Practice Exam 2

You MUST show all work, and INDICATE WHICH VALUE IS THE MAIN OPERATOR VALUE.

I. You will do two things on these (DON'T do Truth Tables on these):
    A. Translate the following statements into symbolic form, using A, B, C and D.
    B. Next, using your knowledge of the truth of propositions A, B, C and D in these exercises, determine the truth values of propositions 1-7. (6 pts. each)

    1. Alaska is a state and British Columbia is a state, or California is a state.

    2. Alaska is not a state if either British Columbia is a state or California is a state.

    3. Both Alaska is a state and British Columbia is a state provided that Delaware is not in the Pacific time zone.

    4. Delaware is in the Pacific time zone if and only if California is not a state.

    5. If Alaska is a state implies that either British Columbia is a state or California is a state, then Delaware is in the Pacific time zone.

    6. Delaware is in the Pacific time zone only if neither California nor Alaska is a state.

    7. Delaware is in the Pacific time zone; however, given that British Columbia is a state and California is not a state, Alaska is a state.

II. Fill in the blanks with "necessary" or "sufficient" to make the following statements true. Then translate the statements into symbolic form.

    1. Being beheaded is a _____ condition for losing one's life.
    Symbolic form (use B and L):

    2. Being a reptile is a _____ condition for being a lizard.
    Symbolic form (use R and L):

    3. A passport is a _____ condition for legally traveling to Europe.
    Symbolic form (use P and E):

III. Given that A and B are true and X and Y are false, determine the truth values of the following propositions. Show your work and circle the answer.

    1. [(A ⊃ X) v (Y ⊃ B)] ≡ ~[(A v X) • (B v Y)]

    2. [(B v X) • (B ⊃ ~Y)] ⊃ [(~Y ≡ A) • (Y v ~B)]

    3. (A ⊃ A) v (X • ~Y)

IV. Use an ordinary truth table to determine whether the following propositions are tautologous (T), self-contradictory (S-C), or contingent (C) I recommend using one pool of values for all three statements.

1. (A ⊃ B) ≡ ~(B v ~A)   2. (A • B) ⊃ [(A • B) v B]   3. [B • ~(A v B)] v A

V. Answer the following questions about propositions 1-3 in part IV above.

    1. Are 1 and 2 logically equivalent, contradictory, consistent, or inconsistent?
    2. Are 2 and 3 logically equivalent, contradictory, consistent, or inconsistent?
    3. Are 1 and 3 logically equivalent, contradictory, consistent, or inconsistent?

VI. Use and show an ordinary truth table to answer the following questions.

1. Albert says to Barbara: "Our philosophy instructor just said that if the class studies hard then the class won't fail the exam." Barbara replies: "Unfortunately the instructor's claim is consistent with the claim that the class will study hard or it will fail the exam." Is Barbara correct? **(Use C and F)**

2. Yasmine says to Zatoichi: "Russia will call for a cease fire if and only if Europe imposes sanctions." Zatoichi responds by saying: "But that means that Russia won't call for a cease fire given that Europe won't impose sanctions." Is Zatoichi correct? **(Use R and E)**

VII. Determine whether the following arguments are valid or invalid by constructing an ordinary truth table for each. If an argument is invalid, circle the pertinent truth values.

    1. A ⊃ B / ~C ⊃ ~B / A v C // B v C

    2. (A • ~B) v (B • ~A) / (B ⊃ ~A) • (~B ⊃ A) // ~(B v ~A)

    3. A ≡ ~B / ~A ⊃ B // B • ~A

VIII. Use indirect truth tables to determine whether the following arguments are valid or invalid. Be sure to explicitly note any contradictions that result from this process.

1. (A • B) v (C • D) / B ⊃ (E • F) / D ⊃ (G • H) // F v H

2. ~A v G / B • ~F / B ⊃ ~G // ~A ⊃ ~B

3. A v B / ~A v (C • D) / B ⊃ (E • F) // D • F

IX. Use indirect truth tables to determine if the following sets of claims are consistent. Be sure to explicitly note any contradictions that result from this process.

1. G • ~C / F ⊃ [B v (G ≡ A)] / F • (G v B)

2. (C v A) ≡ G / ~B v C / ~C ⊃ (B • ~A)

PRACTICE EXAM 2 ANSWER KEY

I. Please be sure to CIRCLE the main operator value.

1. (A • B) v C
   T F   T
    F
      (T)

2. (B v C) ⊃ ~A
   F T   T
    T   F
      (F)

3. ~D ⊃ (A • B)
   F   T F
   T   F
    (F)

4. D ≡ ~C
   F   T
      F
   (T)

5. [A ⊃ (B v C)] ⊃ D
   T F T   F
      T
    T
       (F)

6. D ⊃ ~(C v A)
   F   T T
      T
      F
   (T)

7. D • [(B • ~C) ⊃ A]
   F   F T   T
       F
      F
        T
  (F)

II.   1. Being beheaded is a **sufficient** condition for losing one's life.
Symbolic form (use B and L):   **B ⊃ L**

2. Being a reptile is a **necessary** condition for being a lizard.
Symbolic form (use R and L):   **L ⊃ R**

3. A passport is a **necessary** condition for legally traveling to Europe.
Symbolic form (use P and E):   **E ⊃ P**

III.

