FRAC QUIZBOWL RULES

There are two kinds of questions, **Tossup Questions** worth 10 pts. apiece and **Bonus Questions** worth 20 pts. apiece. In order for a team to receive a Bonus Question, someone from that team must first answer a Tossup Question correctly.

Tossup Questions

1. Anyone from either team may buzz in to answer a Tossup Question, and whoever buzzes in first must answer that question. No help from teammates is permitted, and he or she must respond within 5 seconds after being recognized by the moderator. The answer to a Tossup Question must be entirely correct in order for that team to score points and receive a Bonus Question.
2. If someone buzzes in for a Tossup and cannot answer the question within the allotted 5 seconds, or else answers it incorrectly, the entire question will be repeated for the other team, and that team will be given 5 seconds for someone to buzz in.
3. If neither team buzzes in or answers the Tossup Question correctly, a Replacement Tossup Question will be asked and either team may buzz in.
4. If we haven't used up all of the Replacement Tossup Questions by the end of the round of 20 Tossup/Bonus Questions, we'll use the remaining Tossup Questions as "Lightning Round" Tossups worth 10 pts. apiece without Bonus Questions.

Bonus Questions

1. Only the team whose player answers a Tossup Question may participate in the Bonus Question phase. After hearing the Bonus Question, that team will have 30 seconds to formulate its response. You may write down your answers on the scratch paper provided, and discussion between teammates is allowed and encouraged.

2. After 20 seconds have elapsed, the timer will warn the team that they have only ten seconds more to complete their response.

3. After 30 seconds have elapsed or the team buzzes in, whichever comes first, the Team Captain will answer the question. Partial credit will be given for all correct answers to Bonus Questions.

4. If your response to a Bonus Question is ready before the allotted 30 seconds have elapsed, you don't have to buzz in, just say "We're ready."

Any situations or rules not covered herein will be judged on the basis of common sense and fair play. For example, if a Bonus Question asks, "Which planet is nearest to the Sun?," you can't list all eight planets and claim credit on the basis of having one correct answer amid seven wrong answers.

Pronunciation doesn't matter, but you can't say "*Sagittarius*" and then tell us that's how you pronounce *Scorpius*.

After the 10th Tossup and Bonus Questions, the team captains will be given the opportunity to make changes in their lineups if they wish.

TOSSUP #1. For 10 pts.: In our solar system, which planet's day is longer than its year? It also has the highest recorded surface temperature of any of the planets -- 864 degrees Fahrenheit. It is the 2nd planet out from the Sun.

Ans: VENUS. (Its day equals 243 Earth days, its year 224.7 Earth days.)

BONUS #1. For 10 pts. apiece, what are the names of the two moons of Mars?

Ans: DEIMOS (pronounced DIE mohss) and PHOBOS.

TOSSUP #2. For 10 pts., who discovered Pluto in 1930?

Ans: (CLYDE) TOMBAUGH.

BONUS #2. For 10 pts. apiece, (a) Besides the mythical Roman god of the underworld, what actual person's name does Pluto represent?; and (b) What is the name of Pluto's moon?

Ans: (a) PERCIVAL LOWELL.
(b) CHARON. (Pronounced CARE un.)

TOSSUP #3. For 10 pts., who discovered the planet Uranus in 1781?

Ans: WILLIAM HERSCHEL. (Both names required.)

BONUS #3. For 10 pts. apiece, name the two planets in our solar system that rotate backward, or from east to west.

Ans: VENUS and URANUS. (Pluto does too, but it's no longer a planet.)

TOSSUP #4. For 10 pts., what is the nearest naked-eye star to the Sun?

Ans: ALPHA CENTAURI. (Also accept: RIGEL KENTAURI.)

BONUS #4. For 10 pts. apiece, (a) What is the nearest naked-eye star to the North Celestial Pole?; and (b) What is the nearest 1st-magnitude star to the North Celestial Pole?

Ans: (a) POLARIS. (For "North Star" response, ask: Be more specific.)
(b) CAPELLA.

TOSSUP #5. For 10 pts., which two constellations contain the most Messier objects?

Ans: *SAGITTARIUS* (15); and *VIRGO* (11). (Numbers unimportant.)

BONUS #5. For 5 pts. apiece, TRUE OR FALSE: (a) The lunar feature Rupes Recta, better known as the "Straight Wall," is a sharply vertical cliff face; (b) The term annular means "yearly"; (c) All constellations are circumpolar; and (d) The total number of eclipses, solar and lunar, that can occur in a year is never less than four or more than ten.

Ans: (a) FALSE. Its steepest angle is only 41 degrees. (Source: Ernest Cherrington's *Exploring the Moon Through Binoculars & Small Telescopes*, p. 106).

