

VITEEE 2020 Question Paper with Solutions for Aptitude

Time Allowed :90 Minutes	Maximum Marks :80	Total Questions :80
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General Instructions

Read the following instructions very carefully and strictly follow them:

1. The question paper contains a total of 80 questions divided into four parts:
 - Part I: Physics (Questions 1 to 25)
 - Part II: Chemistry (Questions 26 to 50)
 - Part III: Mathematics (Questions 51 to 75)
 - Part IV: English & Logical Reasoning (Questions 76 to 80)
2. All questions are multiple-choice with four options, and only one of them is correct.
3. For each correct answer, the candidate will earn 1 mark.
4. There is no negative marking for incorrect answers.
5. The test duration is 12 hours.

1. A school has four sections A, B, C and D of Class IX students. The results of half-yearly and annual examinations are shown in the table given under:

Results	No of Students			
	Section A	Section B	Section C	Section D
Students failed in both the examinations	28	23	17	27
Students failed in half-yearly but passed in the annual examinations	14	12	8	13
Students passed in half-yearly but failed in the annual examinations	6	17	9	15
Students passed in both examinations	64	55	46	76

If the number of students passing an examination be considered as a criteria for comparison of difficulty level of the two examinations, which of the following statements is true in this context?

- (A) Half-yearly examinations were more difficult.
(B) Annual examinations were more difficult.
(C) Both the examinations had almost the same difficulty level.
(D) The two examinations cannot be compared to difficulty level.

Correct Answer: (C) Both the examinations had almost the same difficulty level.

Solution:

To compare the difficulty, we calculate the total number of students passing each exam across all sections.

Pass counts for Half-yearly Examination:

Students pass if they are in the "Students passed in half-yearly but failed in annual" row OR

the "Students passed in both" row.

Row 3 (Pass Half/Fail Annual) Total = $6 + 17 + 9 + 15 = 47$.

Row 4 (Pass Both) Total = $64 + 55 + 46 + 76 = 241$.

Total Passing Half-yearly = $47 + 241 = 288$.

Pass counts for Annual Examination:

Students pass if they are in the "Students failed in half-yearly but passed in annual" row OR the "Students passed in both" row.

Row 2 (Fail Half/Pass Annual) Total = $14 + 12 + 8 + 13 = 47$.

Row 4 (Pass Both) Total = 241.

Total Passing Annual = $47 + 241 = 288$.

Since the total number of students passing the Half-yearly exam (288) is exactly equal to the number of students passing the Annual exam (288), the pass percentage is the same.

Therefore, both examinations had almost the same difficulty level.

💡 Quick Tip

Instead of calculating percentages, simply comparing the raw number of passing students is sufficient since the total number of students is the same for both calculations.

2. The variable C is an integer. Is C even?

Statements:

(a) $C + 6$ is even

(b) $C - 5$ is odd

(A) If (a) alone is sufficient to answer the question.

(B) If (b) alone is sufficient to answer the question.

(C) If (a) and (b) together are necessary to answer the question.

(D) If either (a) or (b) is sufficient to answer the question.

Correct Answer: (D) If either (a) or (b) is sufficient to answer the question.

Solution:

We need to determine if C is even.

Analyze Statement (a): $C + 6$ is even.

We know that an Even number + Even number = Even number.

Since 6 is even, for the sum to be even, C must be even.

Thus, statement (a) alone is sufficient to deduce that C is even.

Analyze Statement (b): $C - 5$ is odd.

We know that an Even number - Odd number = Odd number.

Since 5 is odd, for the difference to be odd, C must be even.

Thus, statement (b) alone is sufficient to deduce that C is even.

Since each statement alone provides the answer, option (D) is correct.

 Quick Tip

Recall parity rules: $\text{Even} \pm \text{Even} = \text{Even}$; $\text{Odd} \pm \text{Odd} = \text{Even}$; $\text{Even} \pm \text{Odd} = \text{Odd}$.
Use these to quickly isolate the variable's parity.

