MATHEMATICAL REASONING

The inverse of the statement $(p \land \tilde{q}) \rightarrow r$ is-1. (1) $(p \lor q) \rightarrow r$ (2) $(p \land q) \rightarrow r$ (3) $(\tilde{p} \lor q) \to \tilde{r}$ (4) None of these 2. $(p \vee q)$ is logically equivalent to-(1) p ∧ q (2) $\tilde{p} \rightarrow q$ (3) $p \rightarrow \tilde{q}$ (4) $\tilde{p} \rightarrow \tilde{q}$ The equivalent statement of $(p \leftrightarrow q)$ is-3. (2) $(p \rightarrow q) \lor (q \rightarrow p)$ (1) $(p \land q) \lor (p \lor q)$ (3) $(p \lor q) \lor (p \lor q)$ (4) $(p \lor q) \land (p \lor q)$ If the compound statement $p \rightarrow (p \lor q)$ is false 4. then the truth value of p and q are respectively-(1) T, T (2) T, F (3) F, T (4) F, F The statement $(p \rightarrow p) \land (p \rightarrow p)$ is-5. (1) a tautology (2) a contradiction (3) neither a tautology nor a contradiction (4) None of these 6. Negation of the statement $(p \land r) \rightarrow (r \lor q)$ is-(1) $(p \land r) \rightarrow (r \lor q)$ (2) $(p \lor r) \lor (r \lor q)$ (4) $(p \land r) \land (\tilde{r} \land \tilde{q})$ (3) $(p \land r) \land (r \land q)$ The dual of the statement $p \wedge [q \wedge (p \vee q) \wedge r]$ 7. (1) $p \vee [q \vee (p \vee q) \vee r]$ (2) $p \vee [q \vee (p \wedge q) \vee r]$ (3) $\tilde{p} \vee [\tilde{q} \vee (p \land q) \vee \tilde{r}]$ (4) $\tilde{p} \vee [\tilde{q} \land (p \land q) \land \tilde{r}]$ 8. Which of the following is correct-(1) $(p \lor q) \equiv (p \land q)$ (2) $(p \rightarrow q) \equiv (\tilde{q} \rightarrow \tilde{p})$ (3) $\tilde{(p \rightarrow q)} \equiv (p \land q)$ (4) $(p \leftrightarrow q) \equiv (p \rightarrow q) \lor (q \rightarrow p)$ 9. The contrapositive of $p \rightarrow (\tilde{q} \rightarrow \tilde{r})$ is-(2) (q \rightarrow r) \rightarrow \tilde{p} (1) $(\tilde{q} \wedge r) \rightarrow \tilde{p}$ (3) $(q \vee \tilde{r}) \rightarrow \tilde{p}$ (4) None of these **10**. The converse of $p \rightarrow (q \rightarrow r)$ is-(1) $(q \land \tilde{r}) \lor p$ (2) $(\tilde{q} \lor r) \lor p$ (3) $(q \land \tilde{r}) \land \tilde{p}$ (4) $(q \wedge \tilde{r}) \wedge p$ **11.** If p and q are two statement then $(p \leftrightarrow \tilde{q})$ is true when-(1) p and q both are true (2) p and q both are false (3) p is false and q is true (4) None of these **12.** Statement $(p \land q) \rightarrow p$ is-(1) a tautology (2) a contradiction (3) neither (1) nor (2) (4) None of these

13	If statements p, q, r have truth values T, F, T respectively then which of the following statement									
	is true-									
	(1) $(n \rightarrow q) \land r$	(2) $(n \rightarrow q) \vee \tilde{r}$								
	$(1) (p \land q) \land (q \land r)$	$(2) (p \rightarrow q) \rightarrow r$								
11	$(0) (p \land q) \lor (q \land 1)$	(\mathbf{T}) $(\mathbf{p} \rightarrow \mathbf{q}) \rightarrow \mathbf{I}$								
14.	in statement $p \rightarrow (q \lor r)$ is the their the truth values of statements n a r respectively.									
	(1) T F T	(2) F T F								
	(1) I, I, I (3) F F F	(4) All of these								
15	Which of the following sta	(+) mi or mese								
15.	(1) $(n \land a) \land (\tilde{a}(n \land a))$	(2) $n \vee (\tilde{n} \wedge q)$								
	$(1) (p \land q) \land (p \lor q) $ $(3) (p \rightarrow q) \rightarrow p$	$(2) p \lor (p \land q)$ $(4) \tilde{p} \lor \tilde{q}$								
16	(5) $(p \rightarrow q) \rightarrow p$ The perative of the sta	$(\mathbf{T}) \not \mathbf{P} \lor \mathbf{q}$								
10.	divisible by 15 then it is divisible by 5 or 3"									
	(1) If a number is divisible by 15 then it is not divisible									
	by 5 and 3									
	(2) A number is divisible by 15 and it is not divisible by 5 or 3 $$									
	(3) A number is divisible by 15 or it is not divisible									
	by 5 and 3									
	(4) A number is divisible by $15\ \text{and}\ \text{it}$ is not divisible									
	by 5 and 3									
17.	Which of the following is a statement-									
	(1) Open the door									
	(2) Do your home work									
	(3) Hurrah! we have won the match									
	(4) Two plus two is five									
18.	The negation of the statement " $2 + 3 = 5$ and $8 < 10$ " is-									
	(1) $2 + 3 \neq 5$ and $8 \not< 10$ (2) $2 + 3 \neq 5$ or $8 > 10$									
	(3) $2 + 3 \neq 5$ or $8 \ge 10$ (4) None of these									
19.	For any three simple state	ment p, q, r the statement								
	(p \land q) \lor (q \land r) is true when-									
	(1) p and r true and q is false									
	(2) p and r false and q is true									
	(3) p, q, r all are false									
	(4) q and r true and p is false									
20.	Which of the following s	tatement is a tautology-								
	(1) ($\ p \lor \ q$) \lor (p $\lor \ q$)	(2) ($\ p \lor \ q$) \land (p $\lor \ q$)								
	(3) ~ p ∧ (~ p ∨ ~ q)	(4) ~q ∧ (~p ∨ ~q)								
21.	Which of the following sta	atement is a contradiction-								
	(1) ($\ p \lor \ q$) \lor (p $\lor \ q$)	(2) (p \rightarrow q) \vee (p \land ~q)								
	(3) (˜p∧q)∧(˜q)	(4) (~p ∧ q) ∨ (~q)								
22.	The negation of the sta	atement q \vee (p \wedge \tilde{r}) is								
	equivalent to-									
	(1) $\tilde{q} \land (p \rightarrow r)$	(2) $\tilde{q} \wedge \tilde{(p \rightarrow r)}$								

(3) $\tilde{q} \wedge (\tilde{p} \wedge r)$ (4) None of these

			TC					
23.	Which of the following is not a statement-	30.	If p is any statement, t is a tautology and c is a					
	(1) every set is a finite set		correct-					
	(2) every square is a rectangle		(1) $p \land (\tilde{c}) \equiv p$					
	(3) The sun is a star		$(2) p \vee (\tilde{t}) = p$					
0.4	(4) Shut the window \tilde{z}	31.	$(2) p \vee (-p = p)$					
24.	The statement $(p \rightarrow q) \leftrightarrow (p \lor q)$ is-		(0) v c = p v c					
	(1) a tautology		$(+) (p \land i) \lor (p \lor c) = (i \land c)$					
	(2) a contradiction		T, F, T respectively then the truth value of $((p \lor q) \land (r) \rightarrow p \text{ is})$					
	(3) neither a tautology nor a contradiction							
05	(4) None of these		(1) True	(2) False				
25.	which of the following is equivalent to $(p \land q)$		(3) True if r is false	(4) True if q is true				
	$ (1) p \rightarrow q \qquad (2) (p \land q) $	32.	Which of the following is	wrong-				
0.6	(3) $(p \rightarrow q)$ (4) None of these							
26.	The dual of the following statement "Reena is healthy and Megna is healthy is-		(1) $p \vee p$ is a fautology					
	(1) Rooma is heaufiful and Mooma is healthu		(2) $\tilde{(p)} \leftrightarrow p$ is a tautology					
	(2) Regna is beautiful or Megna is healthy		(3) p $\wedge \tilde{p}$ is a contradiction					
	(2) Reena is beautiful or Meena is heutiful		(4) ((p \land p) \rightarrow q) \rightarrow p is a tautology					
	(4) None of these		The statement "If $2^2 = 5$ then I get first slave" is					
27.	If p is any statement, t and c are a tautology and a	55.	logically equivalent to-					
	contradiction respectively then which of the							
	following is not correct-		(1) $2^{2} = 5$ and I donot get first class					
	(1) $p \wedge t \equiv p$ (2) $p \wedge c \equiv c$		(2) $2^2 = 5$ or I do not get	first class				
	(3) $p \lor t \equiv c$ (4) $p \lor c \equiv p$		(3) $2^2 \neq 5$ or L get first class					
28.	If $S^*(p, q)$ is the dual of the compound statement							
	S(p, q) then S*(\tilde{p} , \tilde{q}) is equivalent to-		(4) None of these					
	(1) $S(p, q)$ (2) $S(p, q)$	34.	If statement (p \vee $r)$ \rightarrow (q \wedge r) is false and statement q is true then statement p is-					
	(3) $\tilde{S}^{*}(p, q)$ (4) None of these							
29.	Which of the following is a statement-	35.	(1) true	(2) false				
	(1) I am Lion							
	(2) Logic is an interesting subject		(3) may be true or false	(4) None of these				
	(3) A triangle is a circle and 10 is a prime number		Which of the following statement are not logically equivalent-					
	(4) None of these							
			(1) ~(p \vee ~q) and (~p \wedge q) (2) ~(p \rightarrow q) and (p \wedge ~q)					
			(3) (p \rightarrow q) and (~q \rightarrow ~p) (4) (p \rightarrow q) and (~p \land q)					

ANSWER KEY															
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	3	3	4	2	2	4	3	2	1	1	3	1	4	4	1
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	4	4	3	4	1	3	1	4	3	3	3	3	2	3	4
Que.	31	32	33	34	35										
Ans.	1	4	3	3	4										