(b)FALSE. It means "ring-shaped."

(c) FALSE. A circumpolar constellation never appears to set.

(d) TRUE.

TOSSUP #6. (You'll have ten seconds, not five, to respond to this question.) For 10 pts., which zodiac constellation figure is neither animal nor human?

Ans: *LIBRA*, the Scales.

BONUS #6. For 10 pts. apiece, (a) Which Messier object is nearest to the North Celestial Pole?; and (b) Which is farthest from the North Celestial Pole?

Ans: (a) M82.
(b) M7.

TOSSUP #7. For 10 pts., what well-known double star am I referring to? It was the first double star to be discovered by telescope (in 1650). It was the first to be photographed (in 1857). It was the first spectroscopic binary detected (in 1889). Often referred to as "the Horse and the Rider," it lies in the curve of the Big Dipper's handle.

Ans: MIZAR and ALCOR. (Both names required.)

BONUS #7. You will receive five points for each correct response. Of the 20 brightest stars other than the Sun, which two: (a) are red giants?, and (b) have Beta rather than Alpha designations in the Bayer classification system (e.g., Beta Cygni)? The answers include four different stars.

Ans: (a) BETELGEUSE and ANTARES.
(b) AGENA (Beta Centauri) and RIGEL (Beta Orionis).

TOSSUP #8. For 10 pts., which of the following does NOT occur? (a) an annular lunar eclipse, or (b) an annular solar eclipse?

Ans: (a) An ANNULAR LUNAR ECLIPSE.

BONUS #8. For 10 pts. apiece, TRUE OR FALSE: (a) Edmond Halley discovered the famous comet that bears his name; and (b) Neutron stars and pulsars result from supernova explosions.

Ans: (a) FALSE. Halley was the first person to recognize that that comet returns regularly at roughly 76-year intervals. The comet's appearances have been traced back to 467 B.C.
(b) TRUE.

TOSSUP #9. For 10 pts.: On a clear evening, how much of the First Quarter Moon is sunlit?

Ans: HALF.

BONUS #9. For 10 pts. apiece, which two zodiac constellations do not contain a Messier object?

Ans: *ARIES* and *LIBRA.*

TOSSUP #10. For 10 pts., what does the phrase "Oh, Be A Fine Girl, Kiss Me" refer to?

Ans: The sentence is a mnemonic device for remembering the letter sequence **O, B, A, F, G, K** and **M,** which represent the SEVEN SPECTRAL CLASSES OF STARS.

BONUS #10. Each correct response is worth five points. Match the astronomers with their nationalities. (You'll want to write these names down.) Charles Messier, Galileo, Ptolemy and Nicolas Copernicus were the astronomers; their nationalities were Polish, Greek, Italian and French.

Ans: Messier was French; Galileo was Italian; Ptolemy was Greek; and Copernicus was Polish.

***HALFTIME- ADD REPLACEMENT PLAYERS HERE**

TOSSUP #11. For 10 pts., which ONE of the following pairs of astronomy terms mean exactly the same thing? (a) double star and binary star; (b) zenith and meridian; (C) fireball and bolide; and (D) meteoroid and meteorite.

Ans: (C) FIREBALL and BOLIDE.

BONUS #11. For 10 pts. apiece, (a) How many constellations are there in all?, and (b) How many constellations contain at least one Messier object?

Ans: (a) 88.
(b) 35. (Also accept: 34.)

TOSSUP #12. For 10 pts., Which involves a greater distance, (a) a parsec, or (b) a light year?

Ans: (a) A PARSEC, which is defined as "the distance at which a star would have a parallax of one arc-second." One PARSEC equals 3.26 LIGHT-YEARS.

BONUS #12. For 2 pts. apiece, name any ten constellations of the zodiac. Answer slowly to give us time to check off your responses.

Ans: *AQUARIUS*; *ARIES*; *CANCER*; *CAPRICORNUS*; *GEMINI*; *LEO*; *LIBRA*; *PISCES*; *SAGITTARIUS*; *SCORPIUS*; *TAURUS*; *VIRGO*.

TOSSUP #13. For 10 pts., what present-day constellation, originally a member of the zodiac, was dropped from the list because astrologers considered the number 13 to be unlucky? The ancients saw this constellation as a man holding a serpent that was writhing on either side of his body. It lies south of Hercules and north of Scorpius, and contains the globular clusters M10 and M12.

Ans: *OPHIUCHUS*, the Serpent Bearer.

BONUS #13. For one pt. apiece, name 20 of the 35 constellations that contain at least one Messier object. Answer slowly.

Ans: *AQUARIUS; ANDROMEDA; AURIGA; CANCER; CANES VENATICI; CANIS MAJOR; CAPRICORNUS; CASSIOPEIA; CETUS; COMA BERENICES; CYGNUS; DRACO; GEMINI; HERCULES; HYDRA; LEO; LEPUS; LYRA; MONOCEROS; OPHIUCHUS; ORION; PEGASUS; PERSEUS; PISCES; PUPPIS; SAGITTA; SAGITTARIUS; SCORPIUS; SCUTUM; SERPENS; TAURUS; TRIANGULUM; URSA MAJOR; VIRGO; VULPECULA.*

TOSSUP #14. For 10 pts.: Regarding meteor showers: what is a radiant?

Ans: THE POINT IN THE SKY FROM WHICH METEORS IN A METEOR SHOWER APPEAR TO BE COMING.

BONUS #14: For one point apiece, name 20 of the 43 constellations that were named for animals (not including humans). Answer slowly.

Ans: ***APUS***, the Bird of Paradise; ***AQUILA***, the Eagle; ***ARIES***, the Ram; ***CAMELOPARDALIS,*** the Giraffe; ***CANCER,*** the Crab; ***CANES VENATICI***, the Hunting Dogs; ***CANIS MAJOR,*** the Big Dog; ***CANIS MINOR***, the Little Dog; ***CAPRICORNUS,*** the Goat; ***CENTAURUS,*** the Centaur; ***CETUS,*** the Whale; ***CHAMAELEON,*** the Chameleon; ***COLUMBA,*** the Dove; ***CORVUS,*** the Crow; ***CYGNUS,*** the Swan; ***DELPHINUS,*** the Dolphin; ***DORADO,*** the Swordfish; ***DRACO,*** the Dragon; ***EQUULEUS,*** the Colt; ***GRUS,*** the Crane; ***HYDRA,*** the Water Snake; ***HYDRUS,*** the Sea Serpent; ***LACERTA,*** the Lizard; ***LEO,*** the Lion; ***LEO MINOR***, the Little Lion; ***LEPUS,*** the Hare; ***LUPUS,*** the Wolf; ***LYNX,*** the Lynx; ***MONOCEROS,*** the Unicorn; ***MUSCA,*** the Fly; **PAVO,** the Peacock; ***PEGASUS,*** the Winged Horse; **PHOENIX,** the Phoenix; ***PISCES,*** the Fishes; ***PISCIS AUSTRINUS,*** the Southern Fish; ***SCORPIUS,*** the Scorpion; ***SERPENS,*** the Serpen; ***TAURUS,*** the Bull; ***TUCANA,*** the Toucan; ***URSA MAJOR***, the Great Bear; ***URSA MINOR,*** the Little Bear; ***VOLANS,*** the Flying Fish; ***VULPECULA***, the Little Fox.

TOSSUP #15. For 10 pts., name the two planetary moons in our solar system that are larger than Mercury. One of them orbits Saturn, and the other is a moon of Jupiter.

Ans: GANYMEDE (5,258 km dia.); and TITAN (5,150 km). (Mercury's dia. Is 4,878 km. Our Moon's diameter is 3,476 km.)

BONUS #15. For 2 pts. apiece, name ten of the 18 constellations that represent humans or human figures, either wholly or in part. Answer slowly.

Ans: **A*NDROMEDA***, the Princess; **A*QUARIUS,*** the Water Bearer; ***AURIGA,*** The Charioteer; ***BOOTES,*** the Herdsman; ***CASSIOPEIA,*** the Queen; ***CENTAURUS,*** the Centaur; ***CEPHEUS,*** the King; ***COMA BERENICES,*** Berenice's Hair; ***GEMINI,*** the Twins; ***HERCULES,*** the Strongman; ***INDUS,*** the Indian; ***OPHIUCHUS,*** the Serpent Bearer; ***ORION,*** the Hunter; ***PERSEUS,*** the Hero; ***PICTOR,*** the Painter; ***SAGITTARIUS,*** the Archer; ***SCULPTOR,*** the Sculptor; ***VIRGO,*** the Maiden.

Tossup #16. For 10 pts., what do the prefix letters <u>NGC</u> stand for?

Ans: NEW GENERAL CATALOGUE.

Bonus #16. For 4 pts. apiece, name the five main types of nebulae. ("Diffuse nebula" is not acceptable, nor is Sir Patrick Caldwell-Moore's "bright nebula".)

Ans: PLANETARY; EMISSION; REFLECTION; SUPERNOVA REMNANT; and DARK (also accept: absorption).

Tossup #17. For 10 pts., what was the first asteroid to be discovered?

Ans: CERES, in 1801. (Date not necessary.)

Bonus #17. For 1 pt. apiece, give the familiar names of the 20 brightest stars as seen from the Earth. Answer slowly.