3. If SAUCER is coded as TBVBDQ, how is TOWN coded?

- (A) UPXO
- (B) PUOX
- (C) UPVM
- (D) UPYM

Correct Answer: (C) UPVM

Solution:

Let's analyze the pattern in the word **SAUCER** to **TBVBDQ**.

The word has 6 letters. It appears the first half follows one rule and the second half follows another.

First half (S-A-U):

$S \rightarrow (+1) \rightarrow T$

$A \rightarrow (+1) \rightarrow B$

$U \rightarrow (+1) \rightarrow V$

Rule: Next letter (+1).

Second half (C-E-R):

$C \rightarrow (-1) \rightarrow B$

$E \rightarrow (-1) \rightarrow D$

$R \rightarrow (-1) \rightarrow Q$

Rule: Previous letter (-1).

Now apply this logic to **TOWN** (4 letters). We split it into two halves: TO and WN.

First half (T-O) $\rightarrow +1$:

$T \rightarrow U$

$O \rightarrow P$

Second half (W-N) $\rightarrow -1$:

$W \rightarrow V$

$N \rightarrow M$

Combining them gives **UPVM**.

 Quick Tip

When encoding words, check if the word is split into parts (halves or thirds) where the logic (forward/backward shift) might change.

4. Two statements are followed by a few conclusions i, ii, iii and iv. Assume the given statements to be true, even if they seem to be at variance with commonly known facts and choose your answer from the given choices A, B, C and D.

Statements:

All bags are phones.

Some batteries are phones.

Conclusions:

i. All phones are bags.

ii. All phones are batteries.

iii. Some bags are phones.

iv. Some bags are not batteries

(A) (iv) follows

(B) (ii) follows

(C) (iii) follows

(D) (i) follows

Correct Answer: (C) (iii) follows

Solution:

Let's analyze the statements using Set Theory or Venn Diagrams.

Statement 1: All bags are phones.

This means the set of Bags (B) is a subset of the set of Phones (P). ($B \subseteq P$).

Statement 2: Some batteries are phones.

This means there is an intersection between the set of Batteries (Bt) and the set of Phones (P). ($Bt \cap P \neq \emptyset$).

Note: We do not know if Batteries intersect with Bags.

Now evaluate the conclusions:

i. All phones are bags: Incorrect. P is the superset, not the subset.

ii. All phones are batteries: Incorrect. Only "Some" overlap is given.

iii. Some bags are phones: Correct. Since All bags are phones, it logically implies that at least some bags (in fact, all of them) are phones. In syllogisms, $A \subseteq B \implies A \cap B \neq \emptyset$ (assuming sets are non-empty).

iv. Some bags are not batteries: Incorrect. It is possible that all bags are batteries (if the Bag

circle is inside the intersection of Phones and Batteries). We cannot conclude this definitely.

Thus, only conclusion (iii) definitely follows.

 Quick Tip

In Syllogisms, if "All A are B" is true, then "Some A are B" and "Some B are A" are implicitly true. Avoid assumptions about relations not explicitly stated (like Bags vs Batteries).

5. An accurate clock shows 10 o'clock in the morning. Through how many degrees will the hour hand rotate when the clock shows 3 o'clock in the afternoon?

(A) 144°

(B) 150°

(C) 168°

(D) 180°

Correct Answer: (B) 150°

Solution:

Calculate the total duration between the two times.

Start time: 10:00 AM.

End time: 3:00 PM.

Duration = (12:00 PM - 10:00 AM) + (3:00 PM - 12:00 PM)

Duration = 2 hours + 3 hours = 5 hours.

Calculate the speed of the hour hand.

The hour hand completes one full circle (360°) in 12 hours.

Speed of hour hand = $\frac{360^\circ}{12 \text{ hours}} = 30^\circ \text{ per hour}$.

Calculate the total rotation.

Rotation = Speed $\times$ Time

Rotation = $30^\circ/\text{hr} \times 5 \text{ hours} = 150^\circ$.

 Quick Tip

Standard angular speeds for clocks: Hour hand = $0.5^\circ/\text{min}$ or $30^\circ/\text{hour}$. Minute hand = $6^\circ/\text{min}$.