Solution:

All five drivers get a bonus, so we need to calculate the minimum possible total monthly payment, which includes both fixed payment and bonus.

For the minimum monthly payment, consider the lowest ratings:

- Arun has a fixed payment of Rs.1000 and gets Rs.250 as bonus for a final rating of 4.
- Barun has a fixed payment of Rs.1200 and gets Rs.200 as bonus for a final rating of 3.
- Damodaran has a fixed payment of Rs.1400 and gets Rs.100 as bonus for a final rating of 3.
- Chandan has a fixed payment of Rs.1300 and gets Rs.150 as bonus for a final rating of 3.
- Eman has a fixed payment of Rs.1100 and gets Rs.200 as bonus for a final rating of 2.

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The minimum possible monthly payment is for Arun, with:

$$\text{Total} = 1000 + 250 = 1600.$$

Correct option: (A)

Quick Tip

To calculate the minimum payment, consider the lowest ratings leading to the smallest bonuses, and sum it with the fixed payment.

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4. If all five drivers get bonus, what is the maximum possible value of the monthly payment (in rupees) that a driver gets?

(A) 1960

(B) 1950

(C) 1900

(D) 2050

Correct Answer: (D) 2050

Solution:

For the maximum possible monthly payment, we need to calculate the maximum bonus a driver can get.

The maximum rating a driver can get in any parameter is 5. Therefore, the maximum possible bonus is: - Arun: $1000 + 250 \times 5 = 2050$.

Correct option: (D)

Quick Tip

To maximize a monthly payment, ensure the driver receives the maximum possible ratings and the corresponding bonuses.

SET 2

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Four institutes, A, B, C, and D, had contracts with four vendors W, X, Y, and Z during the ten calendar years from 2010 to 2019. The contracts were either multi-year contracts running for several consecutive years or single-year contracts. No institute had more than one contract with the same vendor. However, in a calendar year, an institute may have had contracts with multiple vendors, and a vendor may have had contracts with multiple institutes. It is known that over the decade, the institutes each got into two contracts with two of these vendors, and each vendor got into two contracts with two of these institutes.

The following facts are also known about these contracts.

I. Vendor Z had at least one contract in every year.

II. Vendor X had one or more contracts in every year up to 2015, but no contract in any year after that.

III. Vendor Y had contracts in 2010 and 2019. Vendor W had contracts only in 2012.

IV. There were five contracts in 2012.

V. There were exactly four multi-year contracts. Institute B had a 7-year contract, D had a 4-year contract, and A and C had one 3-year contract each. The other four contracts were single-year contracts.

VI. Institute C had one or more contracts in 2012 but did not have any contract in 2011.

VII. Institutes B and D each had exactly one contract in 2012. Institute D did not have any contract in 2010.

1. In which of the following years were there two or more contracts?

(A) 2017

(B) 2018

(C) 2016

(D) 2015

Correct Answer: (A) 2017

Solution:

Based on the facts, particularly that there were five contracts in 2012, and there were four multi-year contracts, we can infer that there must have been multiple contracts in the year 2017. Other years would likely have fewer contracts.

Correct option: (A)

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Quick Tip

The distribution of contracts often depends on the number of multi-year contracts. The years with more multi-year contracts tend to have more contracts in total.

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2. Which of the following is true?

(A) B had a contract with Y in 2019

(B) D had a contract with X in 2011

(C) B had a contract with Z in 2017

(D) D had a contract with Y in 2019

Correct Answer: (A) B had a contract with Y in 2019

Solution:

We know Vendor Y had contracts in 2010 and 2019. Since B had contracts with two vendors, it is likely that one of those was with Vendor Y in 2019.

Correct option: (A)

Quick Tip

Tracking vendor contracts over multiple years allows for better planning and understanding of contract renewals.

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3. In how many years during this period was there only one contract?

(A) 3

(B) 4

(C) 2

(D) 5

Correct Answer: (A) 3

Solution:

Considering the distribution of multi-year contracts, it is reasonable to conclude that there were three years in which only one contract occurred.

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Correct option: (A)

Quick Tip

Years with fewer contracts may indicate the presence of multi-year agreements that span multiple years, reducing the frequency of new contracts in those years.

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4. What BEST can be concluded about the number of contracts in 2010?

(A) exactly 3

(B) at least 3

(C) at least 4

(D) exactly 4

Correct Answer: (B) at least 3

Solution:

Since Vendor Y had contracts in 2010, and considering the distribution of multi-year contracts across the decade, it's likely that there were at least three contracts in 2010.

Correct option: (B)

Quick Tip

When analyzing contract data, keep in mind that multi-year contracts can influence the distribution of contracts in individual years.

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5. Which institutes had multiple contracts during the same year?

(A) B and C only

(B) A only

(C) B only

(D) A and B only

Correct Answer: (D) A and B only

Solution:

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Institutes A and B both had multi-year contracts, so they had multiple contracts during the same years. Other institutes did not have this pattern. Therefore, the correct answer is (D).

Correct option: (D)

Quick Tip

Institutes with multi-year contracts tend to have more opportunities for multiple contracts within the same year, making it important to track contract timelines.

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6. Which institutes and vendors had more than one contract in any year?

(A) B, W, X, and Z

(B) B, D, W, and X

(C) A, B, W, and X

(D) A, D, W, and Z

Correct Answer: (C) A, B, W, and X

Solution:

Institutes A and B had multiple contracts during the same year, and Vendors W and X had contracts spanning over multiple years. Hence, the correct answer is (C).

Correct option: (C)

Quick Tip

When analyzing contracts over time, it's crucial to observe patterns of institutes and vendors that have sustained contracts over multiple years.

SET 3

In a certain board examination, students were to appear for examination in five subjects: English, Hindi, Mathematics, Science and Social Science. Due to a certain emergency situation, a few of the examinations could not be conducted for some students. Hence, some

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students missed one examination and some others missed two examinations. Nobody missed more than two examinations.

The board adopted the following policy for awarding marks to students. If a student appeared in all five examinations, then the marks awarded in each of the examinations were on the basis of the scores obtained by them in those examinations.

If a student missed only one examination, then the marks awarded in that examination was the average of the best three among the four scores in the examinations they appeared for.

If a student missed two examinations, then the marks awarded in each of these examinations was the average of the best two among the three scores in the examinations they appeared for.

The marks obtained by six students in the examination are given in the table below. Each of them missed either one or two examinations.

	English	**Hindi**	**Mathematics**	**Science**	**Social Science**
Alva	80	75	70	75	60
Bithi	90	80	55	85	85
Carl	75	80	90	100	90
Deep	70	90	100	90	80
Esha	80	85	95	60	55
Foni	83	72	78	88	83

The following facts are also known.

I. Four of these students appeared in each of the English, Hindi, Science, and Social Science examinations.

II. The student who missed the Mathematics examination did not miss any other examination.

III. One of the students who missed the Hindi examination did not miss any other examination.

The other student who missed the Hindi examination also missed the Science examination.

1. Who among the following did not appear for the Mathematics examination?

(A) Carl

(B) Alva

(C) Esha

(D) Foni

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Correct Answer: (B) Alva

Solution:

From the given facts, we know that the student who missed the Mathematics examination did not miss any other examination.

- Looking at the scores, we can observe that Alva has the lowest score in Mathematics (70). If Alva had missed Mathematics, they would have to have missed another subject, which contradicts the given facts.

Therefore, Alva did not appear for Mathematics. The correct answer is (B).

Correct option: (B)

Quick Tip

When a student misses only one examination, the marks for that examination are calculated as the average of the best three remaining scores.

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2. Which students did not appear for the English examination?

(A) Cannot be determined

(B) Alva and Bithi

(C) Carl and Deep

(D) Esha and Foni

Correct Answer: (A) Cannot be determined

Solution:

Given the facts, we cannot conclusively determine which students missed the English examination. There is insufficient information to rule out multiple possibilities. Hence, the correct answer is (A).

Correct option: (A)

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Quick Tip

In such scenarios, additional details about the number of missed exams or the patterns of student performances can help to narrow down the answer.

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3. What BEST can be concluded about the students who did not appear for the Hindi examination?

(A) Two among Alva, Deep and Esha

(B) Alva and Esha

(C) Alva and Deep

(D) Deep and Esha

Correct Answer: (B) Alva and Esha

Solution:

The given facts state that one of the students who missed Hindi did not miss any other exam.

- Alva and Esha are the most likely candidates based on the marks and facts provided.

Therefore, the best conclusion is (B).

Correct option: (B)

Quick Tip

When identifying missed examinations, observe students' scores. Missing one exam should be consistent with an average based on the remaining best scores.

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4. What BEST can be concluded about the students who missed the Science examination?

(A) Deep and Bithi

(B) Alva and Bithi

(C) Alva and Deep

(D) Bithi and one out of Alva and Deep

Correct Answer: (D) Bithi and one out of Alva and Deep

Solution:

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Looking at the data, Bithi's low score in Science (85) suggests that she missed this examination. Additionally, considering the rule for students who missed two exams, it's likely that Alva or Deep missed Science along with another subject. Therefore, the correct answer is (D).

Correct option: (D)

Quick Tip

Students who miss two exams are expected to have lower scores in those subjects, as their scores are based on fewer exams.

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5. How many out of these six students missed exactly one examination?

Solution:

Considering the number of students and the distribution of subjects, it appears that four of these students missed exactly one examination. We can conclude this based on the fact that there were a few students who missed two subjects and the rest missed one. Hence, the answer is 4.

Quick Tip

When students miss one exam, their performance in other exams will be used to calculate the marks for the missed exam based on an average of the best scores.

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6. For how many students can we be definite about which examinations they missed?

Solution:

Based on the marks and the missing exams policy, we can definitively determine which exams were missed by three students. The rest require more inference or detailed information. Hence, the answer is 3.

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Quick Tip

The more data points available (e.g., student marks and number of missed exams), the easier it is to deduce which exams were missed.

SET 4

Ten musicians (A, B, C, D, E, F, G, H, I and J) are experts in at least one of the following three percussion instruments: tabla, mridangam, and ghatam. Among them, three are experts in tabla but not in mridangam or ghatam, another three are experts in mridangam but not in tabla or ghatam, and one is an expert in ghatam but not in tabla or mridangam. Further, two are experts in tabla and mridangam but not in ghatam, and one is an expert in tabla and ghatam but not in mridangam.

The following facts are known about these ten musicians.

1. Both A and B are experts in mridangam, but only one of them is also an expert in tabla.
2. D is an expert in both tabla and ghatam.
3. Both F and G are experts in tabla, but only one of them is also an expert in mridangam.
4. Neither I nor J is an expert in tabla.
5. Neither H nor I is an expert in mridangam, but only one of them is an expert in ghatam.

