Additional Problems For Self Practice (APSP)

PART - I : PRACTICE TEST PAPER

This Section is not meant for classroom discussion. It is being given to promote self-study and self testing amongst the Resonance students.

Max. Marks : 120 **Max. Time : 1 Hr.**

Important Instructions :

1. The test is of **1 hour** duration and max. marks 120.
2. The test consists **30** questions, **4 marks** each.
3. Only one choice is correct **1 mark** will be deducted for incorrect response. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
4. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instructions 3 above.

1. Choose the incorrect alternative
(1) p = I study and I pass
~p =Either I don't study or I don't pass
(2) p = If she come then she will get bonus
~p = She come and she will not get bonus
(3) p = He plays if and only if his father permits
~p = Either he play and his father does't permit or he does not play and his father permits.
(4) p = 4+3 > 2 and 4 + 3 < 9
~p = 4 + 3 < 2 or 4 + 3 > 9

2. Which of the following is not a statement ?
(1) Three plus two equals six
(2) Three plus two equals five
(3) Tomorrow is tuesday
(4) There are 380 days in an year

3. Identify use of inclusive OR in one of the following
(1) Two lines intersect at a point or are parallel
(2) An year has 365 days or 366 days
(3) To visit America, you need a passport or voter ID.
(4) None

4. Find truth of statement :
If sun rises in the west then 2 + 2 = 6
(1) False because Sun rises in the East
(2) True
(3) Can't determine
(4) It is false because 2+2=4

5. Which of the following statement doesn't convey same meaning as
p = if a number is odd, then its cube is also odd
(1) A number is odd implies that its cube is odd.
(2) A number is odd only if its cube is odd.
(3) If cube of a number is not odd, then the number is not odd.
(4) For the cube of a number to be odd, it is necessary that the number is odd.

6. Identify the necessary and sufficient conditions for if you pass the exam then you will get good college.
(1) Necessary is : " pass the exam" sufficient is: " getting good college"
(2) Necessary is : " getting good college" sufficient is: " pass the exam"
(3) Necessary is : " not getting good college" sufficient is" pass the exam"
(4) Necessary is : " not pass the exam" sufficient is: " getting good college"

7. Negation of (~pvq) is
(1) p v q (2) pv~q (3) p ∧~q (4)~p∧~q

8. (~p v q) ∧ (~p∧~q) is equivalent to
(1) p ∧ q (2) ~(p ∧ q) (3) (~p ∧ ~q) (4) ~p ∧q

9. Negation of "Every Indian Speaks Hindi" is
(1) Every indian doesn't speak Hindi
(2) There exist a Indian who doesn't speaks Hindi
(3) Not everyone in India speaks Hindi
(4) All of these

10. Which of the following is not a component statement of '36 is divisible by 2, 3 and 6, ' ?
(1) 36 is divisible by 2 (2) 36 is divisible by 3
(3) 36 is divisible by 6 (4) 36 is divisible by 18

11. (~q∧ q) v (pv ~p) is
(1) tautology (2) fallacy (3) p (4) q

12. Negation of p v (~p v q) is -
(1) tautology (2) fallacy (3) p (4) q

13. Negation of ~p → q is
(1) ~p ∧~q (2) p∧~ q (3) p∧q (4) ~p v q

14. Number of 'True' value in truth table of ~ p v q
(1) 1 (2) 2 (3) 3 (4) 4

15. Negation of "2+3 = 5 and 8 < 10" is
(1) 2 + 3 ≠ 5 and 8 < 10 (2) 2 + 3 = 5 or 8 < 10
(3) 2 + 3 ≠ 5 or 8 ≥ 10 (4) None of these

16. Negation of " A is in class X or B is in class XII" is
(1) A is not in class X and B is in class XII
(2) A is not in class X and B is not in class XII
(3) Either A is not in class X or B is not in class XII
(4) None

17. Truth value of the statement "If p then q" is false when
(1) p ≡ true, q ≡ true (2) p ≡ true; q ≡ false
(3) p ≡ false, q ≡ false (2) p ≡ false; q ≡ true

18. If p : Ram is in class X
q : Ram is intelligent
Then, the symbolic form Ram is in class X and intelligent is
(1) p∧q (2) p v q (3) p∧~q (4) p v~q

