Practice Midterm 2018

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1 Introduction

Hi, this is your practice midterm.

2 Entailments, etcetera

2.1. (a) Fred is an intelligent politician.

(b) Fred is intelligent.

Acceptable answer 1:

> This is an entailment.

Acceptable answer 2:

> This is not an entailment. Suppose Fred is intelligent as a politician but a hopeless idiot at anything else. Then (a) is true and (b) is false.

2.2. (a) Susan is either a doctor or a lawyer.

(b) Susan is a doctor.

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Not an entailment. Suppose Susan is a lawyer. Then (a) is true and (b) is false.

2.3. (a) A Communist who writes mystery novels waits tables at the country club.

(b) Reginald is a Communist who writes mystery novels and waits tables at the country club.

This is not an entailment. Suppose Frank is a communist who waits tables at the country club; and suppose Reginald is a socialist who writes science fiction novels and tends bar at a gay bar. Than (a) is true and (b) is false.

2.4. (a) Bibi is a doctor.

(b) Bibi is either a doctor or a lawyer.

This is an entailment. If the first sentence is true, then of course the second is.

2.5. (a) Tanqueray is an expensive brand of gin.

(b) Tanqueray is a brand of gin.

This is an entailment.

2.6. (a) The centerfielder is the shortstop's brother.

(b) The shortstop is male.

Not an entailment. Suppose the shortstop is the centerfielder's sister and the centerfielder is male. Then (a) is true and (b) false.

2.7. (a) Reginald is a Communist who writes mystery novels and waits tables at the country club.

(b) A Communist who writes mystery novels waits tables at the country club.

This is an entailment.

2.8. (a) Not every idiot is a politician

(b) Some idiot is not a politician.

These are logically equivalent.

2.9. (a) Louisa stopped eating.

(b) Louisa had started eating.

(a) entails (b). Also, the negation of (a) entail (b):

(a) Louisa did not stop eating.

(b) Louisa had started eating.

Therefore, (a) also presupposes (b).

2.10. (a) The doctor cost Lee$_i$ his$_i$ job

(b) Lee is male.

Since correct use of *his* entails that the referent is male, and since on the reading we are considering *Lee* and *his* refer to the same person, (a) entails (b). Notice that the negation of (a) also entails (b):

(a) The doctor did not cost Lee$_i$ his$_i$ job.

(b) Lee is male.

Therefore (a) presupposes (b).

2.11. (a) No one gave candy to the Shi Tsu.

(b) Alice didn't give candy to the Shi Tsu.

(a) entails (b)

2.12. (a) No sharks were harmed during the making of this film.

(b) No great white sharks were harmed during the making of this film.

This is an entailment. Since a negative is involved, it's worth demonstrating this with a further test. Suppose (b) is false. Then some great white sharks were harmed, and therefore (a) is false. So the falsity of (b) entails the falsity of (a), and that's another way of saying (a) entails (b).

2.13. (a) Every automatic weapon was confiscated.

(b) Every weapon was confiscated.

No entailment. Suppose all the automatic weapons are confiscated and bows and arrows are not. Then (a) is true and (b) is false. Some of you thought (a) implicated (b). But there is no general conversational reason to think (b) is true when (a) is uttered. In fact, since (b) entails (a) [see next example], there is a pretty decent argument that by taking the trouble to specify (a), the speaker implicates that (b) is false (Q-implicature to the negation of (b)).

2.14. (a) Every weapon was confiscated.

(b) Every automatic weapon was confiscated.

This is an entailment.

2.15. (a) Ludwig quietly left the room.

(b) Ludwig left the room.

This is an entailment.

2.16. (a) Rita is Pat's sister.

(b) Pat is female.

Not an entailment. Suppose Rita is Pat's sister, but Pat is male. Then (a) is true and (b) is false.

2.17. (a) Not every politician is an idiot.

(b) There is a politician who is not an idiot.

These are logically equivalent.

2.18. (a) John's bicycle is broken.

(b) John has a bicycle.

Certainly (a) entails (b), but so does the negation of (a):

John's bicycle is not broken.

Therefore, *John's bicycle is broken* presupposes *John has a bicycle*.

2.19. (a) John's bicycle is broken.

(b) John's bicycle is not broken.

These are contraries. In fact, they would be contradictories if not for the fact that neither has to be true if John has no bicycle.

2.20. (a) Every Italian loves fairy tales.

(b) Every bald Italian loves fairy tales.