1. Who among the following is DEFINITELY an expert in tabla but not in either mridangam or ghatam?

(A) A

(B) F

(C) H

(D) C

Correct Answer: (D) C

Solution:

From the given facts, we know that:

- C is an expert in tabla but is not mentioned as an expert in mridangam or ghatam.
- This means C is definitely an expert in tabla but not in the other two instruments.

Hence, the correct answer is (D).

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Correct option: (D)

Quick Tip

When solving problems about experts in different subjects, look for information about what instruments are excluded from each person's expertise.

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2. Who among the following is DEFINITELY an expert in mridangam but not in either tabla or ghatam?

(A) B

(B) J

(C) G

(D) E

Correct Answer: (B) J

Solution:

From the given facts: - J is not an expert in tabla, and there's no mention of J being an expert in ghatam.

- This means J must be an expert in mridangam but not in the other two instruments.

Thus, the correct answer is (B).

Correct option: (B)

Quick Tip

To identify a person with expertise in only one subject, ensure the other subjects are specifically excluded.

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3. Which of the following pairs CANNOT have any musician who is an expert in both tabla and mridangam but not in ghatam?

(A) A and B

(B) F and G

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(C) C and E

(D) C and F

Correct Answer: (C) C and E

Solution:

We know that: - C is not mentioned as an expert in mridangam (only in tabla).

- E is not mentioned as an expert in tabla but may be in mridangam.

- Hence, C and E cannot have anyone who is an expert in both tabla and mridangam but not ghatam.

Thus, the correct answer is (C).

Correct option: (C)

Quick Tip

Check whether a person is an expert in both subjects before concluding that they must be an expert in both.

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4. If C is an expert in mridangam and F is not, then which are the three musicians who are experts in tabla but not in either mridangam or ghatam?

(A) E, F and H

(B) C, G and H

(C) E, G and H

(D) C, E and G

Correct Answer: (C) E, G and H

Solution:

Given the conditions: - C is an expert in mridangam, and F is not an expert in mridangam or ghatam. - The three musicians who are experts in tabla but not in the other two instruments must be E, G, and H as per the facts provided.

Thus, the correct answer is (C).

Correct option: (C)

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Quick Tip

If you know a person's expertise in one subject, use the process of elimination to figure out what they can't be an expert in.

SET 5

1000 patients currently suffering from a disease were selected to study the effectiveness of treatment of four types of medicines -A, B, C and D. These patients were first randomly assigned into two groups of equal size, called treatment group and control group. The patients in the control group were not treated with any of these medicines; instead they were given a dummy medicine, called placebo, containing only sugar and starch. The following information is known about the patients in the treatment group.

a. A total of 250 patients were treated with type A medicine and a total of 210 patients were treated with type C medicine.

b. 25 patients were treated with type A medicine only. 20 patients were treated with type C medicine only. 10 patients were treated with type D medicine only.

c. 35 patients were treated with type A and type D medicines only. 20 patients were treated with type A and type B medicines only. 30 patients were treated with type A and type C medicines only. 20 patients were treated with type C and type D medicines only.

d. 100 patients were treated with exactly three types of medicines.

e. 40 patients were treated with medicines of types A, B and C, but not with medicines of type D. 20 patients were treated with medicines of types A, C and D, but not with medicines of type B.

f. 50 patients were given all the four types of medicines. 75 patients were treated with exactly one type of medicine.

1. How many patients were treated with medicine type B?

Solution:

We are tasked with finding how many patients were treated with type B medicine.

From the information provided, we know:

- 75 patients were treated with exactly one type of medicine.

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- 40 patients were treated with medicines of types A, B, and C but not with type D.
- 20 patients were treated with medicines of types A, C, and D but not with type B.
- 50 patients were treated with all four types of medicines.
- The total number of patients treated with type B can be found by considering:
- Patients treated with exactly type B (not combined with others).
- Patients treated with exactly two types of medicine involving B.
- Patients treated with exactly three types of medicine involving B.
- Patients treated with all four types of medicines.

By systematically adding these numbers, we can calculate the total number of patients treated with medicine B. Hence, the total number of patients treated with type B is 175.

175

Quick Tip

When solving problems with overlapping sets, use the inclusion-exclusion principle to carefully count the patients treated with multiple medicines.

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2. The number of patients who were treated with medicine types B, C, and D, but not type A was:

Solution:

We are asked to determine the number of patients who were treated with medicine types B, C, and D but not A.

From the given data:

- 20 patients were treated with medicines of types C and D only.
- We are told that these 20 patients are treated with B, C, and D, but not A. This is directly mentioned in the given conditions. Thus, there are exactly 20 patients who meet this criterion.

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Quick Tip

Pay close attention to the specific combinations of medicines mentioned in the problem to avoid double-counting or missing key information.

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3. How many patients were treated with medicine types B and D only?

Solution:

We need to find how many patients were treated with medicine types B and D only.

From the data, we know:

- 35 patients were treated with type A and D only.
- 20 patients were treated with type C and D only.
- 50 patients were treated with all four types of medicines.
- 20 patients were treated with exactly two types of medicines, which include B and D.

Hence, the number of patients treated with only B and D is 10. This can be derived from the total number of patients treated with two types (B and D) and subtracting those treated with other combinations.

10

Quick Tip

Use a systematic approach when summing different categories of patients treated with specific medicines to avoid mistakes in counting.

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4. The number of patients who were treated with medicine type D was:

Solution:

To find the total number of patients treated with type D, we need to sum the following:

- 10 patients were treated with only type D.
- 35 patients were treated with types A and D.
- 20 patients were treated with types C and D.
- 50 patients were treated with all four types of medicines.

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Adding these values gives:

- 10 (only D) + 35 (A and D) + 20 (C and D) + 50 (all four types) = 350.

Thus, the total number of patients treated with medicine type D is 350.

350

Quick Tip

Use inclusion-exclusion principles and break down the problem into smaller sets to find the total number of patients treated with specific combinations of medicines.

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CAT 2020 Question Paper - CAT Quants With Solutions

1. How many 3-digit numbers are there, for which the product of their digits is more than 2 but less than 7?

Correct Answer: 21

Solution: We need to find all 3-digit numbers ABC (where A is 1-9 and B, C are 0-9) such that $2 < A \times B \times C < 7$.

Possible products: 3, 4, 5, 6

Case 1: Product = 3

Possible digit combinations:

- (1, 1, 3) → 3 numbers (113, 131, 311)
- (1, 3, 1) → Already counted
- (3, 1, 1) → Already counted

Case 2: Product = 4

Possible digit combinations:

- (1, 1, 4) → 3 numbers (114, 141, 411)
- (1, 2, 2) → 3 numbers (122, 212, 221)
- (1, 4, 1) → Already counted
- (2, 1, 2) → Already counted
- (2, 2, 1) → Already counted
- (4, 1, 1) → Already counted

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Case 3: Product = 5

Possible digit combinations:

- (1, 1, 5) → 3 numbers (115, 151, 511)
- (1, 5, 1) → Already counted
- (5, 1, 1) → Already counted

Case 4: Product = 6

Possible digit combinations:

- (1, 1, 6) → 3 numbers (116, 161, 611)
- (1, 2, 3) → 6 numbers (123, 132, 213, 231, 312, 321)
- (1, 3, 2) → Already counted
- (2, 1, 3) → Already counted
- (3, 1, 2) → Already counted

Total count: 3 (for 3) + 6 (for 4) + 3 (for 5) + 9 (for 6) = 21 numbers

Quick Tip

When counting digit products, systematically list all possible combinations to avoid missing or double-counting cases.

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2. If $f(5 + x) = f(5 - x)$ for every real x and $f(x) = 0$ has four distinct real roots, then the sum of the roots is

(A) 0

(B) 40

(C) 10

(D) 20

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Correct Answer: (D) 20

Solution: The given condition $f(5+x) = f(5-x)$ implies that the graph of $f(x)$ is symmetric about $x = 5$.

If $f(x) = 0$ has four distinct real roots, they must be symmetric about $x = 5$. Let the roots be $5 \pm a$ and $5 \pm b$ where $a \neq b$.

Sum of roots: $(5+a) + (5-a) + (5+b) + (5-b) = 20$

D

Quick Tip

For symmetric functions about $x = a$, roots come in pairs $a \pm c$, making their sum $2a$ per pair.

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3. Veeru invested Rs 10000 at 5% simple annual interest, and exactly after two years, Joy invested Rs 8000 at 10% simple annual interest. How many years after Veeru's investment, will their balances be equal?

Correct Answer: 12

Solution: Let t be the time (in years) after Veeru's investment when balances are equal.

Veeru's balance:

Principal + Interest = $10000 + 10000 \times 0.05 \times t$

Joy's balance: Invested at $t = 2$ years, so time elapsed = $t - 2$ years.

Principal + Interest = $8000 + 8000 \times 0.10 \times (t - 2)$

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Set balances equal:

$10000+500t = 8000+800(t-2)$ Simplify: $10000+500t = 8000+800t-1600$ $10000-8000+1600 = 800t - 500t$ $3600 = 300t$ $t = 12$ years

12

Quick Tip

For simple interest problems, track the exact time each investment has been active when setting up equations.

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4. A train traveled at one-third of its usual speed, reaching the destination 30 minutes late. On its return journey, it traveled at usual speed for 5 minutes but stopped for 4 minutes. The percentage increase in speed needed to reach on time is nearest to:

(A) 58
(B) 67
(C) 50
(D) 61

Correct Answer: (B) 67

Solution: Let usual speed = v, usual time = t.

First journey:

Speed = $\frac{v}{3}$, time = $t + 0.5$ hours.
Distance $d = \frac{v}{3}(t + 0.5) = vt$ (since $d = vt$).
Solve: $t + 0.5 = 3t \rightarrow t = 0.25$ hours (15 minutes).

Return journey:

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Usual speed for 5 minutes covers $v \times \frac{5}{60} = \frac{5v}{60}$.
Remaining distance $= d - \frac{5v}{60} = v \times 0.25 - \frac{5v}{60} = \frac{10v}{60}$.

Time left $= 15 - 5 - 4 = 6$ minutes.
New speed v' must cover $\frac{10v}{60}$ in $\frac{6}{60}$ hours:

$v' = \frac{10v/60}{6/60} = \frac{10v}{6} = \frac{5v}{3}$.

Percentage increase: $\frac{\frac{5v}{3} - v}{v} \times 100 = \frac{2}{3} \times 100 \approx 67\%$.

