Astronomy 104, Spring 2025

Test 1

Print your name:

_____

Make sure your scantron has your name and code on it.

Show a picture ID,
and
turn in the test paper with the scantron.

It is advisable but not required
to fill in the answers on the test paper.

Answer these questions on the scantron as indicted:

1 **Answer E**
2 **Answer A**
3 **Answer B**

4 What is in the Picture 7?

A: An open cluster.

B: A planetary nebula.

C: A supernova remnant.

D: A galaxy.

E: A diffuse nebula.

5 How far is the closest star, and what is its name? (Exclude the Sun.)

A: The Andromeda galaxy, 270 arc minutes.

B: Polaris, 100 light years.

C: Venus, 0.3 AU.

D: Proxima Centauri, 4 light years.

E: Alpha Centauri, 150 million km.

6 The whole universe is build up of …'s. (Provide the name of the type of objects.)

A: Star clusters.

B: Planets.

C: Stars.

D: Galaxies.

E: Gas clouds.

7 Where in the Galaxy is the Sun?

A: The Sun is not in the Galaxy at all.

B: At the center of the Galaxy.

C: 20,000 light years from the center, between two spiral arms.

D: At the outer edge of the galaxy.

E: 20,000 light years from the center, inside a spiral arm.

8 What is a parsec?

A: The time light takes to cross the solar system.

B: A very long time. The solar system is almost 5 parsecs old.

C: The time light takes to arrive from the Sun to Earth.

D: A unit of distance. The parallax of a star at 1 parsec is 1 arc second.

E: The angle the closest star moves in the sky in one year.

9 How large is the Universe?

A: 14 billion light years.

B: 4.5 billion light years.

C: 1.0 arc minutes.

D: 200,000 km.

E: 150 million km.

10 What is a globular cluster?

A: a large galaxy that has no spiral arms.

B: a collection of ~ 100,000 old stars.

C: a loose, desintegrating collection of young stars.

D: a globe-shaped nebula of gas and dust.

E: a star with a large collection of planets orbiting around it.

11 How many stars are brighter than 5 magnitudes?

A: Millions.

B: Three.

C: Two hundred.

D: None.

E: Five thousand.

12 How far is the farthest constellation?

A: This question is nonsense.

B: 4 light years.

C: 14 billion light years.

D: 750 light years.

E: 150 million kilometers.

13 How is the motion of charged particles restricted by the magnetic field of Earth?

A: Charged particles do not interact with magnetic field lines but move on straight.

B: Charged particles are reflected by field lines back into space.

C: Charged particles cancel out the magnetic field lines of Earth.

D: Charged particles are slowed and stopped by magnetic field lines.

E: Charged particles closely follow magnetic field lines.

14 If the Sun were covered all in sunspots, how would it appear?

A: Much hotter, brighter and redder than it is now.

B: Much hotter, brighter and whiter than it is now.

C: Still very bright and hot, but dimmer than now and red in color.

D: Dark and almost unnoticeable in the sky.

E: As dim as the full Moon, red.

15 Why can we not see spectacular views of nebulae and galaxies in a telescope?

A: Because they are all exceedingly faint.

B: Because their light is obscured by interstellar dust.

C: Because they all radiate in invisible (IR) light only.

D: Because they are all too small.

E: Because they are all too far to see.

16 What is in Picture 2?

A: A sunspot.

B: A hot solar granule.

C: A hot cloud of gas hovering over a sunspot area (called 'facula').

D: A solar prominence.

E: A solar flare.

17 What is an astronomical unit, and how many km's is it?

A: 1 AU is the size of the observable Universe, 14,000,000,000 light years.

B: 1 AU is the distance to the center of the Galaxy, equals 150,000,000 km.

C: 1 AU is the distance from Earth to Moon, equals 400,000 km.

D: 1 AU is the distance from the Sun to Earth, equals 150,000,000 km.