(a) entails (b)

2.21. (a) Every Italian knows a song.

(b) Every Italian knows a German song.

Suppose every Italian knows a song and suppose it is the same song, *Volare*, and moreover, suppose no Itlian knows any other song. Then (a) is true, and since *Volare* happens not be a German song, (b) is false.

2.22. (a) Every Italian knows a song.

(b) Not every Italian knows a song.

These are contradictories.

2.23. (a) Every Italian knows a song.

(b) No Italian knows a song.

These are contraries. They are not contradictories because they can both be false, if some Italians know a song and some do not.

2.24. (a) Germany won World War II.

(b) Germany fought in World War II.

Note that (a) entails (b) even though (a) is historically false. Whether a sentence (a) entails another sentence (b) does not depend on whether (a) is true. It depends on this: IF (a) were true, would (b) have to be true? And in this case, if (a) were true (b) would also have to be true. Note that (a) also presupposes (b), since the negation of (a) also entails (b)

(a') Germany did not win World War II.

(b') Germany fought in World War II.

2.25. (a) It's cold.

(b) It's hot.

These are contraries. They are not contradictories because the weather can be sunny and mild, as in San Diego; and then it's neither hot nor cold.

2.26. (a) Someone is tall.

(b) Someone is short.

(a) does not entail (b) because one person may be tall and all the rest middling. Since (a) does not entail (b), it cannot presuppose it. Note that that (a) and (b) are not contraries either, since both may be true at the same time. Fred may be the someone who is short and Alice the someone who is tall. If they are not contraries they certainly cannot be contradictories. So the answer is: no relation. These sentences have none of the semantic relationships we have been looking for.

3 Logic

Consider the truth table for $\sim (\sim p \,\&\, \sim q)$:

p	q	$\sim p$	$\sim q$	$(\sim p \,\&\, \sim q)$	$\sim (\sim p \,\&\, \sim q)$
T	T	F	F	F	T
T	F	F	T	F	T
F	T	T	F	F	T
F	F	T	T	T	F

Answer the questions below about the following expressions.

3.1. Which of these expressions is logically exquivalent to $\sim (\sim p \,\&\, \sim q)$? Prove your answer by showing truth tables for all of the above expressions.

3.2. Point out any of these expressions that are tautologies or contradictions and explain why using the truth tables.

Here are the truth tables, with all the relevant columns. Those of you who got this wrong invariably omitted filling out columns on which the correct truth-values depend.

(a)

p	q	$q \to p$	$\sim (q \to p)$
T	T	T	F
T	F	T	F
F	T	F	T
F	F	T	F

(b)

p	q	$\sim p$	$\sim p \to q$
T	T	F	T
T	F	F	T
F	T	T	T
F	F	T	F

(c)

p	q	$\sim q$	$p \vee \sim q$
T	T	F	T
T	F	T	T
F	T	F	F
F	F	T	T

(d)

p	q	$p \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

(e)

p	q	$p \vee q$	$\sim (p \vee q)$
T	T	T	F
T	F	T	F
F	T	T	F
F	F	F	T

(f)

p	q	$q \to p$	$p \to (q \to p)$
T	T	T	T
T	F	T	T
F	T	F	T
F	F	T	T

(g)

p	q	$p \to q$	$(p \to q) \to p$
T	T	T	T
T	F	F	T
F	T	T	F
F	F	T	F

(h)

p	q	$q \to p$	$p \to (q \to p)$	$\sim (p \to (q \to p))$
T	T	T	T	F
T	F	T	T	F
F	T	F	T	F
F	F	T	T	F

Discussion:

Formulas (b) and (d) are equivalent to $\sim p \to q$. Formula (f) is a tautology and formula (h) is a contradiction.

4 Translation [30 pts]

4.1. Rudolf studied neither syntax nor semantics.

$$\sim (\text{study}(\text{r},\ \text{syn}) \vee \text{study}(\text{r},\ \text{sem}))$$

4.2. Breanna and Letitia are enemies.

$$\text{enemy}(\text{b},\ \text{l}) \wedge \text{enemy}(\text{l},\ \text{b})$$

4.3. Leland detests both John and Mary.

$$\text{detest}(\text{l},\ \text{j}) \,\&\, \text{detest}(\text{l},\ \text{m})$$

4.4. Roland adopted a friendly porpoise.

$$\exists x\,[\text{porpoise}(x)\,\&\,\text{friendly}(x)\,\&\,\text{adopt}(\text{r},\ x)]$$

4.5. Roland is a friendly porpoise.

$$\text{porpoise}(\text{r})\,\&\,\text{friendly}(\text{r})$$

4.6. A successor was chosen.

$$\exists x\,[\,\text{successor}(x)\ \&\,\exists y\,[\,\text{choose}(y,\ x)]\,]$$

Passive paraphrase of *Someone chose a successor*. Notice the $\exists y$ which is necessary so we can fill the missing role of the chooser and continue to use the same 2-place *choose* relation associated with the transitive verb.