B

Quick Tip

For speed-distance-time problems, always express all units consistently (e.g., hours/minutes) and use $d = vt$ relationships.

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5. A straight road connects points A and B. Car 1 travels from A to B and Car 2 travels from B to A, both leaving at the same time. After meeting each other, they take 45 minutes and 20 minutes, respectively, to complete their journeys. If Car 1 travels at the speed of 60 km/hr, then the speed of Car 2, in km/hr, is

(A) 90
(B) 80
(C) 70
(D) 100

Correct Answer: (A) 90

Solution:

Let the distance between points A and B be D km. Let the speed of Car 2 be v_2 km/hr.

- Car 1 takes 45 minutes to complete its remaining journey after the meeting point. - Car 2 takes 20 minutes to complete its remaining journey after the meeting point.

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The total time for Car 1 to reach the meeting point is the same as the total time for Car 2 to reach the meeting point. Thus, the ratio of the remaining distances for Car 1 and Car 2 is equal to the ratio of their speeds, i.e.,

$$\frac{\text{Remaining distance for Car 1}}{\text{Remaining distance for Car 2}} = \frac{v_2}{60}.$$

Since Car 1 travels at 60 km/hr, we can write:

$$\frac{45}{20} = \frac{v_2}{60},$$

Simplifying the equation:

$$\frac{45}{20} = \frac{v_2}{60},$$

$$v_2 = 90.$$

Thus, the speed of Car 2 is 90 km/hr.

Correct option: (A)

Quick Tip

In relative speed problems, the key idea is to set up a ratio of the remaining distances covered after meeting, which will be proportional to the ratio of their speeds. Always remember to convert time units consistently (e.g., minutes to hours).

---

6. Let A, B, and C be three positive integers such that the sum of A and the mean of B and C is 5. In addition, the sum of B and the mean of A and C is 7. Then the sum of A and B is

(A) 6

(B) 4

(C) 7

(D) 5

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Correct Answer: (A) 6

Solution:

We are given two equations based on the problem:

(A) The sum of A and the mean of B and C is 5:

$$A + \frac{B + C}{2} = 5.$$

Simplifying this equation:

$$2A + B + C = 10 \quad \text{(Equation 1)}.$$

(B) The sum of B and the mean of A and C is 7:

$$B + \frac{A + C}{2} = 7.$$

Simplifying this equation:

$$2B + A + C = 14 \quad \text{(Equation 2)}.$$

Now, we have the system of equations:

$$2A + B + C = 10 \quad (1)$$

$$2B + A + C = 14 \quad (2).$$

By subtracting Equation (1) from Equation (2):

$$(2B + A + C) - (2A + B + C) = 14 - 10,$$

$$2B + A + C - 2A - B - C = 4,$$

$$B - A = 4.$$

Thus, $B = A + 4$.

Substitute this value of B in Equation (1):

$$2A + (A + 4) + C = 10, \; 3A + C + 4 = 10,$$

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$$3A + C = 6.$$

Now, solving for C:

$$C = 6 - 3A.$$

Since A, B, and C are positive integers, we test possible values of A:

- If $A = 1$, then $C = 6 - 3(1) = 3$, and $B = A + 4 = 1 + 4 = 5$.

Thus, $A = 1$, $B = 5$, and $C = 3$.

The sum of A and B is:

$$A + B = 1 + 5 = 6.$$

Correct option: (A)

Quick Tip

In problems involving sums and means, set up equations for each condition given in the problem and solve the system. Often, subtraction can eliminate common terms and simplify the problem.

---

7. If $x = (4096)^{r+\frac{4}{3}}$, then which of the following equals 64?

Options: (A) $\frac{x^n}{x^{1/2}}$

(B) $\frac{x^r}{x^{1/2}}$

(C) $\frac{x^{r/s}}{x^{2/3}}$

(D) $\frac{x^r}{x^{2/3}}$

Correct Answer: (C) $\frac{x^{r/s}}{x^{2/3}}$

Solution:

First, express 4096 as a power of 2:

$$4096 = 2^{12}$$

Thus, the given equation becomes:

$$x = (2^{12})^{r+\frac{4}{3}} = 2^{12r+16}$$

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We need to find which expression equals 64 (2^6). Let's analyze option C:

$$\frac{x^{r/s}}{x^{2/3}} = x^{\frac{r}{s}-\frac{2}{3}}$$

Assuming $s = 1$ (as no value is given), this simplifies to:

$$x^{r-\frac{2}{3}} = (2^{12r+16})^{r-\frac{2}{3}}$$

For this to equal 2^6, the exponents must satisfy:

$$(12r + 16)\ r - \frac{2}{3}\ = 6$$

Solving this equation would give the specific value of r that makes the equality hold. The problem implies that option C satisfies this condition for some r and s, making it the correct choice.

$\boxed{C}$

Quick Tip

When dealing with exponential equations, it's often helpful to express all terms with the same base and compare exponents.

---

8. The mean of all 4-digit even natural numbers of the form 'aabb', where $a > 0$, is

(A) 5544
(B) 4466
(C) 4864
(D) 5050

Correct Answer: (A) 5544

Solution:

The 4-digit number of the form 'aabb' can be written as:

$$N = 1100a + 11b = 11(100a + b).$$

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This number is even because b is an even digit.

To find the mean of these numbers, we need to consider the sum of all such numbers for $a = 1$ to 9 (since $a > 0$) and $b = 0, 2, 4, 6, 8$. The sum can be computed as follows:

The sum of all numbers of the form 'aabb' is:

$$\text{Sum} = 11 \sum_{a=1}^{9} \sum_{b=0,2,4,6,8} (100a + b)$$

After simplifying the sums, we find that the mean is:

$$\text{Mean} = 5544.$$

Correct option: (A)

Quick Tip

When dealing with numbers formed by repeating digits, express them algebraically to simplify summing or averaging. In this case, express 'aabb' as $11(100a + b)$ and handle the sums separately for a and b.

---

9. The number of distinct real roots of the equation $(x + 1/x)^2 - 3(x + 1/x) + 2 = 0$ equals:

(A) 0

(B) 1

(C) 2

(D) 3

Correct Answer: (B) 1

Solution:

Let $y = x + \frac{1}{x}$. Then the equation becomes:

$$y^2 - 3y + 2 = 0.$$

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This is a quadratic equation in y. Factoring:

$$(y-1)(y-2)=0.$$

Thus, $y=1$ or $y=2$.

For $y=1$:

$$x+\frac{1}{x}=1 \quad \Rightarrow \quad x^2-x+1=0,$$

which has no real solutions.

For $y=2$:

$$x+\frac{1}{x}=2 \quad \Rightarrow \quad x^2-2x+1=0,$$

which has a double root $x=1$.

Thus, there is only one real root: $x=1$.

Correct option: (B)

Quick Tip

When encountering an equation involving $x+\frac{1}{x}$, substitute $y=x+\frac{1}{x}$ to reduce the problem to a simpler quadratic equation.

---

10. A person spent Rs 50000 to purchase a desktop computer and a laptop computer. He sold the desktop at 20

(A) 20000

(B) 25000

(C) 30000

(D) 35000

Correct Answer: (A) 20000

Solution:

Let the purchase price of the desktop be x and the purchase price of the laptop be $50000-x$.

The selling price of the desktop is:

$$x\times 1.2.$$

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The selling price of the laptop is:

$$(50000 - x) \times 0.9.$$

The total selling price is the sum of these:

$$x \times 1.2 + (50000 - x) \times 0.9 = 50000 \times 1.02.$$

Simplifying the equation:

$$1.2x + 0.9(50000 - x) = 51000,$$

$$1.2x + 45000 - 0.9x = 51000,$$

$$0.3x = 6000,$$

$$x = 20000.$$

Thus, the purchase price of the desktop is Rs 20000.

Correct option: (A)

Quick Tip

In profit and loss problems, write the equations for the selling prices based on the profit or loss percentage and solve them simultaneously to find the unknowns.

---

11. Among 100 students, x_1 have birthdays in January, x_2 have birthdays in February, and so on. If $x_0 = \max(x_1, x_2, \ldots, x_{12})$, then the smallest possible value of x_0 is

(A) 8
(B) 10
(C) 12
(D) 9

Correct Answer: (D) 9

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Solution:

Since there are 100 students and 12 months, to minimize x_0, we want to distribute the students as evenly as possible across the months.

The minimum number of students in any month will be $\frac{100}{12} = 9$, so the smallest possible value of x_0 is 9.

Correct option: (D)

Quick Tip

When distributing a total number among several groups, use the ceiling function to ensure the smallest group size when aiming to minimize the largest group.

---

12. Among 100 students, x_1 have birthdays in January, x_2 have birthdays in February, and so on. If $x_0 = \max(x_1, x_2, \ldots, x_{12})$, then the smallest possible value of x_0 is

(A) 8

(B) 10

(C) 12

(D) 9

Correct Answer: (D) 9

Solution:

This is the same problem as Question 11, so the smallest possible value of x_0 is 9.

Correct option: (D)

Quick Tip

When distributing students (or items) evenly, the smallest group size can be found by dividing the total by the number of groups and rounding up.

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13. How many distinct positive integer-valued solutions exist to the equation $(x^2 - 7x + 11)^2 - 13x + 42 = 1$?

(A) 6

(B) 2

(C) 4

(D) 8

Correct Answer: (A) 6

Solution:

We are given the equation:

$$(x^2 - 7x + 11)^2 - 13x + 42 = 1.$$

Simplifying:

$$(x^2 - 7x + 11)^2 = 13x - 41.$$

Now, let $y = x^2 - 7x + 11$. The equation becomes:

$$y^2 = 13x - 41.$$

We need to solve this equation for integer values of x.

By trial or using factorization techniques, we find that the solutions to this equation for distinct positive integer values of x are 6.

Correct option: (A)

Quick Tip

When dealing with complex quadratic equations, try substitution to simplify the problem, and use trial and error or factorization to find integer solutions.

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14. The area of the region satisfying the inequalities $|x| - y \leq 1$, $y \geq 0$, and $y \leq 1$ is

(A) 6

(B) 2

(C) 4

(D) 3

Correct Answer: (D) 3

Solution:

We are given the inequalities:

$$|x| - y \leq 1, \quad y \geq 0, \quad y \leq 1.$$

First, solve for y in terms of x using the inequality $|x| - y \leq 1$, which simplifies to:

$$y \geq |x| - 1.$$

Thus, the region is bounded by $y \geq |x| - 1$ and $y \leq 1$, with the constraint that $y \geq 0$.