Ans: ACHERNAR; ACRUX; AGENA; ALDEBARAN; ALTAIR; ANTARES; ARCTURUS; BETELGEUSE; CANOPUS; CAPELLA; DENEB; FOMALHAUT; POLLUX; PROCYON; REGULUS; RIGEL; RIGEL KENTAURI; SIRIUS; SPICA; and VEGA.

Tossup #18. For 10 pts., which one of the following terms is NOT associated with the Moon?: (a) Baily's beads; (b) precession; (c) terminator; or (d) gibbous.

Ans: (b) PRECESSION.

Bonus #18. For 2 pts. apiece, name any 10 Astronomical League observing clubs. Answer slowly.

Ans: ARP PECULIAR GALAXIES; ASTEROID; BINOCULAR MESSIER; CALDWELL; COMET; CONSTELLATION HUNTER; DEEP SKY BINOCULAR; DOUBLE STAR; EARTH ORBITING SATELLITE OBSERVERS; GALAXY GROUPS & CLUSTERS; GLOBULAR CLUSTER; HERSCHEL 400; HERSCHEL II; LUNAR; LUNAR II; MASTER OBSERVER; MESSIER; METEOR; OPEN CLUSTER; OUTREACH; PLANETARY; PLANETARY NEBULA; SKY PUPPY; SOUTHERN SKIES BINOCULAR; SOUTHERN SKY TELESCOPIC; SUNSPOTTERS; UNIVERSE SAMPLER; URBAN.

Tossup #19. For 10 pts., what is a sporadic meteor?

Ans: A METEOR THAT IS NOT ASSOCIATED WITH A METEOR SHOWER.

Bonus #19. For 5 pts. apiece: With which celestial body, the Sun or the Moon, are the following terms associated?: (a) libration; (b) the "green flash"; (c) TLPs; and (d) faculae.

Ans: (a) libration – the MOON.
(b) the "green flash" – the SUN.
(c) TLPs – the MOON (Transient Lunar Phenomena).
(d) faculae – the SUN.

Tossup #20. For 10 pts.: *Seasonal Star Charts* refers to it as the "Great Nebula," yet it is in fact a galaxy. Before the existence of galaxies beyond our own was verified, what well-known galaxy was commonly referred to as the "Great Nebula"?

Ans: **M31,** ANDROMEDA GALAXY. (Either is acceptable.)

Bonus #20. For 10 pts. apiece: Comets may have many tails or few, but there are only two kinds of tails, based on their composition. What are they?

Ans: GAS or ION TAILS (either is acceptable) and DUST TAILS.

Replacement (or LIGHTNING ROUND) Tossup Questions
(for 10 pts. apiece, anyone may buzz in):

1. What do the prefix letters IC stand for?

Ans: INDEX CATALOG.

2. Everyone knows about the aurora borealis, or "Northern Lights"; is there also an aurora australis, or "Southern Lights"?

Ans: YES.

3. Who was Pierre Mechain?

Ans: MESSIER'S COLLEAGUE. (Also accept: ASSISTANT, ASSOCIATE or CO-WORKER). Mechain discovered 28 Messier objects, only 10 less than Messier himself discovered.

4. What is an asterism?

Ans: A RECOGNIZABLE PATTERN OR SHAPE OF A GROUP OF STARS.

5. What familiar asterism in *Ursa Major* is known in England as the "Plough"? M40, M97, M 101, M108 and M109 lie nearby.

Ans: THE BIG DIPPER.

6. What does the term albedo refer to?

Ans: AN OBJECT'S RELATIVE ABILITY TO REFLECT LIGHT. (Also accept: …to reflect electromagnetic radiation.)

7. Whose scientific paper, published in 1925, offered the first Conclusive evidence of "island universes," or galaxies, beyond our own Milky Way?

Ans: EDWIN HUBBLE

8. Name one of the three constellation figures that consist of only two stars.

Ans: CAELUM (pronounced SEE lum); CANES VENATICI; or CANIS MINOR.

9. Where is Universal Time measured from?

Ans: GREENWICH, ENGLAND. (For Royal Observatory or prime meridian, ask: What city and country is associated with it?)

10. Which one of the following stars is NOT a part of Orion's belt?: (a) Alnitak; (b) Alnilam; (c) Vindemiatrix; or (d) Mintaka.

Ans: (c) VINDEMIATRIX.

11. Which of the following deep-sky objects is NOT a Messier object?: (a) Sunflower Galaxy; (b) Praesepe; (c) the Double Cluster; or (d) Pinwheel Galaxy.

Ans: (c) the DOUBLE CLUSTER. (The Sunflower Galaxy is M63; Praesepe, the Beehive, is M44; and the Pinwheel Galaxy refers to three Messier objects – M33, M99 and M101.)

