Science Olympiad—Astronomy

Multiple Choice: Choose the best answer for each question. Each question is worth one point. In the event of a tie, there will be a tie-breaking word problem.

1) The final phase of a star's evolution is determined by the star's
    a. Age
    b. Gravitational pull
    c. Density
    d. Mass

2) When our sun reaches the end of its red giant phase, it will turn into a
    a. Supernova
    b. White Dwarf
    c. Black Hole
    d. Neutron Star

3) Cepheid variable stars have fluctuating masses. Some astronomers attempt to use these stars to
    a. Compare to dying stars to determine time of stellar death
    b. Mark distances throughout a galaxy
    c. Map a solar system
    d. Both b and c

4) What sub-class of neutron star is known for its extremely high magnetic field?
    a. magnetar
    b. quasar
    c. magneto
    d. magnetta

5) A pulsar is a rapidly spinning neutron star which emits
    a. a blinding light when it aligns with the planets
    b. radio waves detectable from Earth
    c. a gravitational pull which attracts high energy dust particles
    d. enough energy to power itself indefinitely

6) In a typical H-R diagram, stars are graphed by these two characterisitcs
    a. Temperature and luminosity
    b. Luminosity and distance
    c. Distance and temperature
    d. Size and distance

7) You have discovered a new celestial body. It has a thick atmosphere and it produces powerful cosmic winds and, when observed, the clouds obscure the body. You have determined it is this type of star.
    a. Wolf-Rayet star
    b. Red supergiant
    c. Stellar storm
    d. Pulsar

8) If you were observing a binary system in which one of the twin stars imploded into a black hole, what method would you use to determine the size and power of the black hole?
    a. Ultraviolet Spectrograph
    b. H-R mapping
    c. Binary X-Rays
    d. Both a and b

9) When a star becomes a singularity and has zero volume and infinite density, it is called a
    a. White dwarf
    b. Blue giant
    c. Wolf-Raynet star
    d. Black hole

10) Cygnus X-1 is a dead star being studied by astronomers using its twin star in the binary system in which they both occupy. If astronomers are using binary x-rays to study Cygnus X-1, it is safe to assume it is a
    a. Black hole
    b. Red giant
    c. White dwarf
    d. Neutron star

11) Cas A is a supernova remnant, and is the brightest extrasolar radio source in the sky. It is so called Cas A because of its location in the
    a. Casablanca binary system
    b. Cassidy-Kirk solar system
    c. Cassiopeia constellation
    d. Casserole stellar circle

12) The NGC 6888, or Crescent Nebula, was created with the winds of WR 136, which is this type of star
    a. Red giant

b. Antares
c. Polaris
d. Wolf-Raynet star

13) When a red giant erupts into a supernova and its density is equivalent to about eight solar masses, it will
    a. Collapse again into a black hole
    b. Stabilize into a neutron star
    c. Shrink further into a white dwarf
    d. Explode again into an ultranova

14) PSR J0108-1431 is the closest known _____ to Earth.
    a. Black hole
    b. Red giant
    c. Quasar
    d. Pulsar

15) Kepler's first law of stellar revolution determines that planets revolve around the sun on an imaginary line called a(n)
    a. Faux-path
    b. Ellipse
    c. Stellar line
    d. Planetary passage

16) Delta Cep is the closest one of these to Earth
    a. Quasar
    b. Cepheid
    c. Black hole
    d. Pulsar

17) A star has an apparent magnitude (m) of 10, and an Absolute magnitude (M) of 10. How many parsecs away is it? You will need to use the spectroscopic parallax formula:

    $m_v - M_v = -5 + 5(\log_{10}(d)$

    a. 35,000
    b. 100
    c. 27
    d. 1,000,000

18) Which type of Cepheid would you use to determine the distance to the Galactic center?
    a. Type I Cepheid
    b. Classical Cepheid
    c. Type II Cepheid
    d. Tertiary Cepheid

19) This law determined a planet's revolution may vary in speed depending on its fluctuating distance from the sun; however, the planet's pattern of distance fluctuation would remain constant.
    a. Kepler's First Law
    b. Kepler's Third Law
    c. The Law of Equal Areas
    d. The Law of Ellipses