4.7. Pete mailed every customer a box of chocolate.

$$\forall x[\text{customer}(x) \rightarrow \exists y[\text{box}(y)\ \&\ \text{of}(y,\ \text{chocolates})\ \&\ \text{mail}(\text{p},\ y,\ x)]\,]$$

The reading **not** requested is the one on which all customers got the same box.

$$\exists y[\text{box}(y)\ \&\ \text{of}(y,\ \text{chocolates})\ \&\ \forall x[\text{customer}(x) \rightarrow \text{mail}(\text{p},\ y,\ x)]\,]$$

Here is the step by step derivation of the requested reading, based on identifying the following Noun Phrases *every professor* and *a red apple*. Notice that if you reverse steps (f) and (g) you get the non-requested reading.

a.		Pete mailed $[_{\text{NP}}$ every customer $]_x$ $[_{\text{NP}}$ a box of choc. $]_y$
b.	$[_{\text{NP}}$ every customer $]_x$	Pete mailed x $[_{\text{NP}}$ a box of choc. $]_y$
c.	$[_{\text{NP}}$ every customer $]_x$ $[_{\text{NP}}$ a box of chocolates $]_y$	Pete mailed x y
d.	$[_{\text{NP}}$ every customer $]_x$ $[_{\text{NP}}$ a box of chocolates $]_y$	$\text{mail}(\text{p},\ x,\ y)$
e.	$\forall x$ customer(x) $\exists y$ box(y) & of$(y,$ chocolates$)$	$\text{mail}(\text{l},\ x,\ y)$
f.	$\forall x$ customer(x)	$\exists y\ [\text{box}(y)\,\&\,\text{of}(y,\ \text{chocolates})\,\&\,\text{mail}(\text{p},\ x,\ y)]$
g.		$\forall x\ [\text{customer}(x) \rightarrow \exists y\ [\text{box}(y)\,\&\,\text{of}(y,\ \text{chocolate})\,\&$ $\text{mail}(\text{p},\ x,\ y)\,]\,]$

4.8. No problem was solved by every professor. This is (more or less) the passive of the awkward sentence

Every professor solved no problem.

But there is a difference in meaning between the active and passive versions. The active version seems to say that all the professors batted zero. The passive version says no problem was easy enough to be solved by every professor. Here is the reading that appears right for the passive.

$$\sim \exists x[\text{problem}(x) \,\&\, \forall y[\text{professor}(y) \rightarrow \text{solve}(y,\, x)]\,]$$

4.9. Jack resembles no one I know.

$$\sim \exists x\,[\text{person}(x) \,\&\, \text{know}(\text{I},\, x) \,\&\, \text{resemble}(\text{j},\, x)\,]$$

4.10. The library is adjacent to the rec center.

$$\text{adjacent-to}(\text{l},\, \text{rc})$$

4.11. The library and the rec center are adjacent.

$$\text{adjacent-to}(\text{l},\, \text{rc}) \,\&\, \text{adjacent-to}(\text{rc},\, \text{l})$$

4.12. Canberra is in Australia.

$$\text{in}(\text{c},\, \text{a})$$

4.13. Reggie is Susan's father.

$$\text{father-of}(\text{r},\, \text{s})$$

4.14. John is fond of Mary.

$$\text{fond-of}(\text{j},\, \text{m})\,]$$

4.15. Alex is a student of physics. Two possible answers:

$$\text{student-of}(\text{a},\, \text{physics})$$
$$\text{student}(\text{a}) \,\&\, \text{of}(\text{a},\, \text{physics})$$

The second possibility seems to miss the specificity of the relation between Alex and physics, so let's endorse the first. Generally, both these possibilities will arise when the preposition is *of*, and generally absorbing of into the predicate (as in the first answer) will be safer

4.16. Alex punched a student of physics.

$$\exists x\,[\text{student-of}(x, \text{physics}) \,\&\, \text{punch}(\text{a},\, x)\,]$$