12. Charles Messier published two expanded versions of his famous list of deep-sky objects. How many Messier objects were listed in his third and final edition?

Ans: 103 (The other seven were added after Messier's death, based on his observing notes.)

13. What is the ecliptic?

Ans: THE PORTION OF SKY THAT THE SUN, MOON AND PLANETS PASS THROUGH. (Also accept: the plane of the Earth's orbit around the Sun.)

14. Name either of the two constellations that do not contain a star with an Alpha or Beta designation in the Bayer classification system.

Ans: NORMA (the Level); and PUPPIS (the Ship's Stern, or Poopdeck).

15. Which one of the following statements regarding the ALMAGEST and SKALNATE PLESO is true?: They were: (a) groups in the Inquisition that brought heresy charges against Galileo; (b) astronomical devices used by the ancient Greeks; (c) early constellations that are no longer regarded as such; or (d) a star catalog and a star atlas.

Ans.: (d) A STAR CATALOG AND A STAR ATLAS.

16. Which planet is the only one to have a star named after it?

Ans: MARS. (*Antares* means “rival of Ares [Mars]”.

Practice Tossup Questions

1. Who was the first person to walk on the Moon?

Ans.: NEIL ARMSTRONG.

2. In which constellation is Lagoon Nebula located?

Ans.: *SAGITTARIUS.*

3. M1 is a supernova remnant in *Taurus;* what is its familiar name?

Ans.: CRAB NEBULA

Equipment

*Two Quizbowl buzzer sets, 1 master control panel

*Scratch paper, pencils

*Stopwatch

*Tape (preferably 2”), masking or duct

*Two red writing pens

*Portable chalkboard (or a room with a chalkboard)

*4 sets of questions – 1 for me, 1 for Richard, 1 for Greg, 1 extra

*Chalk, eraser

*Trophies

FRAC QUIZBOWL #2

Tossup #1. For 10 pts.: What two words comprise the term **altazimuth**?

Ans: **ALTITUDE** and **AZIMUTH.**

Bonus #1. For 10 pts. apiece: Define (a) **azimuth;** and (b) **altitude,** in terms of moving Your telescope's tube.

Ans.: (a) **Azimuth** refers to **HORIZONTAL MOVEMENT** of the tube**;**
(b) **Altitude** refers to **VERTICAL MOVEMENT.**

Tossup #2. For 10 pts.: He lives in Miami, Fla. His sign-off is "Keep Looking Up, But Watch Where You Step." He hosts the longest-running astronomy show in TV history, and he also sponsors two youth-oriented annual A.L. award programs. Who is he?

Ans.: **JACK HORKHEIMER**

Bonus #2. For 3pts. Apiece, up to a maximum of 20 pts.: List, from largest to smallest in order of their size, the seven planets other than Earth in our solar system.

Answer: 1. **JUPITER;** 2. **SATURN;** 3. **URANUS;** 4. **NEPTUNE;** 5. **VENUS;** 6. **MARS;** and 7. **MERCURY.**

Tossup #3. For 10 pts.: Polaris, located ½ degree from the North Celestial Pole, is in the constellation Ursa Major**;** in which constellation is the South Celestial Pole located? It begins with the letter **O.**

Ans: **OCTANS** (the Octant)**.**

Bonus #3. For five points apiece: What do the following initials stand for?
(a) AAVSO; (b) ALPO; (c) EOSOC; and (d) IAU.

Ans.: (a) **American Assn. of Variable Star Observers**
(b) **Assn. of Lunar and Planetary Observers**
(c) **Earth Orbiting Satellites Observers Club**
(d) **International Astronomical Union**

Tossup #4. For 10 pts.: What is the nearest galaxy to the Milky Way? It lies about 100,000 light-years from the Sun, and is visible to the unaided eye from the southern hemisphere.

Ans.: **The Large Magellanic Cloud**

Bonus #4. For 5 pts. apiece: Give the familiar names of the following Messier objects: (a) M51; (b) M64; (c) M97; and (d) M104.

Ans.: (a) **Whirlpool Galaxy;** (b) **Black Eye Galaxy;** (c) **Owl Nebula;** and (d) **Sombrero Galaxy.**

Tossup #5. For 10 pts.: What does the genitive term Cygni refer to in "Alpha Cygni"?

Ans.: **"Of Cygnus"** (or, "belonging to Cygnus**.")** Deneb is the alpha star of Cygnus.)

Bonus #5. For 5 pts. apiece: Match the following planetary nebulas with their constellations:

1. Saturn Nebula	a. Hydra
2. The Blue Snowball	b. Aquarius
3. The Blinking Planetary	c. Andromeda
4. The Ghost of Jupiter	d. Cygnus

Ans.: **1 B ; 2C ; 3D ;** and **4A.**

Tossup #6. For 10 pts.: Who was history's first astronomer in modern terms? He mapped the locations of 1,080 stars and classified them according to six levels of brightness. His data, collected by Ptolemy, became the *Almagest*, the world's first star atlas.

