Submitted Dated : Wednesday ,August 26, 2020.

Online Mid – Term Examination Summer Semester 2020

DISCRETE STRUCTURE

Total Marks :30

Submitted to :

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BS (SE) Section B

IQRA NATIONAL UNIVERSITY

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Question No. 1:

a) Show that (p ⋀ q) ⋀ r ≡ p ⋀ (q ⋀ r) and (p ∧ q) ∨ (~ p ∨ (p ∧ ~q)) is a tautology (05)
with the help of truth table.

Solution :

1. (p ⋀ q) ⋀ r ≡ p ⋀ (q ⋀ r)

P	Q	R	(p ⋀ q)	(q ⋀ r)	(p ⋀ q) ⋀ r	p ⋀ (q ⋀ r)
T	T	T	T	T	T	T
T	T	F	T	F	F	F
T	F	F	F	F	F	F
F	T	T	F	T	F	F
F	F	T	F	F	F	F
F	T	F	F	F	F	F
T	F	T	F	F	F	F

2. (p ∧ q) ∨ (~ p ∨ (p ∧ ~q))

P	Q	~ p	~q	(p ⋀ q)	(p ∧ ~q)	(~ p ∨ (p ∧ ~q)	(p ∧ q) ∨ (~ p ∨ (p ∧ ~q))
T	T	F	T	T	T	F	T
T	F	F	F	F	T	F	T
F	T	T	T	T	T	T	T
F	F	T	T	T	T	T	T

b) Let **p**, **q**, and **r** be the propositions, where **p = "you have the flu"**, **q = "you miss the final exam"** and **r = "you pass the course"**. Express the English sentence as propositions. (05)

1. If you have flu, then you will miss the final exam.
2. If you don't miss the final exam, you will pass the course.
3. If you neither have flu nor miss the final exam, then you will pass the course.

Solution

1. If you have the flue, then you miss the final exam.

$$p \wedge q$$

2. If you don't miss the final exam, you will pass the course.

$$\neg q \rightarrow r$$

3 If you neither have flu nor miss the final exam, then you will pass the course.

$$\sim p \wedge \sim q \rightarrow r$$

Question No. 2:

a) Show that the given argument form is invalid $p \rightarrow q$ q $\therefore$ p with the help of truth Table (05)

Solution :

p	q	p→q	q ∴ p
T	T	T	T T
T	F	F	F T
F	T	T	T F
F	F	T	F F

This argument is invalid since the third row is a critical row with a false conclusion.