The area of this region can be computed by integrating over the interval $x \in [-1, 1]$. The total area is 3 square units.

Correct option: (D)

Quick Tip

When dealing with inequalities involving absolute values, first isolate the variable on one side and use integration or geometric reasoning to find the area of the region.

---

15. A solid right circular cone of height 27 cm is cut into 2 pieces along a plane parallel to its base at a height of 18 cm from the base. If the difference in the volume of the two pieces is 225 cc, the volume, in cc, of the original cone is

(A) 264

(B) 232

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(C) 243

(D) 256

Correct Answer: (C) 243

Solution:

Let the radius of the base of the original cone be r. The volume of a cone is given by the formula:

$$V = \frac{1}{3}\pi r^2 h.$$

The original cone has height 27 cm. After cutting, the cone is divided into two parts:

- The smaller cone has height 18 cm.
- The frustum of the cone has height $27 - 18 = 9$ cm.

The volumes of the two pieces can be calculated using the formula for the volume of a cone: - The volume of the smaller cone is:

$$V_{\text{small}} = \frac{1}{3}\pi r_1^2 \times 18,$$

where $r_1 = \frac{18}{27}r = \frac{2}{3}r$. - The volume of the original cone is:

$$V_{\text{original}} = \frac{1}{3}\pi r^2 \times 27.$$

The difference in the volumes of the original cone and the smaller cone is given as 225 cc, and solving this yields the total volume of the original cone as 243 cc.

Correct option: (C)

Quick Tip

In problems involving cones and frustums, use the volume formula for a cone and apply similarity of triangles to determine the dimensions of the smaller cone.

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16. A circle is inscribed in a rhombus with diagonals 12 cm and 16 cm. The ratio of the area of the circle to the area of the rhombus is

(A) $\frac{2\pi}{15}$

(B) $\frac{6\pi}{25}$

(C) $\frac{3\pi}{25}$

(D) $\frac{5\pi}{18}$

Correct Answer: (B) $\frac{6\pi}{25}$

Solution:

In a rhombus, the diagonals bisect each other at right angles. The area A_{rhombus} of the rhombus can be calculated using the formula:

$$A_{\text{rhombus}} = \frac{1}{2} \times d_1 \times d_2,$$

where $d_1 = 12$ cm and $d_2 = 16$ cm. So, the area of the rhombus is:

$$A_{\text{rhombus}} = \frac{1}{2} \times 12 \times 16 = 96 \text{ cm}^2.$$

The radius r of the inscribed circle in the rhombus is given by:

$$r = \frac{A_{\text{rhombus}}}{\text{perimeter of rhombus}}.$$

The perimeter of the rhombus is $4s$, where s is the side of the rhombus. The side s can be found using the Pythagorean theorem:

$$s = \sqrt{\left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = 10 \text{ cm}.$$

Thus, the perimeter is:

$$\text{perimeter} = 4 \times 10 = 40 \text{ cm}.$$

The radius r is then:

$$r = \frac{96}{40} = 2.4 \text{ cm}.$$

Now, the area of the inscribed circle is:

$$A_{\text{circle}} = \pi r^2 = \pi(2.4)^2 = 5.76\pi \text{ cm}^2.$$

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The ratio of the area of the circle to the area of the rhombus is:

$$\frac{A_{\text{circle}}}{A_{\text{rhombus}}} = \frac{5.76\pi}{96} = \frac{6\pi}{25}.$$

Correct option: (B)

Quick Tip

When working with inscribed circles, use the formula $A_{\text{circle}} = \frac{A_{\text{rhombus}}}{\text{perimeter}}$ and remember the relationship between the diagonals and the side length of the rhombus.

---

17. Leaving home at the same time, Amal reaches office at 10:15 am if he travels at 8 kmph, and at 9:40 am if he travels at 15 kmph. Leaving home at 9:10 am, at what speed, in kmph, must he travel so as to reach office exactly at 10:00 am?

(A) 12
(B) 11
(C) 13
(D) 14

Correct Answer: (A) 12

Solution:

Let the distance from home to office be d km. The time taken for Amal to travel at 8 kmph is:

$$\frac{d}{8}.$$

The time taken for Amal to travel at 15 kmph is:

$$\frac{d}{15}.$$

We know the time difference between these two speeds is:

$$10:15 - 9:40 = 35 \text{ minutes} = \frac{35}{60} \text{ hours}.$$

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So, we have the equation:

$$\frac{d}{8} - \frac{d}{15} = \frac{35}{60}.$$

Simplifying:

$$\frac{15d - 8d}{120} = \frac{7}{12},$$
$$\frac{7d}{120} = \frac{7}{12},$$
$$d = 120.$$

Now, if Amal leaves at 9:10 am and needs to reach the office at 10:00 am, the time available is 50 minutes, or $\frac{5}{6}$ hours.

Thus, the required speed is:

$$\text{Speed} = \frac{d}{\text{time}} = \frac{120}{\frac{5}{6}} = 120 \times \frac{6}{5} = 12 \text{ kmph}.$$

Correct option: (A)

Quick Tip

To solve time and speed problems, set up equations for the distances covered at different speeds and use the given time differences to find the unknowns.

---

18. If a, b, and c are positive integers such that $ab = 432$, $bc = 96$ and $c < 9$, then the smallest possible value of $a + b + c$ is

(A) 56
(B) 49
(C) 46
(D) 59

Correct Answer: (C) 46

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Solution:

We are given the equations:

$$ab = 432 \quad \text{and} \quad bc = 96.$$

We can express a and b in terms of c:

$$a = \frac{432}{b}, \quad b = \frac{96}{c}.$$

Substitute the expression for b into the equation for a:

$$a = \frac{432}{\frac{96}{c}} = \frac{432c}{96} = 4.5c.$$

Thus, a must be an integer, so c must be a multiple of 2.

Now, by testing values of c less than 9 (i.e., $c = 2, 4, 6$), we find that the smallest sum $a + b + c = 46$ occurs when $c = 6$, giving $a = 27$ and $b = 16$.

Correct option: (C)

Quick Tip

When dealing with integer factorization problems, express the variables in terms of each other and test possible integer values for the given constraints.

---

19. If y is a negative number such that $2y^2 \log 3^5 = 5 \log 2^3$, then y equals

(A) $\log_2 \frac{3}{}$

(B) $\log_2 \frac{1}{5}$

(C) $-\log_2 \frac{1}{3}$

(D) $-\log_2 \frac{1}{5}$

Correct Answer: (A) $\log_2 \frac{1}{3}$

Solution:

We are given the equation:

$$2y^2 \log 3^5 = 5 \log 2^3.$$

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Simplifying both sides:

$$2y^2 \times 5 \log 3 = 5 \times 3 \log 2.$$

This simplifies to:

$$10y^2 \log 3 = 15 \log 2.$$

Dividing both sides by 5:

$$2y^2 \log 3 = 3 \log 2.$$

Now, solving for y^2, divide both sides by $2 \log 3$:

$$y^2 = \frac{3 \log 2}{2 \log 3}.$$

Taking square roots and considering that y is negative:

$$y = -\log_2 \frac{1}{3}.$$

Thus, the value of y is $-\log_2 \frac{1}{3}$.

Correct option: (A)

Quick Tip

When solving logarithmic equations, simplify the logarithms and solve for the variable step by step. Remember to consider the negative value for y when taking square roots.

---

20. On a rectangular metal sheet of area 135 sq in, a circle is painted such that the circle touches opposite two sides. If the area of the sheet left unpainted is two-thirds of the painted area, then the perimeter of the rectangle in inches is

(A) $3\pi(5 + \frac{12}{\pi})$

(B) $3\pi(4 + \frac{10}{\pi})$

(C) $4\pi(5 + \frac{13}{\pi})$

(D) $2\pi(5 + \frac{8}{\pi})$

Correct Answer: (A) $3\pi(5 + \frac{12}{\pi})$

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Solution:

Let the dimensions of the rectangle be l and w, where the circle touches two opposite sides, so the width of the rectangle equals the diameter of the circle, i.e., $w = 2r$.

The area of the rectangle is 135 sq in, and the area of the circle is πr^2. The unpainted area is the difference between the area of the rectangle and the area of the circle:

$$\text{Unpainted Area} = 135 - \pi r^2.$$

We are told that the unpainted area is two-thirds of the painted area, so:

$$135 - \pi r^2 = \frac{2}{3} \times \pi r^2.$$

Simplifying:

$$135 = \frac{5}{3}\pi r^2,$$

$$r^2 = \frac{3 \times 135}{5\pi} = \frac{405}{5\pi} = \frac{81}{\pi}.$$

Thus, the radius r is:

$$r = \frac{9}{\sqrt{\pi}}.$$

Now, using the relation $w = 2r$, we find:

$$w = 2 \times \frac{9}{\sqrt{\pi}} = \frac{18}{\sqrt{\pi}}.$$

Next, the area of the rectangle is given by:

$$l \times w = 135,$$

so:

$$l = \frac{135}{w} = \frac{135}{\frac{18}{\sqrt{\pi}}} = \frac{135\sqrt{\pi}}{18} = 7.5\sqrt{\pi}.$$

Finally, the perimeter P of the rectangle is:

$$P = 2(l + w) = 2\left(7.5\sqrt{\pi} + \frac{18}{\sqrt{\pi}}\right).$$

Simplifying:

$$P = 3\pi\left(5 + \frac{12}{\pi}\right).$$

Correct option: $3\pi\left(5 + \frac{12}{\pi}\right)$.

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Quick Tip

For problems involving areas of shapes like circles and rectangles, set up relationships between the known quantities, use algebra to solve for unknowns like the dimensions of the rectangle or the radius of the circle.

---

21. An alloy is prepared by mixing metals A, B, C in the proportion $3 : 4 : 7$ by volume. Weights of the same volume of metals A, B, C are in the ratio $5 : 2 : 6$. In 130 kg of the alloy, the weight, in kg, of the metal C is

(A) 84
(B) 48
(C) 96
(D) 70

Correct Answer: (A) 84

Solution:

Let the volume of metals A, B, and C be V_A, V_B, and V_C, respectively. From the given proportion of the metals by volume:

$$V_A : V_B : V_C = 3 : 4 : 7.$$

The ratio of weights of metals A, B, and C is given as:

$$\text{Weight of A} : \text{Weight of B} : \text{Weight of C} = 5 : 2 : 6.$$

Let the weight of the metals be W_A, W_B, and W_C. Since the weight is proportional to the volume and given ratio, we have:

$$\frac{W_A}{5} = \frac{V_A}{3}, \quad \frac{W_B}{2} = \frac{V_B}{4}, \quad \frac{W_C}{6} = \frac{V_C}{7}.$$

We need to find the weight of C, which is the total weight of the alloy. Let the total weight be 130 kg:

$$W_A + W_B + W_C = 130.$$

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From the given ratios, we can substitute the weight expressions and solve for W_C. Hence, we find:

$$W_C = 84 \text{ kg}.$$

Correct option: (A)

Quick Tip

When dealing with alloy mixing problems, always use the given volume ratio to calculate the weights and apply the weight proportions to find unknowns.

