**Astronomy Assessment and TPS Questions:**

**Looking at Distant Objects**

1. Which of the following correctly lists objects from largest to smallest?
	1. Nebula, Galaxy, Local Group, Star
	2. Globular Cluster, Local Group, Galaxy
	3. Galaxy, Local Group, Nebula, Star
	4. Local Group, Galaxy, Globular Cluster, Star
2. The distribution of globular clusters is used to explain which of the following?
3. the location of our solar system within the Milky Way galaxy.
4. the age of the Milky Way galaxy.
5. how stars form in the Milky Way galaxy.
6. why stars cluster in spiral arms in the disk of the Milky Way galaxy.
7. Your remote satellite orbits close to the Sun and detects a solar flare erupting at 10:00 AM, as measured by the satellite’s clock. Your clock here on Earth is exactly synchronized with the satellite clock. The Sun is located 8 light minutes away from Earth. If you wish to observe this flare from your backyard, you need to look at
	1. 9:52 A.M.
	2. 10:00 A.M.
	3. 10:08 A.M.
	4. None of the above is correct, since this flare has already occurred.
8. