LET US DO SOME PROBLEMS- XXXIX

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Mathematical Reasoning is a very important section of competitive mathematics. Some questions are selected here to understand the standard.

Q1. Which of the following is a statement?
(a) Open the door
(b) Do your homework
(c) Switch on the fan
(d) Two plus two is four
Ans.(d)

Q2. Which of the following is a statement?
(a) May you live long!
(b) May God bless you!
(c) The sun is star
(d) Hurrah! We have won the match
Ans.(c)

Q3. Which of the following is not a statement?
(a) Every set is a finite set
(b) 8 is less than 6
(c) Where are you going?
(d) The sum of interior angles of a triangle is 180 degrees
Ans.(c)

Q4. Which of the following is an open statement?
(a) x is natural number
(b) Give me a glass of water
(c) Wish you best of luck
(d) Good morning to all
Ans.(a)

Q5.Negation of the conditional: ? If it rains, I shall go to school? Is
(a) It rains and I shall go to school
(b) It rains and I shall not go to school
(c) It does not rains and I shall go to school
(d) None of these
Ans.(b)

Q6. The conditional $(p\wedge q)$ /Þ p is
(a) A tautology
(b) A fallacy i.e., contradiction
(c) Neither tautology nor fallacy
(d) None of these
Ans.(a)

Q7. Which of the following is a contradiction?
(a) $(p\wedge q) \wedge - (p\vee q)$
(b) $p\vee (-p\wedge q)$
(c) $(p\Rightarrow q)\Rightarrow p$
(d) None of these
Ans.(a)

Q8. Which of the following is logically equivalent to $-(-p\Rightarrow q)$
(a) $p \wedge q$
(b) $p\wedge -q$
(c) $-p\wedge q$
(d) $-p\wedge -q$
Ans.(d)

Q9. If p, q, r are simple propositions with truth values T, F, T, then the truth values of $(-p\vee q)\wedge -r\Rightarrow p$ is
(a) True
(b) False
(c) True if r is false
(d) True if q is true
Ans.(a)

Q10. If $(p \wedge -r) \Rightarrow (q \vee r)$ is false and q and r are both false, then p is
(a) True
(b) False
(c) May be true or false
(d) Data insufficient
Ans.(a)

Q11. $(p \wedge q) \wedge (-p \vee q)$ is
(a) A contradiction
(b) A tautology
(c) Either A or B
(d) Neither A nor B
Ans.(a)

Q12. Which of the following is not logically equivalent to the proposition :? A real number is either rational or irrational?
(a) If a number is neither rational nor irrational then it is not real
(b) If a number is not a rational nor not an irrational, then it is not real
(c) If a number is not real, then it is neither rational nor irrational
(d) If a number is real, then it is rational or irrational
Ans.(b)

Q13. The negation of the compound proposition $p \vee (-p \vee q)$ is
(a) $(p \wedge -q) \wedge -p$
(b) $(p \wedge -q) \vee -p$
(c) $(p \vee -q) \vee -p$
(d) None of these
Ans.(a)

Q14. The inverse of the proposition $(p \wedge -q) \Rightarrow r$ is
(a) $-r \Rightarrow -p \vee q$
(b) $-p \vee q \Rightarrow -r$
(c) $r \Rightarrow p \wedge -q$
(d) None of these
Ans.(b)

Q15. Write the contrapositive of the inverse of $p \Rightarrow \sim q$.
Ans. $\sim q \Rightarrow p$

Q16. ***Which of the following is the contrapositive of if two triangles are identical, then these are similar??***
(a) If two triangles are not similar, they are not identical
(b) If two triangles are not identical, then these are not similar
(c) If two triangles are not identical, then these are similar
(d) If two triangles are not similar, then these are identical
Ans. (a)

Q17. ***If p is true and q is false, then which of the following statements is not true?***
(a) $p \vee q$
(b) $p \Rightarrow q$
(c) $p \wedge (\sim q)$
(d) $p \Rightarrow p$
Ans.(b)

Q18. Write a statement equivalent to $\sim(p \vee q) \vee (\sim p \wedge q)$.
Ans. $\sim q \wedge \sim(\sim (p \wedge q))$

Q19. Which of the following is logically equivalent to $\sim(\sim p \Rightarrow q)$?
(a) $p \wedge q$
(b) $p \wedge \sim q$
(c) $\sim p \wedge q$
(d) $\sim p \wedge \sim q$
Ans. (d)