Ans.: **HIPPARCHUS** (150 B.C.)

Bonus #6. For 10 pts. apiece: Regarding the Double Cluster, NGCs 869 and 884:
(a) Which is the more easterly of the two?; and
(b) What Messier object is nearest to them visually?

Ans.: (a) **NGC 884 ;** and (b) **M103** (an open cluster in Cassiopeia).

Tossup #7. For 10 pts.: Why do Mercury and Venus show phases while the other planets do not?

Ans.: **Mercury and Venus lie closer to the Sun than the Earth does.**

Bonus #7. For 5 pts. apiece: (a) Name the two parts of the head of a comet; and (b) Identify the two principal components of comets' tails.

Ans.: (a) **Coma** and **nucleus;** (b) **Dust** and **gases.** (Accept: ionized gases.)

Tossup #8. For 10 pts.: Although seasons overlap, which season is regarded as having the most of the 20 brightest stars in the sky?

Ans.: **WINTER** (with 8. Spring has 7, Summer 4 and Fall 1.)

Bonus #8. For 2-1/2 pts. apiece: Give the familiar names of those eight winter stars.

Ans.: **SIRIUS (**#1**); CANOPUS (**#2**); CAPELLA (**#6**); RIGEL (**#7**); PROCYON (**#8**); BETELGEUSE (**#11**); ALDEBARAN (**#14**); POLLUX (#**17**).**

Tossup #9. For 10 pts.: Why do so many stars' familiar names begin with the letters A-L?

Ans.: **They were named by middle-eastern** (accept: Arab) **astronomers.** ("Al" is Arabic for "the".)

Bonus #9: For 4 pts. apiece: Name five stars whose familiar names begin with the letters A-L. Give your answers slowly.

Ans.: **ALAMAK; ALBALI; ALBIREO; ALCHIBA; ALCOR; ALCYONE; ALDEBARAN; ALDERAMIN; ALFIRK; ALGEDI; ALGEIBA; ALGENIB; ALGOL; ALHENA; ALGORAB; ALIOTH; ALKAID; ALKARULOPS; ALKES; ALMACH; AL NAIR; ALNASI; ALNILAM; ALNITAK; ALPHARD; ALPHECCA; ALPHERATZ; ALTAIR.**

Tossup #10. For 10 pts.: What are main sequence stars?

Ans.: **Stars that are involved in the process of converting hydrogen into helium at their cores.**

Bonus #10. For 10 pts. apiece: What states would you visit to see (a) Barringer Crater and (b) Wetumpka Crater?

Ans.: (a) **ARIZONA ;** and (b) **ALABAMA.**

Tossup #11. For 10 pts.: Which term refers to the length of time it takes the Moon to make one complete revolution around the Earth? Is it synodic month? Or sidereal month?

Ans.: **SIDEREAL MONTH.**

Bonus #11. For 10 pts. apiece: (a) Which period is shorter, a sidereal month or a synodic month?; and (b) Define the term **new moon.**

Ans.: (a) **SIDEREAL MONTH** (27.3 days; a synodic month is 29.53 days in length.)
(b) **When the Moon is aligned between the Earth and the Sun.**

Tossup #12. For 10 pts.: What is the magnitude of the full Moon?

Ans.: **-12.7.** (Also accept: **-12** or **–13**.)

Bonus #12. For 10 pts. apiece: (a) What is the brightest double star in the sky?; and (b) What is the brightest variable star in the sky?

Ans.: (a) **SIRIUS;** and (b) **BETELGEUSE**

Tossup #13. For 10 pts.:Which of the three stars in Orion's Belt – Alnitak, Alnilam or Mintaka – also served as the title of a novel by poet James Dickey?

Ans.: **ALNILAM** (Epsilon Orionis, the middle star.)

Bonus #13. For 10 pts. apiece: Orion's belt lies roughly halfway between Betelgeuse and Rigel; between which two other nearby stars ranked in the 20 brightest in the night sky does the Belt lie?

Ans.: **SIRIUS** (1^{st}) and **ALDEBARAN** (13^{th}).

Tossup #14. For 10 pts.: Which lies farther from the Sun, the Kuiper Belt or the Oort Cloud?

Ans.: **At 100,000 Astronomical Units from the Sun, the OORT CLOUD is 2-3 times farther out than the Kuiper Belt.**

Bonus #14. For 5 pts. apiece: In which constellations can the following nebulas be found? (a) Rosette Nebula; (b) Eskimo Nebula; (c) Helix Nebula; (d) Pelican Nebula.

