

Midterm #2, Topics 1

Nuclear particles: *protons, neutrons, electrons, alpha particles, neutrinos.*

Nuclear fusion

Astronomers: *antiquity, renaissance, modern era (late 1800s to present).*

Astrolabe –ancient instrument

Refractive Telescopes

Reflecting Telescopes: *Single mirror, segmented, liquid, interferometric, space, radio.*

Diffraction & angular resolution

Adaptive optics, CCD cameras

Space probes & instruments

Structure of the Solar System

Density of planets

Solar nebula hypothesis

Density of materials: *liquids, ices, rocks, metals.*

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Differentiation, planet structure

Planetesimals, frost line

Why do planet lie in orbital disk?

Radioactive dating: *half life, exp. decay.*

Crater counting dating

Earth's structure

Element abundances

Tectonic plates

Magnetosphere

Aurora

Atmosphere: structure, composition

Greenhouse effect

Temperature of the Earth, ice core dating

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Temperature of the Earth, ice core dating

Blackbody radiation

Light pressure

Photon energy, photon momentum

Doppler shift

Midterm #2 Topics, 1

Mars, Venus, Mercury

Basic properties

Moons

Surface features

Internal structure

Atmosphere

Water

Icy gas giants

Atmosphere

Internal Structure

Wind & storms

Magnetosphere

Jupiter

Atmosphere

Magnetosphere

“Vacuum cleaner”

Thermal emission

Galilean moons: Io, Europa,

Ganymede, Callisto

Composition

Tidal locking, heating

Saturn

Rings, composition, origin

Shepherd moons

The Roche limit

Titan

Uranus

Rotation

Neptune

Discovery

Asteroids

Composition, origin

Ceres

Lagrange points

Dwarf planet

Definition (vs planet)

Pluto, Eris, Sedna, etc

Oort cloud

Comets

Origin, composition

Gas tail, dust tail

Dust trail, meteorites

Exoplanets

Detection methods

Properties

Life in Solar System ?

Definition, properties

Hardy, simple lifeforms

Mars, Europa, Enceladus

Midterm Format

- 4 questions (or if two are really easy then 5 questions)
- Mix of quantitative and qualitative questions
- Time: 9 am – 9:50 am
- I will send you the PDF with the midterm questions at 9 am (via Blackboard and e-mail).
- You must upload your answers in PDF to Gradescope (same as homework).
- Submission window closes at 10 am.
- Answer each question on a separate piece of paper(s) – same as homework. You do not need to print out the test.
- Write legibly. Points will be taken off for messy and unreadable test answers.
- Take a picture of each answer for submission to Gradescope (same as homework).

Midterm Rules

- Closed book test.
- No internet searches ... No internet usage.
- No phones, except for taking photos of your test (after 9:50 am)
- No use of course website, Blackboard course notes, or OpenStax Astronomy book.
- Calculator recommended (with trig functions).
- **Proctoring:** The midterm will be taken during a Zoom session. You must have your **webcamera ON** so that I can see you, i.e. you should not be working at your computer, but instead working with pen and paper on your test. Please remove any digital backgrounds on Zoom.