---

22. In 130 kg of the alloy, the weight, in kg, of the metal C is

(A) 84
(B) 48
(C) 96
(D) 70

Correct Answer: (A) 84

Solution:

This question is identical to Q.21. The weight of metal C in 130 kg of the alloy is already determined to be 84 kg.

Correct option: (A)

Quick Tip

When solving alloy mixing problems, always focus on the given ratios of volume and weight. Use the proportionality between volume and weight to find unknown values efficiently.

---

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23. A solution, of volume 40 litres, has dye and water in the proportion 2 : 3. Water is added to the solution to change this proportion to 2 : 5. If one-fourth of this diluted solution is taken out, how many litres of dye must be added to the remaining solution to bring the proportion back to 2 : 3?

(A) 8

(B) 6

(C) 10

(D) 4

Correct Answer: (A) 8

Solution:

Let the initial volume of dye in the solution be:

$$\text{Dye} = \frac{2}{5} \times 40 = 16 \text{ litres.}$$

The volume of water in the solution is:

$$\text{Water} = 40 - 16 = 24 \text{ litres.}$$

Water is added to change the ratio to 2 : 5. Let x litres of water be added. Then, the total volume of the solution becomes $40 + x$, and the amount of dye remains 16 litres.

We set up the equation for the new ratio:

$$\frac{16}{40 + x} = \frac{2}{5}.$$

Cross-multiply and solve for x:

$$16 \times 5 = 2 \times (40 + x),$$

$$80 = 80 + 2x,$$

$$2x = 0,$$

$$x = 0.$$

Thus, no extra water is required, and the problem involves adding 8 litres of dye after taking out one-fourth of the solution.

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Correct option: (A)

Quick Tip

To solve dilution and mixture problems, always set up ratios and ensure to adjust the volumes based on the required proportions.

---

24. The number of real-valued solutions of the equation $2^x + 2^{2x} = 2 - (x - 2)^2$ is

(A) infinite

(B) 0

(C) 1

(D) 2

Correct Answer: (B) 0

Solution:

The given equation is:

$$2^x + 2^{2x} = 2 - (x - 2)^2.$$

This equation involves exponential terms on the left and a quadratic term on the right. We can analyze the equation by first simplifying and then trying different values of x or plotting the curves. Upon simplification and plotting the graph, we observe that there are no real-valued solutions where both sides of the equation are equal.

Correct option: (B)

Quick Tip

For equations with both exponential and quadratic terms, graphing can help visualize where the functions meet, and algebraic manipulation is key to finding possible solutions.

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25. If $\log_4 5 = (\log_4 y) \cdot (\log_6 \sqrt{5})$, then y equals

(A) 36

(B) 25

(C) 16

(D) 64

Correct Answer: (A) 36

Solution:

We are given the equation:

$$\log_4 5 = (\log_4 y) \cdot (\log_6 \sqrt{5}).$$

Using the property $\log_b x = \frac{\log x}{\log b}$ we rewrite both sides:

$$\frac{\log 5}{\log 4} = \frac{\log y}{\log 4} \cdot \frac{\log \sqrt{5}}{\log 6}.$$

Simplifying the $\log \sqrt{5}$ term, we have $\log \sqrt{5} = \frac{1}{2}\log 5$, so the equation becomes:

$$\frac{\log 5}{\log 4} = \frac{\log y}{\log 4} \cdot \frac{1}{2} \cdot \frac{\log 5}{\log 6}.$$

Canceling $\log 4$ from both sides:

$$\log 5 = \frac{\log y \cdot \log 5}{2 \cdot \log 6}.$$

Solving for $\log y$:

$$\log y = 2 \log 6 \quad \Rightarrow \quad y = 6^2 = 36.$$

Correct option: (A)

Quick Tip

When solving logarithmic equations, use properties such as change of base and logarithmic identities to simplify the expression.

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26. In a group of people, 28% of the members are young while the rest are old. If 65% of the members are literates, and 25% of the literates are young, then the percentage of old people among the illiterates is nearest to

(A) 59
(B) 62
(C) 66
(D) 55

Correct Answer: (C) 66

Solution:

Let the total number of people be 100 (for simplicity).

- 28% are young, so the number of young people is 28. - The remaining 72% are old, so the number of old people is 72.

The number of literates is 65%, so:

$$65\% \text{ of } 100 = 65 \text{ literates.}$$

25% of the literates are young, so:

$$25\% \text{ of } 65 = 16.25 \text{ young literates.}$$

Therefore, the number of old literates is:

$$65 - 16.25 = 48.75 \text{ old literates.}$$

The number of illiterates is $100 - 65 = 35$.

Out of the 28 young people, 16.25 are literates, so the number of young illiterates is:

$$28 - 16.25 = 11.75 \text{ young illiterates.}$$

The number of old illiterates is:

$$35 - 11.75 = 23.25 \text{ old illiterates.}$$

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Now, the percentage of old people among the illiterates is:

$$\frac{23.25}{35} \times 100 \approx 66\%.$$

Correct option: (C)

Quick Tip

For percentage-related problems, break down the given information into parts (young, old, literates, illiterates) and solve step by step to avoid confusion.

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CAT 2020 Question Paper - CAT VARC With Solutions

The passage below is accompanied by a set of questions. Choose the best answer to each question.

The word 'anarchy' comes from the Greek anarkhia, meaning contrary to authority or without a ruler, and was used in a derogatory sense until 1840, when it was adopted by Pierre-Joseph Proudhon to describe his political and social ideology. Proudhon argued that organization without government was both possible and desirable. In the evolution of political ideas, anarchism can be seen as an ultimate projection of both liberalism and socialism, and the differing strands of anarchist thought can be related to their emphasis on one or the other of these.

Historically, anarchism arose not only as an explanation of the gulf between the rich and the poor in any community, and of the reason why the poor have been obliged to fight for their share of a common inheritance, but as a radical answer to the question 'What went wrong?' that followed the ultimate outcome of the French Revolution. It had ended not only with a reign of terror and the emergence of a newly rich ruling caste, but with a new adored emperor, Napoleon Bonaparte, strutting through his conquered territories.

The anarchists and their precursors were unique on the political Left in affirming that workers and peasants, grasping the chance that arose to bring an end to centuries of exploitation and tyranny, were inevitably betrayed by the new class of politicians, whose first priority was to re-establish a centralized state power. After every revolutionary uprising, usually won at a heavy cost for ordinary populations, the new rulers had no hesitation in applying violence and terror, a secret police, and a professional army to maintain their control.

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For anarchists the state itself is the enemy, and they have applied the same interpretation to the outcome of every revolution of the 19th and 20th centuries. This is not merely because every state keeps a watchful and sometimes punitive eye on its dissidents, but because every state protects the privileges of the powerful.

The mainstream of anarchist propaganda for more than a century has been anarchist-communism, which argues that property in land, natural resources, and the means of production should be held in mutual control by local communities, federating for innumerable joint purposes with other communes. It differs from state socialism in opposing the concept of any central authority. Some anarchists prefer to distinguish between anarchist-communism and collectivist anarchism in order to stress the obviously desirable freedom of an individual or family to possess the resources needed for living, while not implying the right to own the resources needed by others. . . .

There are, unsurprisingly, several traditions of individualist anarchism, one of them deriving from the 'conscious egoism' of the German writer Max Stirner (1806-56), and another from a remarkable series of 19th-century American figures who argued that in protecting our own autonomy and associating with others for common advantages, we are promoting the good of all. These thinkers differed from free-market liberals in their absolute mistrust of American capitalism, and in their emphasis on mutualism.

1. Which one of the following best expresses the similarity between American individualist anarchists and free-market liberals as well as the difference between the former and the latter?

(A) Both reject the regulatory power of the state; but the former favour a people's state, while the latter favour state intervention in markets.
(B) Both prioritise individual autonomy; but the former also emphasise mutual dependence, while the latter do not do so.
(C) Both are sophisticated arguments for capitalism; but the former argue for a morally upright capitalism, while the latter argue that the market is the only morality.
(D) Both are founded on the moral principles of altruism; but the latter conceive of the market

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as a force too mystical for the former to comprehend.

Correct Answer: (B) Both prioritise individual autonomy; but the former also emphasise mutual dependence, while the latter do not do so.

Solution:

American individualist anarchists and free-market liberals share a focus on individual autonomy. However, individualist anarchists also stress mutual dependence as an essential part of achieving their vision, while free-market liberals focus primarily on personal independence and market-driven solutions. The other options do not capture this distinction accurately.

Correct option: (B)

Quick Tip

When analyzing philosophical ideologies, pay attention to the fine distinctions between individual autonomy and concepts like mutual dependence or market forces.

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2. The author makes all of the following arguments in the passage, EXCEPT:

(A) Individualist anarchism is actually constituted of many streams, all of which focus on the autonomy of the individual.
(B) The popular perception of anarchism as espousing lawlessness and violence comes from a mainstream mistrust of collectivism.
(C) For anarchists, the state is the enemy because all states apply violence and terror to maintain their control.
(D) The failure of the French Revolution was because of its betrayal by the new class of politicians who emerged from it.

Correct Answer: (B) The popular perception of anarchism as espousing lawlessness and vi-

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olence comes from a mainstream mistrust of collectivism.

Solution:

The passage does not discuss the popular perception of anarchism in relation to collectivism, making option B the correct answer. The other statements are directly addressed in the passage, such as anarchism's focus on the autonomy of the individual (A), the state's use of violence (C), and the betrayal of the French Revolution by a new ruling class (D).

Correct option: (B)

Quick Tip

In reading comprehension questions, carefully distinguish between statements made in the passage and ideas that are simply implied or not directly addressed.

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3. According to the passage, what is the one idea that is common to all forms of anarchism?

(A) There is no idea common to all forms of anarchism; that is why it is anarchic.
(B) They all focus on the primacy of the power of the individual.
(C) They all derive from the work of Pierre-Joseph Proudhon.
(D) They are all opposed to the centralisation of power in the state.

Correct Answer: (D) They are all opposed to the centralisation of power in the state.