E: 1 AU is the circumference of the equator, equals 150,000,000 km.

18 How is a planetary nebula different from a supernova remnant?

A: A planetary nebula is millions of times larger than a supernova remnant.

B: A planetary nebula is not an explosion but a continuous blow-off of gas from a star.

C: A planetary nebula is the birthplace of stars, a supernova remnant is a blown-up star.

D: A planetary nebula is in our galaxy, a supernova remnant must be in other galaxies.

E: A planetary nebula is in the empty space outside galaxies, supernova remnants are in the centers of galaxies.

19 In the Sun, what can you say about the motion of magnetic field lines relative to matter?

A: Magnetic field lines are frozen into the matter of the Sun, they can only move together.

B: Matter crossing magnetic field lines gets heated up.

C: Matter crossing magnetic field lines also gets magnetized.

D: Magnetic field lines attempt to sink, while hot matter tries to move up.

E: There is no magnetic field in the Sun.

20 What is absolute brightness?

A: The brightness of the star as we see it in the sky.

B: The calculated brightness of a star, as observed from a distance of 10 pc.

C: The brightness of the star as observed outside the atmosphere.

D: The brightness the star would have if it was located at 1AU, where the Sun is now.

E: The calculated brightness of the star with invisible light forms added.

21 What is a planetary nebula?

A: The result of the explosion of a star.

B: The result of a supernova explosion.

C: A star with a very strong stellar wind.

D: A gas cloud around a planet.

E: A star with a planet that is forming now.

22 How large is a globular cluster?

A: 10 - 100 light years.

B: 10 billion light years.

C: 100,000 light years.

D: 10 astronomical units.

E: 10,000 kilometers.

23 What is distance modulus?

A: The distance to the star expressed in parsecs.

B: The amount of change in the color of the star due to distance.

C: The ratio of the distance to a star to the distance to the Sun.

D: The difference between apparent and absolute magnitude.

E: The amount of starlight lost due to interstellar dust between us and the star.

24 Where in the Sun is there heat production?

A: Only in the core.

B: Only in the photosphere.

C: Nowhere: the Sun is only hot because is cooling off.

D: Only in the convection zone.

E: Everywhere inside.

25 What is aurora?

A: Sunlight is reflected in interplanetary dust particles.

B: The upper atmosphere glows due to extreme solar heating.

C: The light of the rising/setting sun scattered in the atmosphere.

D: Sunlight reflected in very high elevation clouds.

E: Fluorescing air due to charged particles from the Sun.

26 Can we see a 21 mg star with the naked eye?

A: No, because it is too far.

B: Barely.

C: No, because it is too small.

D: Yes, it looks very bright.

E: No, because it is too faint.

27 Sirius, the Dog Star, has its parallax measured as 0.33 arc seconds. How far is it?

A: 0.33 light years.

B: 1 million light years.

C: 100 light years.

D: 3 parsecs.

E: 5 AU's.

28 How old is the Universe?

A: 14 billion years.

B: 6,000 years.

C: 4.5 billion years.

D: infinitely old.

E: 65 million years.

29 Which constellation is closest to us, and how do we know?

A: Orion is closest because it contains the brightest stars in the sky.

B: All constellations are in the sky, consequently at the same distance.

C: The Andromeda Galaxy is the closest constellation, except for a few small irregulars.

D: This question is nonsense because the distance to constellations changes as Earth revolves around the Sun.

E: This question is nonsense because constellations are not real objects.

30 What is in Picture 6?

A: A supernova remnant.

B: An open cluster.

C: A planetary nebula.

D: A galaxy.

E: A diffuse nebula.

31 How long does a planetary nebula live?

A: 10 billion years.

B: A few hundred million years.

C: A few years.

D: 10-20 thousand years.

E: A few million years.

32 What heats the Sun?

A: Helium is used up to produce oxygen and carbon.

B: It has no energy source now, but it is still hot and cooling off slowly.

