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Subject Code : ***MA8351***	**Subject Name** : Discrete Mathematics	Rev. No.	02
Unit No :1	**Unit Name** :**Logic and Proof**	Date	30.09.2020

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S. No.	Objective Questions (MCQ /True or False / Fill up with Choices)	BTL
1	The statement, "At least one of your friends is perfect". Let P (x) be "x is perfect" and let F (x) be "x is your friend" and let the domain be all people. a) ∀x (F (x) → P (x)) b) ∀x (F (x) ∧ P (x)) **c) ∃x (F (x) ∧ P (x))** d) ∃x (F (x) → P (x))	L4
2	Translate ∀x∃y(x < y) in English, considering domain as a real number for both the variable. **a) For all real number x there exists a real number y such that x is less than y** b) For every real number y there exists a real number x such that x is less than y c) For some real number x there exists a real number y such that x is less than y d) For each and every real number x and y such that x is less than y	L4
3	"The product of two negative real numbers is not negative." Is given by? a) ∃x ∀y ((x < 0) ∧ (y < 0) → (xy > 0)) b) ∃x ∃y ((x < 0) ∧ (y < 0) ∧ (xy > 0)) c) ∀x ∃y ((x < 0) ∧ (y < 0) ∧ (xy > 0)) **d) ∀x ∀y ((x < 0) ∧ (y < 0) → (xy > 0))**	L4
4	Let Q(x, y) be the statement "x + y = x − y." If the domain for both variables consists of all integers, what is the truth value of ∃xQ(x, 4). a) True **b) False**	L3
5	Let L(x, y) be the statement "x loves y," where the domain for both x and y consists of all people in the world. Use quantifiers to express, "Joy is loved by everyone." **a) ∀x L(x, Joy)** b) ∀y L(Joy,y) c) ∃y∀x L(x, y) d) ∃x ¬L(Joy, x)	L4
6	6. Express, "The difference of a real number and itself is zero" using required operators. a) ∀x(x − x! = 0) **b) ∀x(x − x = 0)** c) ∀x∀y(x − y = 0) d) ∃x(x − x = 0)	L4

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7	Use quantifiers and predicates with more than one variable to express, "There is a pupil in this lecture who has taken at least one course in Discrete Maths." **a) ∀x∃y P (x, y), where P (x, y) is "x has taken y," the domain for x consists of all pupil in this class, and the domain for y consists of all Discrete Maths lectures** b) ∃x∃yP (x, y), where P (x, y) is "x has taken y," the domain for x consists of all Discrete Maths lectures, and the domain for y consists of all pupil in this class c) ∀x∀yP(x, y), where P (x, y) is "x has taken y," the domain for x consists of all pupil in this class, and the domain for y consists of all Discrete Maths lectures d) ∃x∀yP(x, y), where P (x, y) is "x has taken y," the domain for x consists of all pupil in this class, and the domain for y consists of all Discrete Maths lectures	L4
8	The statement," Every comedian is funny" where C(x) is "x is a comedian" and F (x) is "x is funny" and the domain consists of all people. a) ∃x(C(x) ∧ F (x)) b) ∀x(C(x) ∧ F (x)) c) ∃x(C(x) → F (x)) **d) ∀x(C(x) → F (x))**	L4
9	Let P (x) denote the statement "x >7." Which of these have truth value true? a) P (0) b) P (4) c) P (6) **d) P (9)**	L3
10	p → q is logically equivalent to _____ a) ¬p ∨ ¬q b) p ∨ ¬q **c) ¬p ∀ q** d) ¬p ∧ q	L3
11	Let P: I am in Bangalore.; Q: I love cricket.; then q -> p(q implies p) is? **a) If I love cricket then I am in Bangalore** b) If I am in Bangalore then I love cricket c) I am not in Bangalore d) I love cricket	L3
12	Let P: This is a great website, Q: You should not come back here. Then 'This is a great website and you should come back here.' is best represented by? a) ~P V ~Q **b) P ∀ ~Q** c) P V Q d) P ∧ Q	L4