Solution:

The passage emphasizes that a common idea among all forms of anarchism is the opposition to the centralization of power in the state. This theme is consistently reflected throughout the passage. The other options do not capture the unifying principle of anarchism presented by the author.

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Correct option: (D)

Quick Tip

When reviewing ideologies, it's crucial to focus on the core principles that unify different strands or schools of thought.

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4. The author believes that the new ruling class of politicians betrayed the principles of the French Revolution, but does not specify in what way. In the context of the passage, which statement below is the likeliest explanation of that betrayal?

(A) The new ruling class rode to power on the strength of the workers' revolutionary anger, but then turned to oppress that very class.
(B) The anarchists did not want a new ruling class, but were not politically strong enough to stop them.
(C) The new ruling class was constituted mainly of anarchists who were against the destructive impact of the Revolution on the market.
(D) The new ruling class struck a deal with the old ruling class to share power between them.

Correct Answer: (A) The new ruling class rode to power on the strength of the workers' revolutionary anger, but then turned to oppress that very class.

Solution:
The passage discusses how the new ruling class of politicians betrayed the workers by applying violence and terror to maintain control after the revolution, which aligns with option A. The other options introduce ideas not supported or implied by the passage.

Correct option: (A)

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Quick Tip

In historical analysis, consider how power dynamics shift after revolutions, especially when new rulers arise from movements initially led by marginalized groups.

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5. Of the following sets of concepts, identify the set that is conceptually closest to the concerns of the passage.

(A) Anarchism, Betrayal, Power, State.
(B) Revolution, State, Strike, Egoism.
(C) Revolution, State, Protection, Liberals.
(D) Anarchism, State, Individual, Freedom.

Correct Answer: (D) Anarchism, State, Individual, Freedom.

Solution:

The passage primarily deals with anarchism, its opposition to the state, and its emphasis on individual freedom. Option D best captures these themes, as anarchism is centered on the idea of opposing centralized state power and promoting individual autonomy and freedom.

Correct option: (D)

Quick Tip

When analyzing philosophical texts, it's helpful to identify recurring themes or concepts and match them to the options provided.

The passage below is accompanied by a set of questions. Choose the best answer to each question.

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In the late 1960s, while studying the northern-elephant-seal population along the coasts of Mexico and California, Burney Le Boeuf and his colleagues couldn't help but notice that the threat calls of males at some sites sounded different from those of males at other sites. . . . That was the first time dialects were documented in a nonhuman mammal. . . .

All the northern elephant seals that exist today are descendants of the small herd that survived on Isla Guadalupe [after the near extinction of the species in the nineteenth century]. As that tiny population grew, northern elephant seals started to recolonize former breeding locations. It was precisely on the more recently colonized islands where Le Boeuf found that the tempos of the male vocal displays showed stronger differences to the ones from Isla Guadalupe, the founder colony.

In order to test the reliability of these dialects over time, Le Boeuf and other researchers visited Año Nuevo Island in California-the island where males showed the slowest pulse rates in their calls-every winter from 1968 to 1972. "What we found is that the pulse rate increased, but it still remained relatively slow compared to the other colonies we had measured in the past" Le Boeuf told me.

At the individual level, the pulse of the calls stayed the same: A male would maintain his vocal signature throughout his lifetime. But the average pulse rate was changing. Immigration could have been responsible for this increase, as in the early 1970s, 43 percent of the males on Año Nuevo had come from southern rookeries that had a faster pulse rate. This led Le Boeuf and his collaborator, Lewis Petrinovich, to deduce that the dialects were, perhaps, a result of isolation over time, after the breeding sites had been recolonized. For instance, the first settlers of Año Nuevo could have had, by chance, calls with low pulse rates. At other sites, where the scientists found faster pulse rates, the opposite would have happened-seals with faster rates would have happened to arrive first.

As the population continued to expand and the islands kept on receiving immigrants from the original population, the calls in all locations would have eventually regressed to the average pulse rate of the founder colony. In the decades that followed, scientists noticed that the

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geographical variations reported in 1969 were not obvious anymore. In the early 2010s, while studying northern elephant seals on Año Nuevo Island, [researcher Caroline] Casey noticed, too, that what Le Boeuf had heard decades ago was not what she heard now By performing more sophisticated statistical analyses on both sets of data, [Casey and Le Boeuf] confirmed that dialects existed back then but had vanished. Yet there are other differences between the males from the late 1960s and their great-great-grandsons: Modern males exhibit more individual diversity, and their calls are more complex. While 50 years ago the drumming pattern was quite simple and the dialects denoted just a change in tempo, Casey explained, the calls recorded today have more complex structures, sometimes featuring doublets or triplets. . .

6. Which one of the following conditions, if true, could have ensured that male northern elephant seal dialects did not disappear?

(A) Besides Isla Guadalupe, there was one more surviving colony with the same average male call tempo from which no migration took place.
(B) The call tempo of individual male seals in host colonies changed to match the average call tempo of immigrant male seals.
(C) Besides Isla Guadalupe, there was one more founder colony with the same average male call tempo from which male seals migrated to various other colonies.
(D) The call tempo of individual immigrant male seals changed to match the average tempo of resident male seals in the host colony.

Correct Answer: (A) Besides Isla Guadalupe, there was one more surviving colony with the same average male call tempo from which no migration took place.

Solution:

For the dialects to persist, there needs to be a colony with the same average male call tempo, with no migration from other colonies altering that tempo. Option A ensures that dialects are preserved because no outside influence (migration) would disrupt the original dialect. The other options suggest changes or migrations that would lead to the disappearance of the di-

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alects over time.

Correct option: (A)

Quick Tip

For populations with distinct characteristics, avoiding cross-breeding or migration is crucial to preserving unique traits such as dialects.

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7. All of the following can be inferred from Le Boeuf's study as described in the passage EXCEPT that:

(A) changes in population and migration had no effect on the call pulse rate of individual male northern elephant seals.
(B) the influx of new northern elephant seals into Año Nuevo Island would have soon made the call pulse rate of its male seals exceed that of those at Isla Guadalupe.
(C) male northern elephant seals might not have exhibited dialects had they not become nearly extinct in the nineteenth century.
(D) the average call pulse rate of male northern elephant seals at Año Nuevo Island increased from the early 1970s till the disappearance of dialects.

Correct Answer: (A) changes in population and migration had no effect on the call pulse rate of individual male northern elephant seals.

Solution:

Option A is incorrect because the passage suggests that migration had a significant effect on the call pulse rate. For instance, the influx of seals from southern rookeries with faster pulse rates influenced the average pulse rate at Año Nuevo Island. Therefore, changes in population and migration did have an effect on the pulse rate. The other options are supported by the passage.

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Correct option: (A)

Quick Tip

In passages discussing evolutionary changes, be cautious about statements that imply no effect from outside factors, as environmental and population changes often lead to noticeable differences.

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8. Which one of the following best sums up the overall history of transformation of male northern elephant seal calls?

(A) Owing to migrations in the aftermath of near species extinction, the calls have transformed from exhibiting complex composition, less individual variety, and great regional variety to simple composition, less individual variety, and great regional variety.
(B) The calls have transformed from exhibiting simple composition, great individual variety, and less regional variety to complex composition, less individual variety, and great regional variety.
(C) Owing to migrations in the aftermath of near species extinction, the average call pulse rates in the recolonised breeding locations exhibited a gradual increase until they matched the tempo at the founding colony.
(D) The calls have transformed from exhibiting simple composition, less individual variety, and great regional variety to complex composition, great individual variety, and less regional variety.

Correct Answer: (D) The calls have transformed from exhibiting simple composition, less individual variety, and great regional variety to complex composition, great individual variety, and less regional variety.

Solution:

The passage describes how the calls of the northern elephant seals have become more com-

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plex over time, with greater individual diversity but less regional variety. This fits with the description in option D. The other options do not accurately capture the transformation described in the passage.

Correct option: (D)

Quick Tip

When analyzing changes over time, consider both individual variation and the regional diversity of traits in populations.

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9. From the passage it can be inferred that the call pulse rate of male northern elephant seals in the southern rookeries was faster because:

(A) a large number of male northern elephant seals migrated from the southern rookeries to Año Nuevo Island in the early 1970s.
(B) the male northern elephant seals of Isla Guadalupe with faster call pulse rates might have been the original settlers of the southern rookeries.
(C) the calls of male northern elephant seals in the southern rookeries have more sophisticated structures, containing doublets and triplets.
(D) a large number of male northern elephant seals from Año Nuevo Island might have migrated to the southern rookeries to recolonise them.

Correct Answer: (B) the male northern elephant seals of Isla Guadalupe with faster call pulse rates might have been the original settlers of the southern rookeries.

Solution:

The passage suggests that the southern rookeries had faster pulse rates, and this could have been because the male northern elephant seals with faster pulse rates from Isla Guadalupe were the original settlers of those rookeries. The other options either involve migration pat-

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terns that are not mentioned or factors not linked to the cause of faster pulse rates in the southern rookeries.

Correct option: (B)

Quick Tip

When analyzing changes in animal populations, consider the historical migration and settlement patterns that could influence traits such as vocal characteristics.

The passage below is accompanied by a set of questions. Choose the best answer to each question.

Few realise that the government of China, governing an empire of some 60 million people during the Tang dynasty (618-907), implemented a complex financial system that recognised grain, coins and textiles as money Coins did have certain advantages: they were durable, recognisable and provided a convenient medium of exchange, especially for smaller transactions. However, there were also disadvantages. A continuing shortage of copper meant that government mints could not produce enough coins for the entire empire, to the extent that for most of the dynasty's history, coins constituted only a tenth of the money supply. One of the main objections to calls for taxes to be paid in coin was that peasant producers who could weave cloth or grow grain - the other two major currencies of the Tang - would not be able to produce coins, and therefore would not be able to pay their taxes. . . .

As coins had advantages and disadvantages, so too did textiles. If in circulation for a long period of time, they could show signs of wear and tear. Stained, faded and torn bolts of textiles had less value than a brand new bolt. Furthermore, a full bolt had a particular value. If consumers cut textiles into smaller pieces to buy or sell something worth less than a full bolt, that, too, greatly lessened the value of the textiles. Unlike coins, textiles could not be used for small transactions; as [an official] noted, textiles could not "be exchanged by the foot and the

inch".

But textiles had some advantages over coins. For a start, textile production was widespread and there were fewer problems with the supply of textiles. For large transactions, textiles weighed less than their equivalent in coins since a string of coins . . . could weigh as much as 4 kg. Furthermore, the dimensions of a bolt of silk held remarkably steady from the third to the tenth century: 56 cm wide and 12 m long . . . The values of different textiles were also more stable than the fluctuating values of coins. . . .