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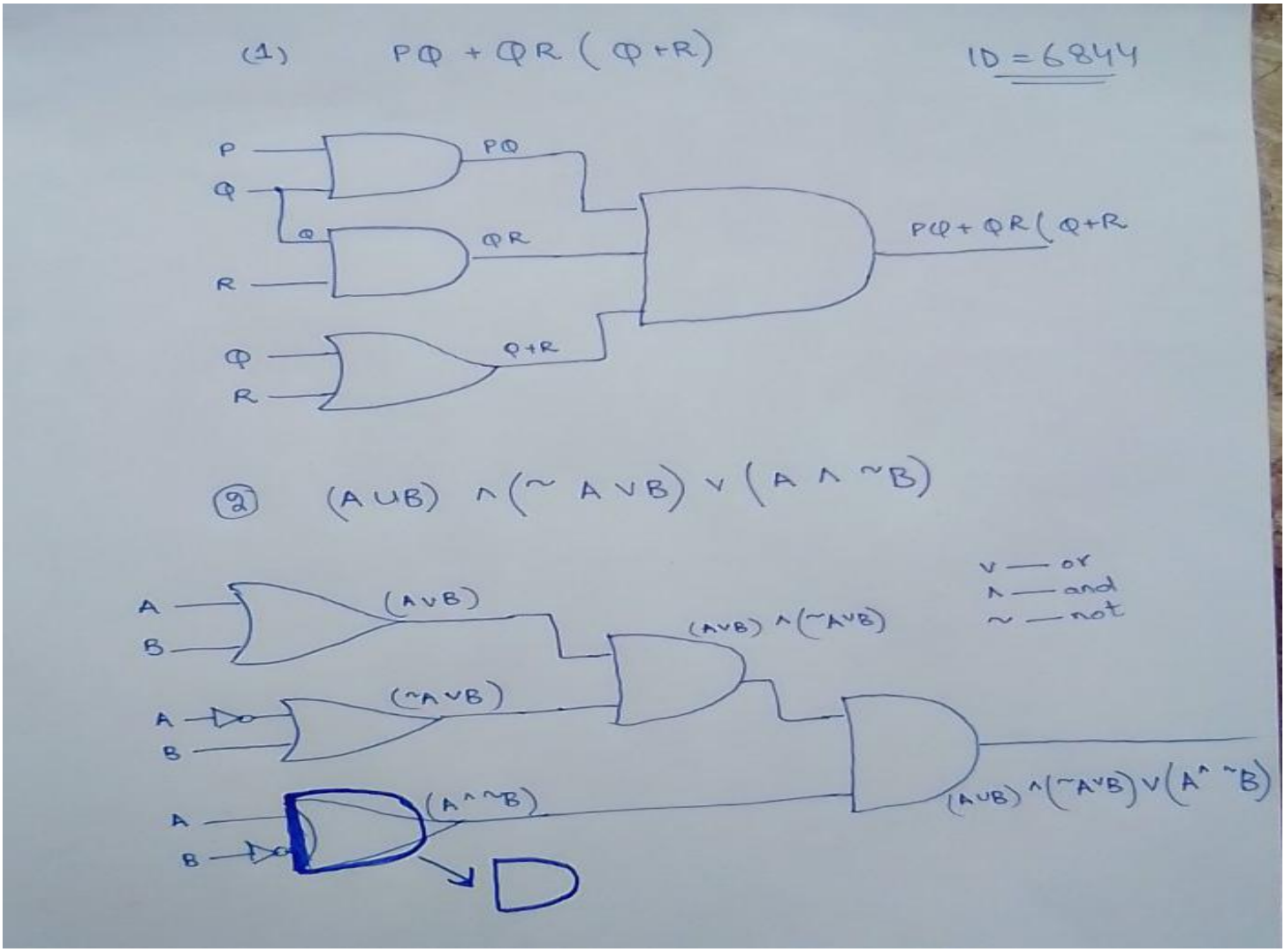
B : Draw circuit diagram for **1**. PQ+QR (Q+R) **2**. (A ∨ B) ∧ (~A ∨ B) ∨ (A ∧~ B) (05)

Solution :



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Question No. 3:

a) If A = {a, b, c} and B = {1,2,3,4} find P (A) and P (B). (05)

Solution :

Two events A and B are independent if knowing that one occurs does not change the probability that the other occurs. This is often called the multiplication rule. If A and B are independent, then P(A and B)=P(A) P(B)

The word "and" in mathematics means the same thing in mathematics as the intersection, which uses the following symbol: ∩. Therefore when A and B are independent, we have P(A∩B)=P(A)P(B)

A = {a, b, c}
B = {1,2,3,4}
P(A∩B)=P(A)P(B)

P(A∩B) = { }

B . Briefly discuss three forms of set with the help of example. (05)

Answer :

Three Form Of Sets With Examples

TABULAR FORM

Listing all the elements of a set, separated by commas and enclosed within braces or curly brackets { } .

EXAMPLES

In the following examples we write the sets in Tabular Form.

A = {1, 2, 3, 4, 5} is the set of first five Natural Numbers.

B = {2, 4, 6, 8, …, 50} is the set of Even numbers up to 50.

C = {1, 3, 5, 7, 9 …} is the set of positive odd numbers.

NOTE : The symbol "…" is called an ellipsis. It is a short for "and so forth."

DESCRIPTIVE FORM:

Stating in words the elements of a set.

EXAMPLES

Now we will write the same examples which we write in Tabular Form ,in the Descriptive Form.

A = set of first five Natural Numbers. (is the Descriptive Form)

B = set of positive even integers less or equal to fifty. (is the Descriptive Form)

C = {1, 3, 5, 7, 9, …} (is the Descriptive Form)

D = set of positive odd integers. (is the Descriptive Form)

SET BUILDER FORM:

Writing in symbolic form the common characteristics shared by all the elements of the set.

EXAMPLES:

Now we will write the same examples which we write in Tabular as well as Descriptive Form ,in Set Builder Form .

A = {x ÎN / x<=5} (is the Set Builder Form)

B = {x Î E / 0 < x <=50} (is the Set Builder Form)

C = {x ÎO / 0 < x } (is the Set Builder Form)

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End of the Paper