

Physics/Global Studies 180
Nuclear Weapons, Nuclear War,
and Arms Control

Frederick K. Lamb and Jeremiah D. Sullivan

Final Examination
2003 May 12

Name _____

ID No. _____

- This is a closed book examination.
- You have the full class period (180 minutes) to complete it.
- Answer all questions on all eight topics. Each topic is worth 20 points. The point value of each question within a topic is indicated.
- Write your answers in the space provided on these pages. Do not submit any additional pages. (If you need more room, write on the back of the page.)
- For full credit on definitions, give numbers where appropriate.

SCORES

1. _____ 5. _____

2. _____ 6. _____

3. _____ 7. _____

4. _____ 8. _____

TOTAL SCORE _____

0. Acronyms

Decode in one phrase the following acronyms, abbreviations, or code words. [1 point each]

ALCM—

ASAT—

ATBM—

C³I—

EMP—

EMT—

GPS—

MIRV—

NATO—

NORAD—

R&D—

SALT—

SIOP—

SLBM—

SLCM—

START—

TMD—

Triad—

Trinity—

TTBT—

0. Nuclear Arms Control Treaties

Three treaties that limit nuclear testing are listed below. For each treaty—

- Give the year the agreement was signed and state whether the treaty is now in force
 - Describe which nations are parties to the agreement
 - List the key provisions and the duration of the agreement
 - Describe one way compliance with the agreement can be monitored
- Limited Test Ban Treaty (LTBT) [7 points]

Year/in force?

Parties:

Key provisions:

One method of monitoring:

- Second Strategic Arms Reduction Treaty (START II) [7 points]

Year/in force?

Parties:

Key provisions:

One method of monitoring:

- Comprehensive Test Ban Treaty (CTBT) [6 points]

Year/in force?

Parties:

Key provisions:

One method of monitoring:

5. Nuclear Forces of NPT Nuclear Weapon States

(a) U.S. and Soviet Union/Russia [10 points]

- About how many nuclear weapons (strategic and non-strategic) did the United States have when its arsenal peaked?
- About how many did the Soviet Union have when its arsenal peaked?
- About how many does the U.S. have today?
- About how many does Russia have today?
- List the *types of operational* strategic nuclear delivery systems the U.S. and Russia have today (you do not need to name them).

United States:

Russia:

(b) United Kingdom [3 points]

- About how many nuclear weapons does the U.K. have today?
- List the *types of operational* nuclear delivery systems the U.K. has today (don't name them)..

(c) France [3 points]

- About how many nuclear weapons does France have today?
- List the *types of operational* nuclear delivery systems France has today (don't name them).

(d) China [4 points]

- About how many nuclear weapons does China have today?
- List the *types of operational* nuclear delivery systems it has (don't name them)
- Does China have nuclear-capable ballistic missiles that could reach the 48 contiguous U.S. states?

6. Nuclear Forces of Other Known Nuclear Weapon States

(a) India [7 points]

- About how many nuclear weapons does India have today?
- List the *types* of the *operational* nuclear delivery systems India has (don't name them).
- What is the approximate range of the longest-range nuclear-capable ballistic missile India has?
- Is it capable of reaching Pakistan?

(b) Pakistan [7 points]

- About how many nuclear weapons does Pakistan have today?
- List the *types* of the *operational* nuclear delivery systems Pakistan has (don't name them).
- What is the approximate range of the longest-range nuclear-capable ballistic missile Pakistan has?
- Is it capable of reaching India?

(c) Israel [6 points]

- About how many nuclear weapons does Israel have today?
- List the *types* of the *operational* nuclear delivery systems Israel has (don't name them).
- What is the approximate range of the longest-range nuclear-capable ballistic missile Israel has?
- Is it capable of reaching Iran?

7. States of Concern

(a) Iran [8 points]

- About how many nuclear weapons is Iran thought to have today?
- List two recent developments which indicate that Iran is pursuing development of nuclear weapons.
- What is the range of the longest-range nuclear-capable ballistic missile Iran has tested?
- Is it capable of reaching Israel?

(a) North Korea [12 points]

- About how many nuclear weapons is North Korea thought to have today?
- List two recent developments which indicate that North Korea is pursuing development and possible deployment of nuclear weapons.
- What is the range of the longest-range nuclear-capable ballistic missile North Korea has tested?
- Is it capable of reaching the 48 contiguous U.S. states?
- Who signed the "1994 Agreed Framework" and what were its basic provisions?
- What is the United States' current approach to North Korea's nuclear weapons program?

8. Anti-Ballistic Missile (ABM) Weapon Systems

- About when did the U.S. first seriously consider deploying an ABM system? [1 point]
- The U.S. once had an operational ABM weapon system. When was it operational and for how long? Why was it turned off? [3 points]
- What is the stated goal of the current administration's ABM program, according to President Bush? [1 point]
- Define "boost-phase intercept" and list one important technical challenge such a system would have to overcome to be effective against a nuclear attack. [4 points]
- List one potentially effective countermeasure to a boost-phase intercept system. [1 point]
- Define "midcourse intercept" and list one important technical challenge such a system would have to overcome to be effective against a nuclear attack. [4 points]
- List one potentially effective countermeasure to a midcourse intercept system. [1 point]
- Define "terminal intercept" and list one important technical challenges such a system would have to overcome to be effective against a nuclear attack. [3 points]
- List one potentially effective countermeasure to a terminal intercept system. [1 point]