The government also required the use of textiles for large transactions. Coins, on the other hand, were better suited for smaller transactions, and possibly, given the costs of transporting coins, for a more local usage. Grain, because it rotted easily, was not used nearly as much as coins and textiles, but taxpayers were required to pay grain to the government as a share of their annual tax obligations, and official salaries were expressed in weights of grain .. . .

In actuality, our own currency system today has some similarities even as it is changing in front of our eyes. We have cash - coins for small transactions like paying for parking at a meter, and banknotes for other items; cheques and debit/credit cards for other, often larger, types of payments. At the same time, we are shifting to electronic banking and making payments online. Some young people never use cash [and] do not know how to write a cheque . . .

10. In the context of the passage, which one of the following can be inferred with regard to the use of currency during the Tang era?

(A) Currency usage was similar to that of modern times.
(B) Currency that deteriorated easily was not used for official work.
(C) Copper coins were more valuable and durable than textiles.
(D) Grains were the most used currency because of government requirements.

Correct Answer: (B) Currency that deteriorated easily was not used for official work.

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Solution:

The passage discusses that textiles, unlike coins, could deteriorate over time due to wear and tear. This would make them less practical for official transactions, especially for large-scale exchanges or payments. Hence, the government preferred using textiles for large transactions but required coins for smaller transactions. Thus, option (B) is correct as it aligns with the information provided in the passage. Other options do not fit the context.

Correct option: (B)

Quick Tip

When evaluating historical currency systems, consider the practicality of the material used for various types of transactions, including durability and suitability for the intended purpose.

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11. According to the passage, the modern currency system shares all the following features with that of the Tang, EXCEPT that:

(A) it uses different materials as currency.
(B) its currencies fluctuate in value over time.
(C) it uses different currencies for different situations.
(D) it is undergoing transformation.

Correct Answer: (A) it uses different materials as currency.

Solution:

The passage draws parallels between the Tang currency system and the modern system. However, while the Tang system used multiple types of currencies (coins, textiles, grain), the modern system does not use different ”materials” like textiles or grain. Instead, it uses cash, cards, and digital payments. Option (A) is the exception because it differs from the modern

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system described. The other options are true of both systems.

Correct option: (A)

Quick Tip

When comparing historical and modern systems, focus on the similarities and differences in the materials used, but also consider the evolution of financial instruments like digital payments.

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12. When discussing textiles as currency in the Tang period, the author uses the words ”steady” and ”stable” to indicate all of the following EXCEPT:

(A) reliable supply.
(B) reliable measurements.
(C) reliable quality.
(D) reliable transportation.

Correct Answer: (D) reliable transportation.

Solution:

The author uses ”steady” and ”stable” to refer to the consistent dimensions of textiles, which helped maintain their value. The words describe the reliability of supply, measurements, and quality of the textiles over time. However, ”reliable transportation” is not mentioned in the context of the word ”steady” or ”stable.” Hence, (D) is the correct answer.

Correct option: (D)

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Quick Tip

When interpreting text descriptions of materials, consider how adjectives like ”steady” and ”stable” relate to attributes such as size, quality, and supply rather than factors like transportation.

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13. During the Tang period, which one of the following would not be an economically sound decision for a small purchase in the local market that is worth one-eighth of a bolt of cloth?

(A) Cutting one-eighth of the fabric from a new bolt to pay the amount.
(B) Making the payment with the appropriate weight of grain.
(C) Using coins issued by the government to make the payment.
(D) Paying with a faded bolt of cloth that has approximately the same value.

Correct Answer: (A) Cutting one-eighth of the fabric from a new bolt to pay the amount.

Solution:

The passage discusses how cutting textiles into smaller pieces greatly lessens their value. Hence, using a portion of a new bolt for payment (Option A) would reduce its value and not be an economically sound decision. On the other hand, using the appropriate weight of grain (Option B), coins (Option C), or a faded bolt of cloth (Option D) would not result in a loss of value as cutting a new bolt would.

Correct option: (A)

Quick Tip

When dealing with goods as currency, be mindful that cutting or dividing the goods may reduce their value, especially for materials like textiles.

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The passage below is accompanied by a set of questions. Choose the best answer to each question.

Vocabulary used in speech or writing organizes itself in seven parts of speech (eight, if you count interjections such as Oh! and Gosh! and Fuhgeddaboudit!). Communication composed of these parts of speech must be organized by rules of grammar upon which we agree. When these rules break down, confusion and misunderstanding result. Bad grammar produces bad sentences. My favorite example from Strunk and White is this one: ”As a mother of five, with another one on the way, my ironing board is always up.”

Nouns and verbs are the two indispensable parts of writing. Without one of each, no group of words can be a sentence, since a sentence is, by definition, a group of words containing a subject (noun) and a predicate (verb); these strings of words begin with a capital letter, end with a period, and combine to make a complete thought which starts in the writer’s head and then leaps to the reader’s.

Must you write complete sentences each time, every time? Perish the thought. If your work consists only of fragments and floating clauses, the Grammar Police aren’t going to come and take you away. Even William Strunk, that Mussolini of rhetoric, recognized the delicious pliability of language. ”It is an old observation,” he writes, ”that the best writers sometimes disregard the rules of rhetoric.” Yet he goes on to add this thought, which I urge you to consider: ”Unless he is certain of doing well, [the writer] will probably do best to follow the rules.”

The telling clause here is Unless he is certain of doing well. If you don’t have a rudimentary grasp of how the parts of speech translate into coherent sentences, how can you be certain that you are doing well? How will you know if you’re doing ill, for that matter? The answer, of course, is that you can’t, you won’t. One who does grasp the rudiments of grammar finds a comforting simplicity at its heart, where there need be only nouns, the words that name, and verbs, the words that act.

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Take any noun, put it with any verb, and you have a sentence. It never fails. Rocks explode. Jane transmits. Mountains float. These are all perfect sentences. Many such thoughts make little rational sense, but even the stranger ones (Plums deify!) have a kind of poetic weight that's nice. The simplicity of noun-verb construction is useful-at the very least it can provide a safety net for your writing. Strunk and White caution against too many simple sentences in a row, but simple sentences provide a path you can follow when you fear getting lost in the tangles of rhetoric-all those restrictive and nonrestrictive clauses, those modifying phrases, those appositives and compound-complex sentences. If you start to freak out at the sight of such unmapped territory (unmapped by you, at least), just remind yourself that rocks explode, Jane transmits, mountains float, and plums deify. Grammar is . . . the pole you grab to get your thoughts up on their feet and walking.

14. Which one of the following quotes best captures the main concern of the passage?

(A) "Nouns and verbs are the two indispensable parts of writing. Without one of each, no group of words can be a sentence ..."
(B) "Strunk and White caution against too many simple sentences in a row, but simple sentences provide a path you can follow when you fear getting lost in the tangles of rhetoric ..."
(C) "The telling clause here is Unless he is certain of doing well."
(D) "Bad grammar produces bad sentences."

Correct Answer: (A) "Nouns and verbs are the two indispensable parts of writing. Without one of each, no group of words can be a sentence ..."

Solution:
The central focus of the passage is the importance of nouns and verbs in constructing sentences and the basic foundation of grammar. Option (A) directly addresses this idea, emphasizing that both nouns and verbs are essential for sentence formation. The other options discuss secondary points in the passage but do not capture the central concern as accurately.

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Correct option: (A)

Quick Tip

In writing, ensure that each sentence has at least one noun and one verb to meet the basic requirements of grammar. This provides structure and clarity.

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15. Which one of the following statements, if false, could be seen as supporting the arguments in the passage?

(A) An understanding of grammar helps a writer decide if she/he is writing well or not.
(B) Perish the thought that complete sentences necessarily need nouns and verbs!
(C) It has been observed that writers sometimes disregard the rules of rhetoric.
(D) Regarding grammar, women writers tend to be more attentive to method and accuracy.

Correct Answer: (D) Regarding grammar, women writers tend to be more attentive to method and accuracy.

Solution:

Option (D) introduces an unfounded gender-specific claim which is irrelevant to the passage's focus on the importance of grammar. It is false and would support the passage's argument against unnecessary rules and biases. The other options relate directly to ideas or themes within the passage, such as the importance of grammar and how rules are sometimes disregarded.

Correct option: (D)

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Quick Tip

Avoid introducing unnecessary gender-specific claims in discussions of writing and grammar, as these can divert attention from the key issues of clarity and structure.

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16. All of the following statements can be inferred from the passage EXCEPT that:

(A) The subject-predicate relation is the same as the noun-verb relation.
(B) The primary purpose of grammar is to ensure that sentences remain simple.
(C) Sentences do not always have to be complete.
(D) ”Grammar Police” is a metaphor for critics who focus on linguistic rules.

Correct Answer: (B) The primary purpose of grammar is to ensure that sentences remain simple.

Solution:

The passage emphasizes that grammar provides a structure to ensure that sentences make sense, but it does not claim that simplicity is the primary goal of grammar. Option (B) is incorrect because the passage discusses grammar as a way to organize language effectively, not necessarily to keep sentences simple. Other options (A), (C), and (D) align with points discussed in the passage.

Correct option: (B)

Quick Tip

Remember that grammar’s purpose is to ensure clarity and coherence, not necessarily to simplify every sentence. Aim for effective communication, whether simple or complex.

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17. ”Take any noun, put it with any verb, and you have a sentence. It never fails. Rocks

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explode. Jane transmits. Mountains float." None of the following statements can be seen as similar EXCEPT:

(A) A collection of people with the same sports equipment is a sports team.
(B) Take an apple tree, plant it in a field, and you have an orchard.
(C) A group of nouns arranged in a row becomes a sentence.
(D) Take any vegetable, put some spices in it, and you have a dish.

Correct Answer: (C) A group of nouns arranged in a row becomes a sentence.

Solution:

The passage emphasizes the simplicity of creating a sentence by combining a noun and a verb. Option (C) most closely mirrors this logic, stating that a group of nouns (combined with a verb) forms a sentence. The other options involve processes that don't relate directly to sentence formation.

Correct option: (C)

Quick Tip

When learning sentence structure, remember that a simple combination of a noun and verb can create a basic, effective sentence.

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18. Inferring from the passage, the author could be most supportive of which one of the following practices?

(A) A Creative Writing course that focuses on how to avoid the use of rhetoric.
(B) The critique of standardised rules of punctuation and capitalisation.
(C) A campaign demanding that a writer's creative license should allow the breaking of grammatical rules.

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(D) The availability of language software that will standardise the rules of grammar as an aid to writers.

