

2024 Final Exam

- Due May 6 at 9:45pm
- Points 100
- Questions 25
- Available May 6 at 7pm - May 6 at 9:45pm 2 hours and 45 minutes
- Time Limit 165 Minutes

Instructions

Closed book; single sheet of notes. Exam runs from 5/6, 7pm - 9:45pm.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	36 minutes	100 out of 100

⚠️ Correct answers are hidden.

Score for this quiz: 100 out of 100

Submitted May 6 at 7:37pm

This attempt took 36 minutes.



Question 1

2 / 2 pts

The period of rotation of the Earth about the Sun, Perihelion to Perihelion, is called a _____ year.

- ☐ Sidereal
- ☒ anomalous
- ☐ Tropical



Question 2

2 / 2 pts

Meteoroid sporadic flux is:

- ☐ particles from Mars
- ☒ Uniform particle distribution
- ☐ caused by Jupiter's gravitation
- ☐ sourced directly from Asteroids



Question 3

2 / 2 pts

What is the Solar Wind escape velocity (m/s) for a star with the following characteristics? Radius = 10.5×10^6 Km; Mass = 8.20×10^{21} Kg

- ☒ 10.21 m/s
- ☐ 304.2 m/s
- ☐ 22.28 m/s
- ☐ 102.1 m/s



Question 4

2 / 2 pts

Given a gas sample at a pressure of 6.34 Atm consisting of 1.39 moles total; 0.50 moles is Nitrogen (N_2). What is the partial pressure (Atm) of Nitrogen in this sample?

- ☐ 3.170
- ☒ 2.280
- ☐ 2.820
- ☐ 1.934



Question 5

2 / 2 pts

The Heliopause is defined as the region beyond the Heliosphere, where the Solar Wind becomes subsonic.

- ☒ True
- ☐ False



Question 6

4 / 4 pts

What is the MJD for May 6, 2024?

- ☐ 59985
- ☒ 60435
- ☐ 60125
- ☐ 60065



Question 7

2 / 2 pts

At 100 Km, the Karman Line defines the edge of Space. In what part of the Earth's Atmosphere is the Karman Line located?

- ☐ Stratosphere
- ☒ Thermosphere
- ☐ Exosphere
- ☐ Mesosphere



Question 8

2 / 2 pts

The concept of Jupiter moving inwards towards the Sun and being pulled back out by Saturn is known as the:

- ☐ Kepler Planetary Syndrome
- ☒ Grand Tack Theory
- ☐ Late Heavy Bombardment
- ☐ Hot Jupiter Theory



Question 9

2 / 2 pts

In a plasma, the length where the electron cloud charge vs. the central proton mass drops by $1/e$ is called the

- ☒ Debye Length
- ☐ Plasma pressure
- ☐ mean plasma anomaly
- ☐ Scale Height



Question 10

2 / 2 pts

The reference surface pressure of Neptune is

- ☐ 1/2 the Scale Height
- ☐ 10 Atmospheres
- ☒ 1 Bar
- ☐ 1000 PSI



Question 11

2 / 2 pts

Assume you are in a stable Geostationary orbit with a Debye length of 100m. What is the generalized Plasma Parameter (meters)?

- ☒ 4.19x10e13
- ☐ 5.44x10e12
- ☐ 4.02x10e13
- ☐ 6.31x10e13



Question 12

4 / 4 pts

What is the Range Error (m) for a 150 MHz transmission to a satellite at 300Km altitude? assume a TEC of 3×10^{15} .

- ☐ 8.650m
- ☒ 5.375m
- ☐ 5.650Km
- ☐ 18.375m



Question 13

2 / 2 pts

A large volume of plasma, with a structured magnetic field, coming from the Sun over the course of several hours is called a

- ☐ Class X solar flare
- ☐ Bad day for the ISS
- ☐ Spiracle
- ☒ Coronal Mass Ejection



Question 14

2 / 2 pts

Within Earth's Magnetosphere, the boundary where the Solar Wind plasma slows to subsonic speed is called the

- ☐ Magnetocoil
- ☒ Bow Shock
- ☐ Heliopause
- ☐ Trailing Lobes



Question 15

4 / 4 pts

Spacecraft Charging within a plasma or Ionospheric environment can be

- ☐ Absolute only
- ☐ neither Absolute nor Differential
- ☒ either Absolute or Differential
- ☐ Differential only



Question 16

6 / 6 pts

The Total Meteoroid Flux is given by

- ☐ the daily NMS prediction
- ☐ the base Sporadic population average
- ☒ a combination of Sporadic population and one or more streaming populations
- ☐ the sum of the current streaming populations



Question 17

6 / 6 pts

In 2010, seven guidelines for Orbital Debris Mitigation were adopted by which governing body or bodies?

- ☐ NASA and the ESA
- ☐ NASA
- ☒ United Nations
- ☐ NATO



Question 18

8 / 8 pts

The impact energy of a 1 cm dia sphere of aluminum moving at 80Km/s is approximately equal to

- ☒ 1 Kg of TNT
- ☐ a GCR impact
- ☐ 10 Kg of TNT
- ☐ 5 Kg of TNT



Question 19

4 / 4 pts

A multi-layer standoff meteoroid shield design that trades mass for bulk is commonly referred to as

- ☐ a Good Idea
- ☐ an ISS Barrier
- ☐ an Ablative Shield
- ☒ a Whipple Shield



Question 20

6 / 6 pts

Which is **not** a common Cleanliness Level assessment technique?

- ☐ Tape Lifts
- ☐ Optical Microscopy
- ☐ Visual Inspection
- ☐ Quartz Crystal Microbalance measurements
- ☒ Scalpel Scrapings



Question 21

4 / 4 pts

Which of these will stop penetration by a GCR?

- ☐ 5 cm Titanium
- ☐ 5 cm 6065 Al
- ☐ 3 cm Gold
- ☒ Nothing.
- ☐ Whipple Shield



Question 22

6 / 6 pts

Which of these manifests itself as a non-destructive bit-flip in digital memory?

- ☐ Single Event Transient
- ☐ Single Event Functional Interrupt
- ☒ Single Event Upset
- ☐ Single Event Burst Error



Question 23

10 / 10 pts

What is the Secular Right Ascension of the Ascending Node (in Deg/Day) for the ISS, in a circular orbit orbit of 400 Km and an inclination of 51.6 deg?

- ☐ -3.78 deg/day
- ☐ +2.23 deg/day
- ☐ -5.86 deg/day
- ☒ -5.00 deg/day



Question 24

8 / 8 pts

What is the Heat Flux Density in Watts/m² at 1.5 AU?

- ☒ 607.17
- ☐ 485.80
- ☐ 912.81
- ☐ 844.21



Question 25

6 / 6 pts

Which Orbits share a common inclination of 63.43 degrees?

- ☒ Tundra and Molniya
- ☐ Sun Synchronous and Geostationary
- ☐ Tundra and Polar Retrograde
- ☐ Molniya and ISS

Quiz Score: 100 out of 100