2021 Academic Super Bowl
Senior English
Final Study Guide

The American Woman:
A Century of Progress, 1920-2020

"You don't make progress by standing on the sidelines...You make progress by implementing ideas."

Shirley Chisholm
First African American Woman Elected to Congress

I. Novel - 25%
   a. *The Joy Luck Club* by Amy Tan (ISBN 978-0-14-303809-2)

II. Short Stories— 25%
   a. "A Good Man is Hard to Find" by Flannery O'Connor
https://repositorio.ufsc.br/bitstream/handle/123456789/160332/A%20good%20man%20is%20hard%20to%20find%20-%20Flannery%20O%27Connor.pdf
   b. "The Lesson" by Toni Cade Bambara
https://lukecart.files.wordpress.com/2019/09/the_lesson.pdf
   c. "Everyday Use" by Alice Walker
https://www.acpsd.net/site/handlers/filedownload.ashx?moduleinstanceid=6626&dataid=60620&FileName=everyday_use_full-text.pdf

III. Poetry— 25%
   a. Maya Angelou "Phenomenal Woman"
https://www.poetryfoundation.org/poems/48985/phenomenal-woman
   b. Maya Angelou "Still I Rise"
https://www.poetryfoundation.org/poems/46446/still-i-rise
   c. Lucille Clifton "The Thirty-eighth Year"
https://www.blueridgejournal.com/poems/lc1-thirtyeight.htm
   d. Rita Dove "My Mother Enters the Work Force"
http://www.afropoets.net/ritadove10.html
   e. Adrienne Rich "Planetarium"
https://www.poetryfoundation.org/poems/46568/planetarium-56d2267df376c

IV. Drama— 25%
   a. *A Raisin in the Sun* by Lorraine Hansberry
http://azactorsacademy.com/uploads/plays/a_raisin_in_the_sun.pdf

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Senior Fine Arts
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I. Visual Artists- 50%
   - A. Isabel Bishop
   - B. Louise Bourgeois
   - C. Helen Frankenthaler
   - D. Lee Krasner
   - E. Louise Nevelson
   - F. Georgia O'Keeffe
   - G. Kara Walker
   - H. Kay WalkingStick

II. Musical Artists - 50%
   - A. Laurie Anderson
   - B. Marian Anderson
   - C. Joan Baez
   - D. Amy Beach
   - E. Aretha Franklin
   - F. Julie Giroux
   - G. Billie Holiday
   - H. The International Sweethearts of Rhythm
   - I. Carole King
   - J. Beyonce Knowles
   - K. Florence Price
   - L. Leontyne Price
   - M. Bessie Smith
   - N. Ellen Zwilich

Visual Art Resources:
Encyclopedia.com; Gilcrease Museum; Guggenheim Museum; The Metropolitan Museum of Art; MoMA; Newfields - Indianapolis Museum of Art: Georgia O'Keeffe Museum online; Smithsonian American Art Museum; Springfield Museum; Whitney Museum; Wikipedia;
Note: If you have this book used in 2010 - Hunter, Sam; Jocobus,John; McWheeler, Daniel Modern Art you can consult it, but the relevant material is very brief, and nothing is taken directly from it.

Music Resources:
Wikipedia
https://www.jstor.org/stable/3051947?seq=1#metadata_info_tab_contents
https://www.npr.org/2019/08/05/747738120/how-bessie-smith-influenced-a-century-of-popular-music
https://blogs.loc.gov/folklife/2018/04/marian-anderson-spirituals/

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2021 Academic Super Bowl
Senior Math
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I. Algebra - 20%
   - A. Powers and Roots
     1. Properties of exponents and radicals
     2. Solving Radical Equations
   - B. Absolute Value Equations

II. Analytic Geometry - 24%
   - A. Non-degenerative conics: circle, ellipse, parabola, hyperbola
     1. General Form and Standard Form (Note B = 0, no xy term. No rotations of the coordinate system)
     2. Identify vertices, foci, center, directrix, transverse axis, major axis, minor axis, latus rectum, asymptotes, and eccentricity
   - B. Applications

III. Probability - 32%
   - A. Definitions and Compound Events
   - B. Counting Principles
     1. Fundamental Principle of Counting
     2. Combinations & Permutations
   - C. Conditional Probabilities and Baye's Theorem
   - D. Bernoulli Trials

IV. Programming - 16%
   - A. BASIC - includes Working Through Short Programs
     Use www.dartmouth.edu/basicfifty/basic.html. Download First BASIC Instruction Manual
   - B. FORTRAN
     Use www.softwarepreservation.org/projects/FORTRAN. Then go to the documentation section, the 5th major bullet (Grace Mitchell), Section 1 March 20, 1957, 1-37 pages as a resource for FORTRAN commands to be used. Also do basic research on the history of the first FORTRAN developed, why and by whom.

