

Final Quiz – ESS 495

Closed book/Closed Notes

Make sure to put your full name and student number on your answer sheet.

You must get at least **14 answers** correct to receive credit for the course.

- 1) Approximately what are the lowest and highest possible masses for a star? A
 - a) Min = 0.8 times the mass of the Sun and max = 150 times the mass of the Sun
 - b) Min = 0.5 times the mass of the Sun and max = 50 times the mass of the Sun
 - c) Min = 0.1 times the mass of the Sun and max = 100 times the mass of the Sun

- 2) Why is the Hubble Space Telescope used for observing a lot of stars and not just a ground based telescope? B
 - a) HST has a bigger mirror than ground based telescopes
 - b) UV light from stars can't be seen on earth
 - c) It's better to have Optical, UV, and IR images from the same telescope

- 3) What is NOT one thing that we can learn by modeling the Color-Magnitude diagram of a galaxy? C
 - a) The history of star formation of the galaxy
 - b) The distance to the galaxy
 - c) If there is a black hole in the center of the galaxy
 - d) The ages of stars in the galaxy

- 4) Which is NOT a class of meteorites? B
 - a) Chondrite
 - b) Metamorphic
 - c) Stony Achondrite
 - d) Iron Achondrite

- 5) How do meteorites form? C
 - a) Capture of interstellar dust
 - b) Breaking apart of comets
 - c) Impact ejection during planet formation

- 6) What is NOT one of the scientific techniques we use to study meteorites? D
 - a) Visually observing hand samples
 - b) Microscope observations
 - c) Telescope observations
 - d) Crushing samples

- 7) Why does the Earth not show clear evidence of impacts, as the Moon does? A
 - a) Removal of impacts by weathering on the Earth
 - b) The Moon is older than the Earth
 - c) The Moon formed in a different region in space than the Earth

- 8) What is NOT a piece of evidence that there was a major impact at the end of the Cretaceous geological period? B
- a) The iridium layer in sediment
 - b) The extinction of the dinosaurs
 - c) Remnants of an impact crater, including shocked quartz grains.
- 9) What is a tsunami? B
- a) A tidal wave
 - b) A wave generated by an earthquake or landslide
 - c) The wave generated by a ship
- 10) When was Hans Bethe awarded his Nobel Prize? (and what was it awarded for?) C
- a) 1933 (Quantum Mechanics)
 - b) 1938 (Neutrinos)
 - c) 1967 (Nucleosynthesis)
- 11) Which other Nobel Prize winner pioneered lab plasma physics? A
- a) Hannes Alfvén
 - b) Niels Bohr
 - c) Enrico Fermi
- 12) What is the name given to one of the simplest fusion-relevant plasma devices? D
- a) Supercollider
 - b) Linear accelerator
 - c) Jelly jar
 - d) Spheromak
- 13) What is the main source of energy for a hurricane? C
- a) Rotation
 - b) Cold, dry air
 - c) Warm, moist air
- 14) A secondary eyewall in a hurricane forms _____ the main eye wall. A
- a) outside
 - b) inside
- 15) Which of the following is NOT a possible reason for global climate change? D
- a) Orbital variations
 - b) Increased volcanic activity
 - c) Decreased ocean circulation
 - d) Increased greenhouse gas absorption of short wave radiation
 - e) Both b and d

- 16) What is NOT a theorized causes for the PETM (Paleocene-Eocene Thermal Maximum)? B
- a) Burning of Paleocene peats
 - b) Comet impact
 - c) Magma intruding into and causing degassing of organic-rich sediments
 - d) Methane hydrate release
- 17) What methods are used to determine the onset of the PETM in terrestrial (continental) sections? E
- a) Oxygen isotope excursion in foraminifera
 - b) Carbon isotopes in terrestrial organic carbon
 - c) *Platycarya* index pollen
 - d) Both a and b
 - e) Both b and c
- 18) What is the solar wind? A
- a) The extension of the solar atmosphere into interplanetary space
 - b) The flux of photons coming from the Sun
 - c) Large eruptions of material being thrown off the Sun
- 19) What is NOT part of the STEREO mission? C
- a) Monitor the solar wind
 - b) Observe explosions in the Sun's atmosphere
 - c) Travel inside Mercury's orbit to observe the Sun upclose
 - d) Observe the Sun from two different viewpoints
- 20) What is a characteristic that we observe from the Sun? E
- a) Magnetic field
 - b) X-rays
 - c) Sunquakes (i.e. vibrations of the interior and surface)
 - d) Visible light
 - e) All of the above
- 21) What is NOT a way were measure Saturn's rotation rate? B
- a) Motion of the clouds
 - b) Using geologic features as reference points
 - c) Periodic variations in the radio emissions from the planet
- 22) The plasma in Saturn's magnetosphere is dominated the most by which of the following? B
- a) Gas flowing off of Titan
 - b) The rotation of Saturn
 - c) A torus of heavy ions from its moon Io
 - d) Orbital resonance of Saturn's moons

- 23) The Hubble Space Telescope and the Cassini spacecraft both observed Saturn in January 2004, before Cassini had arrived at Saturn. What was the main point of having this "cooperative campaign"? A
- a) To correlate changes in the aurora at Saturn with changes in the solar wind.
 - b) To view the aurora at Saturn from two different angles.
 - c) To get long term observations of Saturn.
- 24) By observing changes in how blue the distant Earth appeared, NASA's EPOXI mission was able to produce a crude map of what? D
- a) Earth's vegetation
 - b) Earth's cloud patterns
 - c) Earth's radio transmitters
 - d) Earth's oceans
- 25) When the Galileo spacecraft observed Earth in the early 1990s, it detected pulses of radio signals from the planet. What were the sources of these signals? C
- a) Lightning strikes
 - b) Cosmic ray showers
 - c) AM radio transmitters
- 26) True or False - The methods we primarily use to detect exoplanets, at best, provide us with a mass and size (radius) of the planet. This is enough information to determine if the world is truly Earth-like (similar temperatures on the surface, oceans of liquid water, etc.) B
- a) True
 - b) False
- 27) Which world in the Solar System most closely resembles the majority of the more than 500 exoplanets that have been discovered to date (especially with regard to mass and size)? D
- a) Earth
 - b) Neptune
 - c) Saturn
 - d) Jupiter
- 28) Have we detected any worlds with the same mass and size as Earth? B
- a) Yes
 - b) No