Exam IIB Review

There are two types of questions below: *True/False and Multiple Choice*. Answer the matching questions below by writing the letter corresponding to the correct option. There is only *one* (1) correct answer per question. Pick the most appropriate answer.

There are 40 questions on the exam and you may take up to 6 hours to complete it. This review has a sample of each question type from each exam section. There will be 5 questions drawn at random from a question pool. As such, you might not see all of the question types below.

1 Reference

1.1 Abstract Symbols

1. _____ Given $U_{<w,t,>} = \{א, ב, ג, ד\}$, $P(x) = \{א, ב\}$ and $Q(x) = \{ג, ד\}$, $P(x)$ and $Q(x)$ are...

   A. mutually exclusive (contradictory) antonyms

   B. not mutually exclusive (incompatible) antonyms

   C. perfect synonyms

   D. close enough synonyms

2. _____ Given $[\![A]\!] = \{\alpha, \beta\}$, and $[\![B]\!] = \{\alpha, \beta\}$, $[\![A]\!]$ and $[\![B]\!]$ are...

   A. mutually exclusive (contradictory) antonyms

   B. not mutually exclusive (incompatible) antonyms

   C. perfect synonyms

   D. close enough synonyms

3. _____ Given $[\![A]\!] = \{\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta\}$, and $[\![B]\!] = \{\alpha, \beta, \gamma\}$, $[\![A]\!]$ is a _____ of $[\![B]\!]$.

   A. Synonym

   B. Antonym

   C. Hypernym

   D. Hyponym

1.2 English Words

4. _____ Given $U_{<w,t>}$ ={Karen, Christen, Janelle, Jay, Daniel, Katherine},[[American]] = $\{x$: x is American$\}$ = $\{christen, janelle, jay, daniel\}$, and [[Not American]] = $\{karen, katherine\}$, "American" and "Not American" are...

   A. mutually exclusive (contradictory) antonyms

   B. not mutually exclusive (incompatible) antonyms

   C. perfect synonyms

   D. close enough synonyms

5. _____ Given [[canines]] = {chihuahuas, rat terriers, German shepards, wolves, coyotes, jackals}, and [[dogs]] = {chihuahuas, rat terriers, German shepards}, "dogs" is a _____ of "canines"

   A. Synonym

   B. Antonym

   C. Hypernym

   D. Hyponym

6. _____ What is the relationship between the two words "vegetarian" and "meat-eater"?

   A. mutually exclusive (contradictory) antonyms

   B. not mutually exclusive (incompatible) antonyms

   C. perfect synonyms

   D. close enough synonyms

2 Set Theory

2.1 Meaningful Sets

7. _____ If A is a **hyponym** of B, then which of the following is true.

   A. $A \subset B$

   B. $A \supset B$

   C. $A = B$

   D. $A \notin B$

8. _____ If A is a **hyponym** of B, then $A \in B$.

   A. True

   B. False

2.2 Abstraction

9. _____ Given $A = \{a, b, c, d\}$; $B = \{a, b, c, d\}$, A is a **proper subset** of B

   A. True

   B. False

10. _____ What is the relation (if any) between the sets A and B if $A = \{a, b, \{\emptyset\}\}$; $B = \{a, b\}$?

   A. $A \subset B$

   B. $A \subseteq B$

   C. $A \supset B$

   D. $A \supseteq B$

   E. $A = B$

   F. None of the above

3 Propositional & Predicate Logic

3.1 Truth Values

11. _____ If $[\![P(x)]\!] = 1$ and $[\![Q(x)]\!] = 0$ then what is the truth value for $[\![P(x) \to Q(x)]\!]$?

   A. 1, True

   B. 0, False

12. _____ If $[\![P(x)]\!] = 1$ and $[\![Q(x)]\!] = 0$ then $[\![P(x) \wedge Q(x)]\!] = 1$?

   A. True

   B. False

3.2 Predicate Logic

13. _____ Which of the following is the best predicate logic translation of the utterance "Reza make nachos and watched TV"?

   A. $M(r, n) \wedge W(r, t)$

   B. $M(x, y) \wedge W(x, y)$

   C. $M(r, n) \wedge W(x, t)$

   D. $M(x, y) \to W(x, y)$

   E. None of the above

3.3 Scope

14. _____ If $[\![P(x)]\!] = 0$, $[\![Q(x)]\!] = 1$, $[\![R(x)]\!] = 0$ then what is the truth value for $[\![(P(x) \wedge Q(x)) \vee R(x)]\!]$?

    A. 1, True

    B. 0, False

15. _____ If $[\![P(x)]\!] = 0$ and $[\![Q(x)]\!] = 1$ then $[\![\neg(P(x) \vee Q(x))]\!] = 1$?

    A. True

    B. False

3.4 Quantification

16. _____ If $B(x) = \{x : x \text{ is a baseball cap}\}$ and $C(x) = \{x : x \text{ is a thing that is cool}\}$, then which predicate logic formula correctly describes the English utterance "Some baseball caps are cool"?

    A. $\exists x[B(x) \wedge C(x)]$

    B. $\exists x[B(x) \vee C(x)]$

    C. $\exists x[B(x) \rightarrow C(x)]$

    D. $\forall x[B(x) \rightarrow C(x)]$

17. _____ If $M(x) = \{x : x \text{ is a practitioner of the Mormon faith}\}$ and $L(x) = \{x : x \text{ is a thing that loves ice cream}\}$, then $\forall x[M(x) \rightarrow L(x)]$ means...

    A. All Mormons love ice cream

    B. Some Mormons love ice cream

    C. The Mormons love ice cream

    D. Mormons love ice cream