20) 28,000 light years away, there is a black hole in the Scorpius Constellation called
    a. Beta-1246U
    b. Cas A
    c. IGR J17091
    d. Charon ZNJ46777

21) Particle clouds from where stars are formed are known as
    a. Stellar nurseries
    b. Star clouds
    c. Event horizons
    d. Singularities

22) Messier 1 (M1) was the first Messier Object catalogued. It's also known by this name
    a. Delta Cep
    b. NGC 3582
    c. Crab Nebula
    d. Horse Nebula

23) Every planet has the same T_2/R_3 ratio in our solar system. This was discovered through the use of _____
    a. Spectroscopic parallax
    b. Cepheids
    c. Kepler's Third Law
    d. Kepler's First Law

24) Chandra allowed astronomers to peer 200,000 light years away into an area where stars were being formed through the expelling of stellar gases.
    a. LHa115-N19
    b. N19
    c. V838 Mon
    d. Both a and b

25) SXP 1062 is a _____ located 180,000 light years away.
    a. Cepheid
    b. Quasar
    c. Pulsar
    d. Magnetar

26) Sigma Orionis is a five star system located in this constellation
    a. Cancer
    b. Virgo
    c. Orion
    d. Scorpio

27) A dying star must have 8 times and no more than 50 times the solar mass of our sun to erupt into this when it dies.
    a. Type II supernova
    b. Type I supernova
    c. Type III supernova
    d. Type IV supernova

28) About 20,000 light years away in the constellation Monoceros, this was once the largest known stars before its “outburst”.
    a. Sigma Mon
    b. VYK3 Mon
    c. V838 Mon
    d. Delta Mon

29) This in-between phase of stellar nurseries and star formation in stellar evolution is when the gathered dust is still condensing to form a star.
    a. Alpha Stage
    b. Stellar Genesis
    c. Proto-star
    d. Star of Adam

30) If Earth is 3.156×10^{7} seconds from the sun, and 1.4957×10^{11} meters from the sun then use the Law of Harmonies and calculate the Earth's T^2/R^3 ratio.
    a. 2.975×10^{-19}
    b. 2.977×10^{-19}
    c. 2.854×10^{-19}
    d. 2.999×10^{-19}

31) On a H-R diagram, red supergiants fall in the category of
    a. Main sequence stars
    b. Cepheid variables
    c. Semi-regular variables
    d. Super stars

32) Located in the RCW 57 region, this large nebula sends back new photos of giant stars being created.
    a. NBD 1200
    b. HQN 3580-12I
    c. NGC 3582
    d. SXP 1062

33) These are the largest stars in the universe in regards to volume.
    a. Blue ogres
    b. Red giants
    c. White ultragiants
    d. Red supergiants

34) Antares is of the largest known _____
    a. Quasars
    b. Pulsars
    c. White Dwarfs
    d. Red Supergiants

35) The first brown dwarf to be identified was discovered in this mass of stellar clouds called
    a. Stellular nimbus
    b. Rho Ophiuchi cloud complex
    c. SN 2010JL
    d. IC 1396

36) The sun is made up of 99.9% of _____ and _____.
    a. Oxygen and Hydrogen
    b. Hydrogen and Sulfur
    c. Carbon and Silicon
    d. Hydrogen and Helium

37) Blackbody radiation is used to identify this phenomenon, as it is almost difficult to spot in the darkness of space.
    a. Nebulas
    b. Stellar clouds
    c. Black holes
    d. Dark matter

38) A Type II supernova discovered in the constellation Leo.
    a. SN 300852
    b. SN 96541LO
    c. SN 2010JL
    d. SN 3541YU

39) The brightness of a star, otherwise known as this, is one of the key factors used in the spectroscopic parallax formula to determine distance between stars and other celestial bodies.
    a. Luster
    b. Radiance
    c. Luminescence
    d. Luminosity

40) The IC 1396 Nebula, or Elephant's Trunk Nebula is _____ light years from Earth.
    a. 15,000
    b. 9,800
    c. 142
    d. 2,400