C: Hydrogen burns into water in its core.

D: The Sun is slowly contracting and using its gravitational energy to produce heat.

E: Hydrogen to helium fusion.

33 How long is the sunspot cycle?

A: 350 years.

B: 9 months.

C: 1 day.

D: 1 month.

E: 11 years.

34 How hot is the photosphere of the Sun?

A: 1 million degrees.

B: -200 F below.

C: 6000 degrees.

D: 15 million degrees.

E: 20 F.

35 The majority of the individual stars, but not all, of those that are visible in the sky without a telescope, are in …

A: the Galaxy.

B: a little area around the center of the Galaxy.

C: the Solar Neighborhood.

D: the Galaxy and a few close-by galaxies.

E: the Solar System.

36 How large is the Galaxy?

A: About one light year.

B: A hundred astronomical units.

C: Ten million light years.

D: A good 100,000 light years.

E: 14 billion light years.

37 Define the photosphere.

A: The non-convective inner part of the Sun.

B: The part of the Sun that is hot, from the center out.

C: The illuminated, bright half of the Sun where it is day.

D: The part of the Sun where heat is produced in a nuclear reaction.

E: The visible outside 'shell' of the Sun.

38 What instrument do you need to see a 7-magnitude star?

A: Only your naked eyes.

B: A pair of binoculars.

C: Such an object would be too faint to see at all.

D: A 12-inch amateur telescope.

E: A large professional telescope, at least 80 inches.

39

Which is the brightest star in the sky and how bright is it? (Exclude the Sun.)

A: Polaris, 2 mg.

B: Proxima Centauri, 11.7 mg.

C: Betelgeuse (Alpha Orionis), 0.5 mg.

D: Sirius, -1.6 mg.

E: Polaris, 0 mg.

40 What is the absolute magnitude of the Sun?

A: 5 mg.

B: 0 mg.

C: +11.4 mg.

D: -26.4 mg.

E: -12.5 mg.

41 How long before/after the Sun did the planets form?

A: The planets were formed only a few thousand years ago, while the Sun is billions of years old.

B: The planets were formed right after the Sun did.

C: The planets were formed 1 billion years ago, while the Sun is 4-5 billion years old.

D: The planets were formed long before the Sun and were captured by the Sun's gravity.

E: The Sun is 14 billion years old, the planets are 4-5 billion years old.

42 What minimum temperature is needed for hydrogen to helium fusion?

A: 400 K.

B: 200 million K.

C: 3 K.

D: 6000 K.

E: 1 million K.

43 All stars that one can see as individual stars in the sky are part of …

A: either our Galaxy or the space between galaxies.

B: the Solar Neighborhood.

C: the Solar System.

D: the Andromeda Galaxy.

E: the Galaxy.

44 What is granulation?

A: Rotating storms on the Sun, the equivalent of tornadoes.

B: The heads of hot upcoming gas bubbles in the Sun look like bright spots.

C: Giant waves travelling along the surface of the Sun.

D: The 'surface' of the Sun is very uneven. Higher elevations look brighter.

E: Matter falling onto the Sun from outer space makes the Sun look grainy.

45 The Pleiades is … ?

A: A star.

B: A planet.

C: A galaxy.

D: A constellation.

E: An open cluster.

46 What object must M 42 be, judged only by its name?

A: A moon (satellite).

B: A deep-sky object.

C: A meteorite.

D: A bright star.

E: A planet.

47 The number of sunspots changes with what time period?

A: 11 years.

B: 1 month.

C: 4.5 billion years.

D: 22 years.

E: 1 year.

48 What is the name of the first and most famous deep-sky object catalogue?

A: Herzsprung-Russell

B: Terminator

C: Stefan-Boltzman

D: Messerschmidt

E: Messier

49 What is in Picture 5?

A: A solar flare.

B: A solar eruption.

C: Aurora.

D: A solar prominence.

E: A sunspot.