1. [(A ⊃ X) v (Y ⊃ B)] ≡ ~[(A v X) • (B v Y)]
    T F F T FT T (F)F TTF T TTF

2. [(B v X) • (B ⊃ ~Y)] ⊃ [(~Y ≡ A) • (Y v ~B)]
    TTF T TT TF (F) TFTT F FFFT

3. (A ⊃ A) v (X • ~Y)
    TTT (T) FF TF

IV. Again, the m.o. values are in bold.

		Self-Contradictory		Tautologous		Contingent
AB	1. (A ⊃ B) ≡ ~(B v ~A)		2. (A • B) ⊃ [(A • B) v B]		3. [B • ~(A v B)] v A	
T T	T	**F** F T T	T	**T** TTT TT		**T** T
T F	F	**F** T FF FT	F	**T**		**T** T
F T	T	**F** F T T	F	**T**	T F F F T T	**F** F
F F	T	**F** F F T T F	F	**T**	F F	**F** F

V. Answer the following questions about propostions 1-3 in part IV above.
1. Are 1 and 2 logically equivalent, **contradictory**, consistent, or inconsistent?
2. Are 2 and 3 logically equivalent, contradictory, **consistent**, or inconsistent?
3. Are 1 and 3 logically equivalent, contradictory, consistent, or **inconsistent**?

VI. Use and show an ordinary truth table to answer the following questions.

1.

C F	C ⊃ ~F	/	C v F	
T T	T **F** FT		T **T** T	Yes, Barbara is correct, see rows 2 & 3.
T F	T **T** TF		T **T** F	
F T	F **T** FT		F **T** T	
F F	F **T** TF		F **F** F	

2.

R E	R ≡ E	/	~E ⊃ ~R	
T T	T **T** T		FT **T** FT	No, Zatoichi is wrong, see row 3.
T F	T **F** F		TF **F** FT	
F T	F **F** T		FT **T** TF	
F F	F **T** F		TF **T** TF	

VII. Determine whether the following arguments are valid or invalid by constructing an ordinary truth table for each. If an argument is invalid, circle the pertinent truth values.

ABC   1. A ⊃ B / ~C ⊃ ~B / A v C // B v C   This argument is **valid**, it
TTT   T **T**   cannot have all true premises
TTF   T **T**   and a false conclusion.
TFT   F **T** T
TFF   T **F** F   F **F** F
FTT   T **T**
FTF   T **T**
FFT   F **T** T
FFF   F **T**   TF **T** TF F **F** F   F **F** F

AB   2. (A • ~B) v (B • ~A) / (B ⊃ ~A) • (~B ⊃ A) // ~(B v ~A)
TT   T F FT | **F** T FFT   **F** T T
TF   **T** F F FT
FT   F F   **T** T T TF   T T T F **T** FT T   **F** T T   **<---Shows invalid**
FF

AB   3. A ≡ ~B / ~A ⊃ B // B • ~A
TT   T **F** FT   T **F** FT
TF   T **T** TF   FT **T**   F **F**   **<------Shows invalid**
FT
FF

VIII. You must indicate contradictions, and can simply cross out the relevant m.o. value.

   1. (A • B) v (C • D) / B ⊃ (E • F) / D ⊃ (G • H) // F v H
          F F **X**   F F   F **T**   F F   F **T**   F F   F **F** F

          Contradiction in the first premise, therefore VALID

   2. ~A v G / B • ~F / B ⊃ ~G // ~A ⊃ ~B   **INVALID**
        TF **T** F   T **T** TF   T **T** TF   TF **F** FT

   3. A v B / ~A v (C • D) / B ⊃ (E • F) // D • F   **INVALID**
        T **T** F   FT **T** T TT   F **T**   F F   T **F** F   Also:
                                                                F **F** F <——doesn't work, but
        F **T** T   TF **T**   F F   T **T** T T T   F **F** T <——does

IX. Use indirect truth tables to determine if the following sets of claims are consistent. Be sure to explicitly note any contradictions that result from this process.

1. G • ~C / F ⊃ [B v (G ≡ A)] / F • (G v B)   **CONSISTENT**
   T(T) TF   T(T) T T T   T(T)T T T

2. (C v A) ≡ G / ~B v C / ~C ⊃ (B • ~A)   **CONSISTENT**
   F F F(T)F   TF(T)F   TF(T) FF   <----- doesn't work, but
   T T (T)T   (T)T FT(T)   <------does