19. If p : A man is happy
q : A man is rich
Then, the statement, "If a man is not happy, then he is not rich" is written as
(1) ~p → ~q (2) ~q → p (3) ~q → ~p (4) q → ~q

20. The compound statement p → (~p v q) is false, then the truth values of p and q are respectvely
(1) T,T (2) T,F (3) F,T (4) F,F

21. The contrapositive of p ⇒ ~q is
(1) ~p ⇒ q (2) ~q ⇒ p (3) q ⇒ ~p (4) None

22. Which of the following is tautology

(1) $A \wedge (Av B)$ (2) $A v(Av B)$ (3) $[A \wedge (A \to B)] \to B$ (4) $B \to [A \wedge (A \to B)]$

23. Consider the following statement

P : Ritu is lazy Q : Ritu is rich R: Ritu is selfish

The negation of the statement " Ritu is lazy and not selfish if and only if Ritu is rich" can be expresed as

(1) $\sim P \wedge (Q \leftrightarrow R)$ (2) $\sim(Q \leftrightarrow (P \wedge \sim R))$ (3) $\sim Q \leftrightarrow \sim P$ (4) $\sim((P \wedge \sim R) \leftrightarrow Q)$

24. The statement $p \to (q \to p)$ is equivalent to

(1) $P \to (p \leftrightarrow q)$ (2) $P \to (p \to q)$ (3) $P \to (p \vee q)$ (4) $P \to (p \wedge q)$

25. $\sim(p \vee q) \vee (\sim p \wedge q)$ is logically equivalent to

(1) $\sim p$ (2) p (3) q (4) $\sim q$

26. $\sim(p \leftrightarrow \sim q)$ is equivalent to

(1) $p \leftrightarrow q$ (2) $p \leftrightarrow \sim q$ (3) $\sim p \leftrightarrow q$ (4) $\sim(p \leftrightarrow q)$

27. If p, q, r are simple propositions, then $(p \wedge q) \wedge (q \wedge r)$ is true then

(1) p, q, r are all false (2) p, q, r are all true

(3) p, q are true and r is false (4) p is true and q and r are false

28. $(\sim p \wedge q) \vee q$ is equivalent to

(1) p (2) q (3) $\sim q$ (4) $\sim p$

29. Negation of statement :

"If I become PM, then I will open more llTs"

(1) Neither I will become PM nor I will open more llTs

(2) I will not become PM or I will not open more llTs.

(3) I will become PM and I will not open more llTs.

(4) Either I will not become PM or I will not open more IITs.

30. Consider the following statement

p : Rohan is smart

q : Rohan is poor

The statement "Rohan is not smart or he is not poor" is equivlent to

(1) $\sim p \vee \sim q$ (2) $p \wedge q$ (3) $\sim(p \vee q)$ (4) $\sim p \wedge \sim q$

Practice Test (JEE-Main Pattern)

OBJECTIVE RESPONSE SHEET (ORS)

Que.	1	2	3	4	5	6	7	8	9	10
Ans.										
Que.	11	12	13	14	15	16	17	18	19	20
Ans.										
Que.	21	22	23	24	25	26	27	28	29	30
Ans.										

PART - II : PRACTICE QUESTIONS

1. Suppose that x and y are positive real numbers.
Let p : $x < y$ and q : $x_2 < y_2$, then
(1) $p \Rightarrow q$ and $q \not\Rightarrow p$ (2) $p \not\Rightarrow q$ and $q \Rightarrow p$ (3) $p \Leftrightarrow q$ (4) $p \Rightarrow q$ and $\sim q \Rightarrow p$

2. Which of the following statements among the following is a tautology.
(1) $A \vee (A \wedge B)$ (2) $[A \wedge (A \rightarrow B)] \rightarrow B$
(3) $B \rightarrow [A \wedge (A \rightarrow B)]$ (4) $A \wedge (A \wedge B)$

3. The statement $p \rightarrow (q \rightarrow p)$ is equivalent to
(1) $p \rightarrow (p \wedge q)$ (2) $p \rightarrow (p \leftrightarrow q)$ (3) $p \rightarrow (p \rightarrow q)$ (4) $p \rightarrow (p \vee q)$