Ans.: (a) **MONOCEROS;** (b) **GEMINI;** (c) **AQUARIUS;** (d) **CYGNUS.**

Tossup #15. For 10 pts.: How many objects are there in the Caldwell Club list?

Ans.: **109.**

Bonus #15. For 10 pts. apiece: Name any two of the three Caldwell Club objects that do not possess an NGC or IC number.

Ans.: **Sharpless 2-155** ("Cave Nebula" in Cepheus, Caldwell# 9); **the Hyades** (Caldwell # 41); and **the Coal Sack** (Caldwell #99, a dark nebula in Crux).

Tossup #16. For 10 pts.: Why do we see Mercury and Venus naked-eye as round disks when their phases are less than full, or even crescent?

Ans.: **They are so bright that our unaided eyes fill in the unlit portions of their disks.**

Bonus #16. For 5 pts. apiece: With which bodies in our solar system are the following features associated?: (a) Mons Hadley (b) Olympus Mons (c) the Encke Division (d) The South Equatorial Belt.

Ans.: 1. **The Moon;** 2. **Mars;** 3. **Saturn; (d) Jupiter.**

Tossup #17. For 10 pts.: He was an intellectual rival of Sir Isaac Newton. He discovered Orion Nebula in 1656, and in the same year he discovered Saturn's moon Titan. Fittingly, the project to soft-land a probe on Titan bears his name. Who was this early giant of astronomy?

Ans.: **(CHRISTIAAN) HUYGENS**

Bonus #17. For 5 pts. apiece: Match the following stellar shapes with their constellations:

1. The Water Jar	a. Ophiuchus
2. The Hyades	b. Pisces
3. The Bull of Poniatowski	c. Aquarius
4. The Circlet	d. Taurus

Ans.: **1-C; 2-D; 3-A; 4-B.**

Tossup #18. For 10 pts.: Identify by his last name, full name or initials and last name the American who first catalogued dark nebulae in 1927.

Ans.: **(Edward Emerson) Bernard**

Bonus #18. For 4 pts. apiece: In which constellations are these "A-L" stars located?: (a) Altair; (b) Albireo; (c) Algol; (d) Aldebaran; (e) Alcor.

Ans.: (a) **Aquila;** (b) **Cygnus;** (c) **Perseus;** (d) **Taurus;** (e) **Ursa Major.**

Tossup #19. For 10 pts.: Which lies highest in the sky, the celestial equator, the ecliptic, the meridian or the zenith?

Ans.: **The ZENITH.**

Bonus #19. For 5 pts. apiece: Answer the following True-False statements:

(a) Sir William Herschel and Sir Isaac Newton lived at the same time and knew each other.
(b) None of the ten brightest stars is variable.
(c) Sir Isaac Newton invented the reflecting telescope.
(c) Polaris is one of the 50 brightest stars in the night sky.

Answers: (a) **FALSE.** ((Newton died in 1727; Herschel was born in 1738.)
(b) **FALSE.** (Agena, #9 on the list, is variable.)
(c) **FALSE.** (The reflector was invented by the Scottish mathematician James Gregory in 1663; his design was improved by Newton five years later.
(d) **TRUE.** (At magnitude 2.0, Polaris is the 49th brightest star.)

Tossup #20. For 10 pts.: The brightest variable star in the sky, Agena, is the 9th brightest star overall. But Agena is only the 2nd brightest star in its constellation, its brighter neighbor being the 3rd brightest star in the sky and 2nd closest star to Earth. In what constellation are these two bright stars located?

Ans.: **CENTAURUS.** (Agena is Beta Centauri. The other, brighter star is Alpha Centauri.)

Bonus #20. For 5 pts. apiece: How many objects do you have to find and observe in order to earn a pin in the following A.L. observing clubs?: (a) Binocular Messier Club; (b) Arp Peculiar Galaxies Club; (c) Deep-Sky Binocular Club; (d) Comet Observers Club.

Ans.: (a) **50;** (b) **100;** (c) **60;** (d) **12** (or **18**) **.**

Tossup #21. For 10 pts.: What is the Sun's magnitude?

Ans.: **-26.7.** (Also accept: **-26** or **–27**.)

Bonus #21. For 10 pts. apiece: What L-words refer to: (a) the edge of the visible disk of an object such as the Moon or a planet?, and (b) the apparent wobbling of a celestial body in its orbit around another celestial body?

Ans.: (a) **LIMB;** (b) **LIBRATION.**

Tossup #22. For 10 pts.: Why don't asteroids glow like comets?

Ans.: **Their compositions are different.** (Both reflect sunlight, but while asteroids are primarily rocky or metallic in composition [and thus appear as points of light], comets are composed of frozen gases that evaporate and release gases and dust particles when sufficiently warmed by the Sun's radiation.)

