Unit -3

1. $(p \to q) \wedge (r \to q)$ is equivalent to

   a) $(p \vee r) \to q$ b) $(p \wedge r) \to q$ c) Tautology d) Contradiction

2. Consider the statement, "Either $-2 \le x \le -1$ or $1 \le x \le 2$". The negation of this statement is

   a) X<-2 or 2<x or -1<x<1 b) X<-2 or 2<x c) -1<x<1 d) -2<x<2

3. $(p \vee q) \vee (p \wedge r)$ is equivalent to

   a) $(p \vee q) \vee (p \vee r)$ b) $(p \vee q) \wedge r$ c) $(p \vee q) \wedge (p \wedge r)$ d) $p \vee q$ e) $(p \wedge q) \vee p$

4. Which of the following statement is the negation of the statement, "2 is even and -3 is negative"?

   a) 2 is even and -3 is not negative b) 2 is odd and -3 is not negative

   c) 2 is even or -3 is not negative d) 2 is odd or -3 is not negative

5. $p \to q$ is logically equivalent to

   a)7p → 7q b)7p → q c)7p ∧ q d) 7p ∨ q

6. 7q ∧ (p → q) → 7p is

   a) Consistent b) inconsistent c) Tautology d) Contradiction

7. The statement $(p \wedge q) \Rightarrow p$ is a

   a) Consistent b) Contradiction c) Tautology d) None of the above

8. Which one is the contrapositive of $q \to p$?

   a) $p \to q$ b) $\neg p \to \neg q$ c) $\neg q \to \neg p$ d) None of these

9. The truth or falsity of a given proposition is called its _____

   a) Integer value b) Truth value c) Numerical value d) Actual value

10. The _____ of a proposition is generally formed by introducing the word "not" at the proper place

a) Conjunction b) Disjunction c) Negation d) Conditional

11. State true (T) or false (F)

I) The proposition "$p \vee q$" is F when 'p' is F and 'q' is F.

II) The proposition "$p \wedge q$" is T when 'p' is T and 'q' is F.

a) (i) T (ii) T b) (i) F (ii) F c) (i) T (ii) F d) (i) F (ii) T

12. State true (T) or false (F)

I) $a \wedge a = F$ II) $a \wedge (a \vee b) = b$

a) (i) T (ii) T b) (i) F (ii) F c) (i) T (ii) F d) (i) F (ii) T

13. The following are the properties of logical equivalence

i) $p \equiv p$ ii) if $p \equiv q$ and $q \equiv r$ then $p \equiv r$ iii) $p \rightarrow q \equiv 7q \rightarrow p$ iv) $q \rightarrow p \equiv 7p \rightarrow 7q$

a) (i) T (ii) T (iii) F (iv) F

b) (i) T (ii) T (iii) F (iv) T

c) (i) F (ii) T (iii) F (iv) F

d) (i) T (ii) T (iii) T (iv) T

14. Let 'p' be "He is tall" and let 'q' be "He is handsome". Then the statement "It is false that he is short or handsome" is:

a) $p \vee q$ b) 7(7p ∨ q) c) p∨ 7q d) 7p ∨ q

15. Which of the following proposition is a tautology?

a) $(p \vee q) \rightarrow p$ b) $p \vee (q \rightarrow p)$ c) $p \vee (p \rightarrow q)$ d) $p \rightarrow (p \rightarrow q)$

16. What is the converse of the following assertion? I stay only if you go.

a) I stay if you go b) If you do not go then I do not stay

c) If I stay then you go d) If you do not stay then you go

17. Which of the following statement is the contra positive of the statement "If 4 is even and then -5 is negative"?

a) If -5 is not negative and then 4 is not even b) If 4 is even then -5 is not negative

c) 4 is odd or -5 is not negative d) 4 is even and -5 is not negative

18. Which one is the inverse of $q \to p$?

a) $p \to q$ b) 7p → 7q c) 7q → p d) None of these

19. What is the dual of $(p \to q) \to (\neg q \to \neg p) \equiv T$

a) $\neg(\neg p \wedge q) \wedge (q \wedge \neg p) \equiv F$ b) $\neg(p \wedge q) \wedge (q \wedge p) \equiv T$