4. Consider statements :
p : 767 is divisible by 37 and 17
q : 767 is divisible by 13
The negation of the statement "Either 767 is divisible by 37 and 17 or it is divisible by 13" is
(1) Either 767 is not multiple of 37 and 13 or it is not multiple of 17 and 13
(2) 767 is not divisible by any of 37, 17, 13
(3) 767 is divisible by 37 and 17 but not by 13
(4) 767 is divisible by 13 but not by 37 and 17

5. Consider statement p : If two integers a and b are such that a divides b then $b_3 - a_2$ is a composite number. The converse of the statement p is
(1) If two integers a and b are such that $b_3 - a_2$ is a composite number then a divides b.
(2) If a divides b then a,b are integers and $b_3 - a_2$ is a composite number.
(3) If $b_3 - a_2$ is a composite number then a,b are integers and a divides b.
(4) If a, b are integers and a does not divide b then $b_3 - a_2$ is not a composite number.

6. Let S be a non-empty subset of R. Consider the following statement
P : There exist two irrational numbers $x \in S$ and $y \in S$ such that $x + y$ is a rational number.
Negation of the statement P is
(1) There is no irrational number which when added to a particular irrational number results in a rational number.
(2) Sum of two irrational numbers is always irrational
(3) There exist atleast one pair of irrational numbers whose sum is irrational.
(4) We do not always get a rational number when we add two irrational numbers.

7. If the compound propositions $(q \leftrightarrow q) \wedge r$ is true and $p \rightarrow (\sim q)$ is false, then the truth values of p, q and r are respectively
(1) T, T and F (2) T, F and T (3) T, T and T (4) F, F and F

8. The incorrect statement of the following is

(1) $p \wedge (\sim p)$ is a fallacy (2) $p \vee (\sim p)$ is tautology

(3) $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$ is a contradiction (4) $\sim(\sim p) \leftrightarrow p$ is a tautology

9. S_1 : f(x) is not continuous in [a, b]

S_2 : f(x) is differentiable in [a, b]

S_3 : $f'(x) = \frac{f(b)-f(a)}{b-a}$ for at least one $c \in (a, b)$

If a function f(x) is continuous and differentiable in [a, b] then $f'(c) = \frac{f(b)-f(a)}{b-a}$ for at least $c \in (a,b)$ which of the following is equivalent to the given statement

(1) $(S_1 \wedge S_2) \rightarrow S_3$ (2) $(\sim S_1 \wedge S_2) \rightarrow S_3$ (3) $(S_2 \wedge \sim S_2) \rightarrow S_3$ (4) $(S_1 \wedge S_2) \rightarrow (\sim S_3)$

10. The statement $[(p \leftrightarrow \sim q) \wedge \sim p] \rightarrow q$ can be

(1) a tautology (2) a fallacy (3) can't say (4) equivalent to $p \rightarrow q$

11. Let p and q be two statements, then $\sim(\sim p \wedge q) \wedge (p \vee q)$ ~(~p q) (p v q) is logically equivalent to

(1) q (2) $p \wedge q$ (3) p (4) $p \vee \sim q$

12. Which of the following is False?

(1) negation of " There exists a capital for every state in India" is "there exists a state in india which does not have its capital"

(2) negation of " There is a tree in this campus all of whole leaves are green" is "For all tree in this campus, there is a leaf which is not green"

(3) negation of " There is a tree in this campus with atleast one brown leaf " is "no tree in this campus has no brown leaf".

(4) negation of " or every real number x, either $x > 1$ or $x < -1$" is "there exists a real number x, such that $-1 \leq x \leq 1$"

APSP Answers

PART - I

1.	(4)	**2.**	(3)	**3.**	(3)	**4.**	(2)	**5.**	(4)	**6.**	(2)	**7.**	(3)
8.	(3)	**9.**	(4)	**10.**	(4)	**11.**	(1)	**12.**	(2)	**13.**	(1)	**14.**	(3)
15.	(3)	**16.**	(2)	**17.**	(2)	**18.**	(1)	**19.**	(1)	**20.**	(2)	**21.**	(3)
22.	(3)	**23.**	(2)	**24.**	(3)	**25.**	(1)	**26.**	(1)	**27.**	(2)	**28.**	(2)
29.	(3)	**30.**	(1)										

PART - II

1.	(3)	**2.**	(2)	**3.**	(4)	**4.**	(1)	**5.**	(1)	**6.**	(2)	**7.**	(3)
8.	(3)	**9.**	(2)	**10.**	(1)	**11.**	(3)	**12.**	(3)				