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13	Let P: We should be honest., Q: We should be dedicated., R: We should be overconfident. Then 'We should be honest or dedicated but not overconfident.' is best represented by? a) ~P V ~Q V R b) P ∧ ~Q ∧ R c) P V Q ∧ R **d) P V Q ⍰ ~R**	L4
14	Let P: I am in Delhi.; Q: Delhi is clean.; then q ^ p(q and p) is? **a) Delhi is clean and I am in Delhi** b) Delhi is not clean or I am in Delhi c) I am in Delhi and Delhi is not clean d) Delhi is clean but I am in Mumbai	L3
15	How many bits string of length 4 are possible such that they contain 2 ones and 2 zeroes? a) 4 b) 2 c) 5 **d) 6**	L4
16	If a bit string contains {0, 1} only, having length 5 has no more than 2 ones in it. Then how many such bit strings are possible? a) 14 b) 12 c) 15 **d) 16**	L4
17	What is the 2's complement of this string "01010100"? a) 10101010 b) 00110100 **c) 10101100** d) 10101001	L3
18	Let P: We give a nice overall squad performance, Q: We will win the match. Then the symbolic form of "We will win the match if and only if we give a nice overall squad performance." is? a) P v Q b) Q ∧ P **c) Q<->P** d) ~P v Q	L4
19	"Match will be played only if it is not a humid day." The negation of this statement is?	L3

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	a) Match will be played but it is a humid day b) Match will be played or it is a humid day c) All of the mentioned statement are correct d) None of the mentioned	
20	Consider the following statements. A: Raju should exercise. B: Raju is not a decent table tennis player. C: Raju wants to play good table tennis. The symbolic form of "Raju is not a decent table tennis player and if he wants to play good table tennis then he should exercise." is? a) A->B->C **b) B□(C->A)** c) C->B∧A d) B<->A∧C	L3
21	Which of the following represents: ~A (negation of A) if A stands for "I like badminton but hate maths"? a) I hate badminton and maths b) I do not like badminton or maths c) I dislike badminton but love maths **d) I hate badminton or like maths**	L4
22	~ A v ~ B is logically equivalent to? a) ~ A → ~ B b) ~ A ∧ ~ B **c) A → ~B** d) B V A	L3
23	Negation of statement (A ∧ B) → (B ∧ C) is _____ **a) (A □ B) →(~B □ ~C)** b) ~(A ∧ B) v (B v C) c) ~(A →B) →(~B ∧ C) d) None of the mentioned	L3
24	Which rule of inference is used in each of these arguments, "If it is Wednesday, then the Smartmart will be crowded. It is Wednesday. Thus, the Smartmart is crowded." a) Modus tollens **b) Modus ponens** c) Disjunctive syllogism d) Simplification	L3

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25	What rule of inference is used here? "It is cloudy and drizzling now. Therefore, it is cloudy now." a) Addition **b) Simplification** c) Resolution d) Conjunction	L3
26	Let the statement be "If n is not an odd integer then square of n is not odd.", then if P(n) is "n is an not an odd integer" and Q(n) is "(square of n) is not odd." For direct proof we should prove _____ **a) ∀nP ((n) → Q(n))** b) ∃ nP ((n) → Q(n)) c) ∀n∼(P ((n)) → Q(n)) d) ∀nP ((n) → ∼(Q(n)))	L3
27	A theorem used to prove other theorems is known as _____ **a) Lemma** b) Corollary c) Conjecture d) None of the mentioned	L1
28	A proof covering all the possible cases, such type of proofs are known as _____ a) Direct proof b) Proof by Contradiction c) Vacuous proof **d) Exhaustive proof**	L1
29	When to proof P→Q true, we proof P false, that type of proof is known as _____ a) Direct proof b) Contrapositive proofs **c) Vacuous proof** d) Mathematical Induction	L1
30	Which of the following can only be used in disproving the statements? a) Direct proof b) Contrapositive proofs **c) Counter Example** d) Mathematical Induction	L1
31	In proving √5 as irrational, we begin with assumption √5 is rational in which type of proof? a) Direct proof	L2

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	b) Proof by Contradiction c) Vacuous proof d) Mathematical Induction	