

Name: _____

Intro Astro Lab Prep Quiz: Lab 2: The Sky

Instructions: There are 10 multiple-choice problems each worth 10 marks for a total of 100 marks altogether. Choose the **BEST** answer, completion, etc., and **DARKEN** fully the appropriate circle on the table provided below. Read all responses carefully. **NOTE** long detailed responses won't depend on hidden keywords: keywords in such responses are bold-faced capitalized.

This is a 10 minute quiz.

Answer Table for the Multiple-Choice Questions

	a	b	c	d	e		a	b	c	d	e
1.	O	O	O	O	O	6.	O	O	O	O	O
2.	O	O	O	O	O	7.	O	O	O	O	O
3.	O	O	O	O	O	8.	O	O	O	O	O
4.	O	O	O	O	O	9.	O	O	O	O	O
5.	O	O	O	O	O	10.	O	O	O	O	O

001 qmult 00200 1 4 2 easy deducto-memory: celestial sphere defined

1. "Let's play *Jeopardy!* For \$100, the answer is: It is an imaginary sphere centered on the Earth, set at infinity, and used to project all astronomical objects on for mapping."

What is the _____, Alex?

- a) celestial globe b) celestial sphere c) celestial cube d) Boundless
e) sphere of the fixed stars

SUGGESTED ANSWER: (b)

Wrong answers:

- d) This is Anaximander's (c.610–c.546 BCE) principle or substance for all things.
e) This is the historical ancestor of the modern celestial sphere.

Redaction: Jeffery, 2013jan01

002 qmult 00112 1 1 4 easy memory: north pole not on the celestial sphere

2. Which of the following is **NOT** on the celestial sphere?

- a) celestial equator b) north celestial pole c) celestial meridian d) north pole
e) ecliptic

SUGGESTED ANSWER: (d)

In this context, the north pole is that place where the Earth's axis intersects the Earth's surface.

Wrong answers:

- c) The meridian is on the celestial sphere. It sweeps along with the Earth's rotation.

Redaction: Jeffery, 2013jan01

002 qmult 00120 1 1 3 easy memory: rotation on celestial axis

3. From the Earth-at-rest perspective, the celestial sphere rotates _____ on the _____ once per _____.

- a) westward; celestial axis; civil day b) eastward; celestial axis; sidereal day
c) westward; celestial axis; sidereal day d) westward; celestial equator; sidereal day

e) eastward; celestial equator; civil day

SUGGESTED ANSWER: (c)

Wrong answers:

e) Everything is wrong.

Redaction: Jeffery, 2013jan01

002 qmult 00170 1 1 3 easy memory: celestial globe defined

4. The celestial sphere mapped onto a spherical surface is a:

- a) sky globe b) celestial sphere c) celestial globe d) celestial glove
e) terrestrial globe

SUGGESTED ANSWER: (c)

Wrong answers:

a) A reasonable guess.

e) Exactly wrong.

Redaction: Jeffery, 2013jan01

002 qmult 00200 1 1 1 easy memory: equatorial coordinate system

5. The equatorial coordinate system for the celestial sphere is analogous to the _____ for the Earth.

- a) geographical coordinate system b) horizontal coordinate system c) constellation system
d) galactic coordinate system e) GPS system

SUGGESTED ANSWER: (a)

Wrong answers:

e) Oh, c'mon.

Redaction: Jeffery, 2013jan01

002 qmult 00270 1 4 5 easy deducto-memory: equatorial coords and precession

6. "Let's play *Jeopardy!* For \$100, the answer is: These coordinates depend on time because of the Earth's axial precession."

What are _____, Alex?

- a) longitude and latitude b) horizontal coordinates c) local coordinates
d) Cartesian coordinates e) equatorial coordinates

SUGGESTED ANSWER: (e)

The equatorial coordinates are defined using the Earth's axis and equator projected onto the celestial sphere. The axial precession causes the earth's axis and equator to shift relative to distant galaxies which define a state of rotational rest in modern cosmology. Thus the equatorial coordinates shift with time and for precise work need to be updated at least every 10 years.

The constellation zones on the sky also change with time apparently though Wikipedia fails to elucidate why. If you attached them to the particular celestial coordinates, they would gradually over centuries drift off their constellations just as the zodiac signs have drifted off their constellations. This seems not to have been done. If you attached them to fixed points defined by the non-rotating frame of distant galaxies, then their borders would change from "straight" right ascension and declination lines. This seems not to have been done either. So what has been done? Wikipedia bails on this one.

Wrong answers:

a) As Lurch would say AAAARGH.

b) These depend on time, but principally because of the Earth's daily rotation, not because of the axial precession.

c) The horizontal coordinates are generically local coordinates, but they are not called "local coordinates" ordinarily.

Redaction: Jeffery, 2013jan01

002 qmult 00300 1 4 5 easy deducto-memory: horizontal coordinates justified

7. "Let's play *Jeopardy!* For \$100, the answer is: These coordinates are most useful for locating objects on the celestial sphere at one instant in time at one place on Earth."

What are _____, Alex?

- a) moral coordinates b) longitude and latitude c) Cartesian coordinates
d) equatorial coordinates e) horizontal coordinates

SUGGESTED ANSWER: (e)

Wrong answers:

- a) There'd be moral relativism in this case.

Redaction: Jeffery, 2013jan01

002 qmult 00320 1 4 2 easy deducto-memory: altitude defined

8. "Let's play *Jeopardy!* For \$100, the answer is: It is the angular coordinate of the horizontal coordinate system that is measured from the horizon along a great circle that passes through zenith."

What is _____, Alex?

- a) polar angle b) altitude c) height d) azimuth e) algol

SUGGESTED ANSWER: (b)

Wrong answers:

- e) Algol is β Persei. The name means the Ghoul.

Redaction: Jeffery, 2013jan01

002 qmult 00350 1 1 1 easy memory: azimuths of meridian transits

9. In the northern hemisphere north of the tropics, a meridian transit of the Sun occurs at azimuth _____ (as one would usually record it) and in the southern hemisphere south of the tropics, at azimuth _____ (as one would usually record it).

- a) $180^\circ; 0^\circ$ b) $0^\circ; 180^\circ$ c) $90^\circ; 270^\circ$ d) $0^\circ; 0^\circ$ e) $180^\circ; 180^\circ$

SUGGESTED ANSWER: (a)

Recall azimuth is measured eastward from due north along the horizon line to the altitude line to the object.

Wrong answers:

- b) This would require using altitudes of over 90° . One can do it, but it is not as one would usually record them.

Redaction: Jeffery, 2013jan01

002 qmult 00364 1 1 3 easy memory: SCP direction for Las Vegas

10. The general formula for altitude along the meridian is

$$A_{N/S} = 90^\circ + (\pm)_{N/S}(L - \delta)$$

where N/S means measured from due north/south, $(\pm)_{N/S}$ means plus/minus for measured from due north/south, L is latitude counted positive/negative for north/south latitude, and δ is declination.

The declination of the south celestial pole (SCP) is -90° and in Las Vegas the latitude is approximately 36° N. For Las Vegas, what is the altitude of the SCP from due south and is it above, on, or below the horizon?

- a) 0° ; on the horizon. b) 24° ; above the horizon. c) -36° ; below the horizon
d) 54° ; above and below the horizon. e) -90° ; below the horizon.

SUGGESTED ANSWER: (c)

Behold:

$$A_S = 90^\circ - [36 - (-90^\circ)] = -36^\circ$$

which is below the southern horizon.

Wrong answers:

- a) You are on the equator.
- e) You are at the North Pole.

Redaction: Jeffery, 2013jan01