c) $(\neg p \wedge q) \wedge (q \wedge \neg p) \equiv F$ d) None of these

20. What is the dual of $\neg(p \vee q) \vee [(\neg q \wedge p)] \vee p$

a) $\neg(p \wedge q) \vee [(\neg p \vee q)] \wedge p$ b) $(p \vee q) \vee [(p \wedge q)] \vee p$

c) $(\neg p \vee \neg q) \vee [(p \wedge \neg q)] \vee \neg p$ d) None of these

21. $(p \to q) \wedge (r \to q)$ is equivalent to

a) $(p \vee r) \to q$ b) $(p \wedge r) \to q$ c) Tautology d) Contradiction

22. $(p \vee q) \vee (p \wedge r)$ is equivalent to

a) $(p \vee q) \vee (p \vee r)$ b) $(p \vee q) \wedge r$ c) $(p \vee q) \wedge (p \wedge r)$ d) $p \vee q$ e) $(p \wedge q) \vee p$

23. $p \to q$ is logically equivalent to

a)7p → 7q b)7p → q c)7p ∧ q d) 7p ∨ q

24. 7q ∧ (p → q) → 7p is

a) Consistent b) inconsistent c) Tautology d) Contradiction

25. The truth or falsity of a given proposition is called its _____

a) Integer value b) Truth value c) Numerical value d) Actual value

26. The _____ of a proposition is generally formed by introducing the word “not” at the proper place

a) Conjunction b) Disjunction c) Negation d) Conditional

27. $P \to (Q \to R)(P \to Q) \to (P \to R)$
    a) Check whether RHS is a tautology
        a) Tautology
        b) Contradiction
        c) Contingency
        d) None
28. $\neg P \to (\neg P \to (\neg PQ)$
    a) The solution is
        i) pq
        ii) pq
        iii) $p \to q$
        iv) $q \to p$
29. What is the type of inference
    i) Direct proof
    ii) Mathematical induction
    iii) CP rule
    iv) Inference
30. S.T R is a vaild inference from the premises P→ Q,Q→ $R\ and\ P$
    a) Premises $p \to q, q \to R$ implies
        i) $P \to R$
        ii) $q \to R$
        iii) $R \to P$
        iv) $Q \to P$
31. S.T $P \to S$ logically follws from the premises $\neg PQ$, $\neg QR, R \to S$
        a) The rule used to convert $\neg PQ\ to\ P \to Q$ is
            i) Modus pollens
            ii) Modus tollens
            iii) Idempotent
            iv) Conditional equivalence
32. S.T SR logically follows from $PQ, P \to R, Q \to S$
    a) The implication $\neg P \to S \neg S \to P$ is called
        i) Modus pollens
        ii) Modus tollens
        iii) Idempotent
        iv) Contrapositive
33. Conditional premise
    a) If the conclusion is of the form $r \to s$ then r is an
        i) Rule T
        ii) Rule P
        iii) Premises
        iv) Additional premises

34.

a) A set of premises is said to be consistent of their _____ is a contradiction
   i) Conjunction
   ii) Disjunction
   iii) Negation
   iv) Conditional

35. Symbolize the statements
   a) If Rama gets his degree (P), he will go for a job (q)
      i) $q \rightarrow p$
      ii) $p \rightarrow q$
      iii) pq
      iv) pq

36. symbolize the statements
   a) Krishna goes for a job (p) and he will not for higher studies (q)
      i) $p\neg q$
      ii) pq
      iii) $p \rightarrow q$
      iv) $p \rightarrow \neg q$

Answer
1)a 2) a 3) a 4) d 5) d 6) c 7) c 8) c 9) b 10) c 11) c 12) b 13) b 14) d 15) a 16) a 17) a 18) b 19) a 20) d 21) a 22) a 23) d 24) c 25) b 26) c 27) c 28) b 29) a 30) c 31) d) 32) d 33) d 34) a) 35) b 36) b.