V. Mathematicians - 8%
   - A. Julia Robinson
   - B. The NASA 3 - Dorothy Vaughan, Katherine Johnson, Mary Jackson
   - C. Grace Hopper
   - D. Elizebeth Friedman

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Senior Science
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I. Chemistry- 33% - American Chemists

A. Bettye Washington Greene (emulsions and colloids)

1. Types/examples of colloids (aerosol, foam, emulsion, gel, sol)
2. Differences between colloids, solutions, suspensions (particle size, characteristics, Tyndall effect, examples)
3. Biographical (education, employment, awards)

B. Esther Conwell (semiconductors)

1. Terminology/Properties of conductors, insulators, semiconductors: extrinsic, intrinsic, energy bands
2. Electronic characteristics of semiconductors and doping materials (particularly N and P types)
3. PN junctions and diodes
4. History of semiconducting industry: vacuum tubes, transistors, LED's, MOSFET's
5. Calculation of energy/wavelength of light required to overcome the band gap in a material using $E = hc/\lambda$ in kJ/mole
6. Biographical (education, employment, awards)

II. Physics - 33%

A. Spectral Classification of Stars (Annie Jump Cannon)

1. Star Temperature Classification Method - O B A F G K M
   a. O stars are hottest and blue while M stars are coolest and red
   b. Ten subcategories are each letter with numerical suffix: 0 - 9 with 0 as hottest
2. Luminosity (or Absolute Brightness or Absolute Magnitude)
   a. Power per unit surface area is proportional to the temperature raised to the 4th power
   b. Stars are spheres, total surface is proportional to the radius of the sphere squared
   c. Luminosity is proportional Total Surface Area times Power per Area $L \propto R^2T^4$
3. Peak Wavelength is inversely proportional to the temperature of the star

B. Nuclear Shell Theory (Maria Goeppert Mayer)

1. Nucleon Quantum Numbers:
   a. Orbital Angular Momentum (0, 1, 2, 3, 4...) represented by s, p, d, f, g...
   b. Spin-Orbit coupling represented by Orbital Angular Momentum +/- 1/2
   c. There is no principal quantum number, just an integer associated with the appearance of the orbital angular momentum quantum number. For example: 1 g is a possible nucleon quantum number and spin orbit coupling would show two levels for 1g as $1g_{7/2}$ and $1g_{9/2}$
2. Nucleons are fermions obeying Pauli Exclusion Principle: no two nucleons may have the same quantum numbers
3. Filled shells are possible for protons (Z) or neutrons (N) or both as exclusion principle requires
4. Filled shells are associated with Magic Numbers: 2, 8, 20, 28, 50, 82, 126
5. Isotopes with magic numbers of protons and neutrons are doubly magic
6. Stable vs. Radioactive Isotopes: Magic number isotopes are most stable

III. Biology - 33%

A. Barbara McClintock and the "Jumping Genes"*

1. McClintock Science Biography
2. "Jumping Genes:" Transposable Elements or Transposons

*Requires brief overview of DNA & chromosome structure & function

B. Viruses

1. General Features & Structures
2. Classification of viruses
3. Virus Life Cycles
4. Selected Virus Families (with examples) Important to Humans:
   Classification/Structure, Life Cycle, Importance)
   a. Adenoviridae (adenoviruses, "common cold")
   b. Coronaviridae (SARS-CoV-2 [cause of Covid-19], MERS, common cold)
   c. Flaviviridae (yellow fever virus, Dengue virus, hepatitis C virus, Zika virus)
   d. Orthomyoviridae (Influenza viruses)
   e. Paramyoviridae (measles virus, mumps virus)
   f. Phaginae (Bacteriophages that attack bacteria)
   g. Picornaviridae (poliovirus, rhinovirus [common cold])
   h. Poxviridae (smallpox virus, vaccinia virus)
   i. Retroviridae (HIV)
5. Vaccines: basic principles of making and using vaccines