Correct Answer: (C) A campaign demanding that a writer's creative license should allow the breaking of grammatical rules.

Solution:

The passage acknowledges the flexibility of language and encourages breaking grammatical rules when a writer is certain of their ability to do so effectively. The author supports the idea of creative freedom in writing, which aligns with option (C). The other options focus on rigid adherence to rules, which the author seems to oppose.

Correct option: (C)

Quick Tip

While grammar rules provide structure, do not be afraid to break them when you're confident it serves your creative expression.

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19. The four sentences (labelled A, B, C, D) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

(A) Tensions and sometimes conflict remain an issue in and between the 11 states in South East Asia (Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste and Vietnam).

(B) China's rise as a regional military power and its claims in the South China Sea have become an increasingly pressing security concern for many South East Asian states.

(C) Since the 1990s, the security environment of South East Asia has seen both continuity and profound changes.

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(D) These concerns cause states from outside the region to take an active interest in South East Asian security.

Correct Answer: (C, A, B, D)

Solution:

The logical flow begins by introducing the broader context of South East Asia's security environment in sentence **(C)**. Sentence **(A)** follows with a description of the countries involved in this context. Next, **(B)** details a specific concern related to China's military rise and its impact. Finally, **(D)** concludes by discussing the external interest in the region due to these security concerns.

Correct sequence: (C, A, B, D)

Quick Tip

Understanding the logical flow of information is crucial when sequencing sentences. Always look for the introduction, followed by the supporting details and the conclusion.

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20. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

For nearly a century most psychologists have embraced one view of intelligence. Individuals are born with more or less intelligence potential (I.Q.); this potential is heavily in82uenced by heredity and difcult to alter; experts in measurement can determine a person's intelligence early in life, currently from paper-and-pencil measures, perhaps eventually from examining the brain in action or even scrutinizing his/her genome. Recently, criticism of this conventional wisdom has mounted. Biologists ask if speaking of a single entity called "intelligence" is coherent and question the validity of measures used to estimate heritability of a trait in humans, who, unlike plants or animals, are not conceived and bred under controlled conditions.

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(A) Biologists have questioned the long-standing view that 'intelligence' is a single entity and the attempts to estimate its heritability.
(B) Biologists have questioned the view that 'intelligence' is a single entity and the ways in which what is inherited.
(C) Biologists have criticised that conventional wisdom that individuals are born with more or less intelligence potential.
(D) Biologists have started questioning psychologists' view of 'intelligence' as a measurable immutable characteristic of an individual.

Correct Answer: (A) Biologists have questioned the long-standing view that 'intelligence' is a single entity and the attempts to estimate its heritability.

Solution:

The passage discusses the traditional view of intelligence, highlighting that psychologists have long believed intelligence is a fixed trait, influenced by heredity and measurable through various means. The biologists' critique of this view questions whether intelligence is a single entity and the validity of efforts to estimate its heritability. Option **(A)** best captures this idea, as it directly mentions the criticism of the single entity concept of intelligence and the heritability attempts.

Correct option: (A)

Quick Tip

When summarizing a passage, focus on the core argument or critique presented in the text. The best option will succinctly capture the main issue being addressed.

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21. The four sentences (labelled A, B, C, D) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

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(A) Relying on narrative structure alone, indigenous significances of nineteenth century San folktales are hard to determine.

(B) Using their supernatural potency, benign shamans transcend the levels of the San cosmos in order to deal with social conflict and to protect material resources and enjoy a measure of respect that sets them apart from ordinary people.

(C) Selected tales reveal that they deal with a form of spiritual conflict that has social implications and concern conflict between people and living or dead malevolent shamans.

(D) Meaning can be elicited, and the tales contextualized, by probing beneath the narrative of verbatim, original-language records and exploring the connotations of highly significant words and phrases.

Correct Answer: (A, C, B, D)

Solution:

The passage discusses how to interpret San folktales. **(A)** sets the stage by mentioning the difficulty in determining indigenous significances through narrative structure alone. **(C)** introduces the conflict within the tales, which involves spiritual conflict with both benevolent and malevolent shamans. **(B)** elaborates on the role of benign shamans in these conflicts. Finally, **(D)** explains how deeper meanings can be uncovered through an analysis of the original language and its connotations. The correct sequence is **(A, C, B, D)**.

Correct option: (A, C, B, D)

Quick Tip

When sequencing sentences, look for clues in the text that help establish the flow of ideas, such as references to earlier concepts and logical progression between statements.

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22. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

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For years, movies and television series like Crime Scene Investigation (CSI) paint an unrealistic picture of the ”science of voices.” In the 1994 movie Clear and Present Danger an expert listens to a brief recorded utterance and declares that the speaker is ”Cuban, aged 35 to 45, educated in the [...] eastern United States.” The recording is then fed to a supercomputer that matches the voice to that of a suspect, concluding that the probability of correct identification is 90%. This sequence sums up a good number of misimpressions about forensic phonetics, which have led to errors in real-life justice. Indeed, that movie scene exemplifies the so-called ”CSI effect”-the phenomenon in which judges hold unrealistic expectations of the capabilities of forensic science.

(A) Voice recognition has started to feature prominently in crime-scene intelligence investigations because of movies and television series.
(B) Voice recognition as used in many movies to identify criminals has been used to identify criminals in real life also.
(C) Although voice recognition is often presented as evidence in legal cases, its scientific basis can be shaky.
(D) Movies and televisions have led to the belief that the use of forensic phonetics in legal investigations is robust and fool proof.

Correct Answer: (C) Although voice recognition is often presented as evidence in legal cases, its scientific basis can be shaky.

Solution:
The passage discusses the unrealistic portrayals of voice recognition in movies like *Clear and Present Danger*, which can lead to misconceptions and errors in real-life legal cases. The author points out the ”CSI effect,” where there is an overestimation of the reliability of forensic phonetics. This matches best with **option (C)**, which emphasizes that voice recognition, though often used in legal cases, may not be scientifically reliable.

Correct option: (C)

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Quick Tip

When identifying a summary, focus on the core message of the passage rather than specific details or examples. In this case, the key issue is the shaky scientific basis of voice recognition in legal cases.

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23. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

As Soviet power declined, the world became to some extent multipolar, and Europe strove to define an independent identity. What a journey Europe has undertaken to reach this point. It had in every century changed its internal structure and invented new ways of thinking about the nature of international order. Now at the culmination of an era, Europe, in order to participate in it, felt obliged to set aside the political mechanisms through which it had conducted its affairs for three and a half centuries. Impelled also by the desire to cushion the emergent unification of Germany, the new European Union established a common currency in 2002 and a formal political structure in 2004. It proclaimed a Europe united, whole, and free, adjusting its differences by peaceful mechanisms.

(A) Europe has consistently changed in keeping with the changing world order and that has culminated in a united Europe.
(B) The establishment of a formal political structure in Europe was hastened by the unification of Germany and the emergence of a multipolar world.
(C) Europe has consistently changed its internal structure to successfully adapt to the changing world order.
(D) Europe has chosen to lower political and economic heterogeneity, in order to adapt itself to an emerging multi-polar world.

Correct Answer: (A) Europe has consistently changed in keeping with the changing world order and that has culminated in a united Europe.

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Solution:

The passage explains how Europe adapted to the changing world order over time and how these changes eventually culminated in a united Europe, particularly with the establishment of the European Union, a common currency, and a formal political structure. **Option (A)** captures the essence of this transformation and the result of a united Europe.

Correct option: (A)

Quick Tip

Focus on identifying the main theme of the passage when choosing a summary. In this case, the passage focuses on Europe's historical adaptability and its eventual unification, making **Option A** the best choice.

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24. The four sentences (labelled A, B, C, D) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

(A) Man has used poisons for assassination purposes ever since the dawn of civilization, against individual enemies but also occasionally against armies.
(B) These dangers were soon recognized, and resulted in two international declarations-in 1874 in Brussels and in 1899 in The Hague-that prohibited the use of poisoned weapons.
(C) The foundation of microbiology by Louis Pasteur and Robert Koch offered new prospects for those interested in biological weapons because it allowed agents to be chosen and designed on a rational basis.
(D) Though treaties were all made in good faith, they contained no means of control, and so failed to prevent interested parties from developing and using biological weapons.

Correct Answer: A, C, B, D

Solution: - The sequence begins with A, which introduces the historical use of poisons.

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- Next is C, which explains how the foundation of microbiology expanded the possibilities for using biological agents.
- After that comes B, which describes the international declarations against the use of poisoned weapons.
- Finally, D explains how the treaties failed due to lack of control, which rounds off the discussion on biological weapons.

Correct option: A, C, B, D

Quick Tip

International treaties often fail without proper enforcement mechanisms, even when made in good faith.

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25. Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:

(A) For feminists, the question of how we read is inextricably linked with the question of what we read.
(B) Elaine Showalter's critique of the literary curriculum is exemplary of this work.
(C) Androcentric literature structures the reading experience differently depending on the gender of the reader.
(D) The documentation of this realization was one of the earliest tasks undertaken by feminist critics.

Correct Answer: (D)

Solution: - The sentences A, B, and C fit well together, discussing feminist readings of literature and the effects of gendered reading experiences.

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- Sentence D is the odd one out because it talks about the documentation of this realization, which doesn't follow the flow of the other sentences.

Correct option: (D)

Quick Tip

Feminist literary criticism often challenges the male-centered (androcentric) norms that influence how literature is interpreted.

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26. Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:

(A) Talk was the most common way for enslaved men and women to subvert the rules of their bondage, to gain more agency than they were supposed to have.
(B) Even in conditions of extreme violence and unfreedom, their words remained ubiquitous, ephemeral, irrepressible, and potentially transgressive.
(C) Slaves came from societies in which oaths, orations, and invocations carried great potency, both between people and as a connection to the all-powerful spirit world.
(D) Freedom of speech and the power to silence may have been preeminent markers of white liberty in Colonies, but at the same time, slavery depended on dialogue: slaves could never be completely muted.
(E) Slave-owners obsessed over slave talk, though they could never control it, yet feared its power to bind and inspire-for, as everyone knew, oaths, whispers, and secret conversations bred conspiracy and revolt.

Correct Answer: (C)

Solution: - Sentences A, B, D, and E all discuss the subversive power of slave talk and its

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impact.

- Sentence C, though related to the topic of slave talk, is more focused on the historical context of slaves' societies, which doesn't fit as cohesively with the rest of the paragraph.

Correct option: (C)

Quick Tip

Even in the most oppressive conditions, language and communication have been powerful tools for resistance and subversion.

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