Bonus #22. For 5 pts. apiece: Answer the following True-False statements:

(a) Ceres, the first asteroid to be discovered, is also the largest and brightest one.
(b) The first globular cluster to be discovered was M13 in Hercules.
(c) Asteroids are the only astronomical objects that may be named after living persons.
(d) Tycho Brahe had the tip of his nose cut off in a duel, and wore a gold nose.

Ans.: (a) **FALSE.** (At 567 mi. in dia., Ceres is the largest asteroid but 6th-mag. 4 Vesta is brighter.
(b) **FALSE.** (M22 in Sagittarius was discovered by a German astronomer in 1665; M13 was discovered 49 years lager, in 1714, and was first mentioned by Edmond Halley in 1715.)
(c) **TRUE.**
(d) **TRUE.**

Tossup #23. For 10 pts.: During the Dark Ages when astronomy was in disfavor with the Church, Arab astronomers continued to systematically study the skies. By what **A**-word were these Arab astronomers known? Today, that word is associated with charlatans, hucksters and pseudo-science.

Ans.: **ASTROLOGERS.** (accept: astrology)

Bonus #23. For 5 pts. apiece: What **P**-words fit the following definitions?:

(a) The apparent shift of a nearby object against a more distant background.
(b) The lighter part of a sunspot.
(c) The point in its orbit around the Earth at which the Moon is closest to the Sun.
(d) The gradual shift of the celestial poles and equinoxes.

Ans.: (a) **PARALLAX;** (b) **PENUMBRA;** (c) **PERIGEE;**
(e) **PRECESSION.**

Tossup #24. For 10 pts.: Which is longer in terms of Earth hours, an Earth day or a Martian day?

Ans.: **A MARTIAN DAY is 24.6229 Earth-hours long.**

Bonus #24. For 5 pts. apiece: (a-b) Give the names of the two moons of Mars; (c) Which of those moons is closer to Mars?; and (d) Which moon is larger?

Ans.: (a-b) **DEIMOS and PHOBOS.**
(c) **PHOBOS is about 2-1/2 times closer to Mars than Deimos is.**
(d) PHOBOS is nearly three times larger than Deimos.

Replacement (or Lightning Round) Questions
(any player may buzz in)

*Why is M13, Andromeda Galaxy, referred to familiarly as "The Great Nebula"?

Ans.: Because, until 1925 when Edwin Hubble proved their existence, astronomers didn't know for sure that other galaxies existed beyond the Milky Way. (They thought the galaxies were "spiral nebulae".)

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*Two of the ten brightest stars in the sky are better known by their Bayer designations than by their popular names. What are those stars? Give their Bayer, or Greek letter, designations.

Ans.: **ALPHA** and **BETA CENTAURI.** (Rigel Kentaurus or Rigel Kent, and Agena.)

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*Where did the Milky Way get its name?

Ans.: **Ancient (Greek) astronomers saw its glow in the sky as a milky light.** (*Galaxias* is Greek for "milky; "way" was the ancients' term for road, or highway.)

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*What is the most distant object visible to the naked-eye?

Ans.: **ANDROMEDA GALAXY**

What is the nearest star to the Sun?

Ans.: **PROXIMA CENTAURI**. (Alpha Centauri C, an 11^{th}-mag. star that orbits both Alpha Centauri A and B.)

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*Where on the Moon did Apollo 11 land?

Ans.: **The Sea of Tranquility (Mare Tranquillitatis)**

*****Where do comets reside before they become comets?

Ans.: **THE OORT CLOUD.**

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*Name the stars that comprise the Summer Triangle.

Ans.: **VEGA** (Alpha Lyrae); **DENEB** (Alpha Cygni); and **ALTAIR** (Alpha Aquilae).

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*In which constellation are we looking toward the center of the Milky Way?

Ans.: **SAGITTARIUS.**

*****Where would you find the asteroid belt?

Ans.: **BETWEEN THE ORBITS OF MARS AND JUPITER.**

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*Why do comets have tails?

Ans.: **Solar radiation** (accept: heat) **sublimates** (accept: melts) **portions of a comet's icy surface, releasing gases and dust that are blown away from the comet and the Sun.**

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*Where do comets reside before they become comets?

Ans.: **THE OORT CLOUD.**

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*Define the word <u>borealis.</u>

Ans.: **NORTHERN.**

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*How many stars in the Great Square belong to the constellation Andromeda?

Ans.: **ONE** (Alpheratz, Alpha Andromedae. The other three are in Pegasus.)

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*Rhea, Tethys, and Enceladus are moons of which planet?

Ans.: **SATURN.**