IV . Earth & Environmental Sciences

A. Rachel Carson and "Silent Spring"

1. Carson Science Biography
2. Main Points of "Silent Spring:" Carson's premise, analysis, and predictions
3. Impact of Carson's work and writing in Environmental awareness and U.S. policy

B. Energy & Nutrient Movement through ecosystems

C. Bioaccumulation & Biomagnification in Ecosystems (with a concentration on use of pesticides in agriculture and in human health systems)

RESOURCES:

https://images.search.yahoo.com/yhs/search?p=emulsions&fr=yhs-iba-syn&hspart=iba&hsimp=yhs-syn&imgurl=https%3A%2F%2Fi.ytimg.com%2Fvi%2FbC_czAL24zY%2Fmaxresdefault.jpg#id=13&iurl=https%3A%2F%2Fi.ytimg.com%2Fvi%2FDnwC8t8aCAQ%2Fmaxresdefault.jpg&action=click

https://www.differencebetween.com/difference-between-colloid-and-emulsion/

https://www.tutorialspoint.com/semiconductor_devices/semiconductor_devices_introduction.htm

typical text books for AP Chemistry or regular high school chemistry and physics texts.

references continued on next page....

Chemistry Resources: (used by question writer but not required for purchase, research can be done through any reputable website or high school/college textbooks)
Holt Physics ISBN-10: 9780030368165 / ISBN-13: 978-0030368165

Chemistry. Chang / Goldsby. ISBN: 978-0-07-802151-0

Chemistry & Chemical Reactivity. Kotz / Trechel / Townsend.
Student Edition: ISBN-13: 978-0-495-38703-9 / ISBN-10: 0-495-38703-7

Chemistry. Zumdahl (eighth ed.)
Student copy ISBN: 978-1-111-57734-6 ISBN-13: 978-0-547-16826-5 ISBN-10: 0-547-16826-8

Chemistry AP edition (13th ed). Brown / LeMary / Bursten
ISBN-13: 978-0-321-91011-7 ISBN-10: 0-321-91041-9

Chemistry. Silberberg. ISBN: 978-1-259-63175-7

Physics Resources: http://alevelphysicsnotes.com/astrophysics/black_body_rad.htmlPeak
http://spiff.rit.edu/classes/phys230/lectures/spec_interp/spec_interp.html
https://astro.unl.edu/naap/hr/hr_background1.html
Most introductory astronomy text books discuss all of these matters

References: http://hyperphysics.phy-astr.gsu.edu/hbase/Nuclear/shell.html
http://hyperphysics.phy-astr.gsu.edu/hbase/Nuclear/nstate.html#c1
http://hyperphysics.phy-astr.gsu.edu/hbase/Nuclear/nucnot.html#c2
https://www.periodic-table.org/what-is-nuclear-shell-model-shell-model-of-nucleus-definition/

Biology resources coming soon

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Women's Suffrage

I. Successful and Unsuccessful efforts before the 19th Amendment - 5%

II. Congressional Passage of the 19th Amendment and States' Responses - 10%

III. Ratification of the 19th Amendment by Tennessee - 75%
- A. Political Context
- B. Advocates of Ratification
- C. Opponents of Ratification
- D. Political Strategies and Tactics
- E. Impact of Influenza Pandemic

IV. Aftermath of Ratification - 5%

V. Women's Suffrage Chronology - 5%

Source:

The Woman's Hour: The Great Fight to Win the Vote by Elaine Weiss

The Woman Suffrage Amendment by Don Hanlin (supplied)

Rightfully Hers: Woman Suffrage Before the 19th Amendment by Vincent Bartholomew, The National Archives (pdf of article supplied with conference materials or available at https://prologue.blogs.archives.gov/2019/08/15/rightfully-hers-woman-suffrage-before-the-19th-amendment/

How the Spanish Flu Almost Upended Women's Suffrage by Alisha Haridasani Gupta (New York Times, April 28, 2020) https://www.nytimes.com/2020/04/28/us/spanish-flu-womens-suffrage-coronavirus.html?searchResultPosition=1

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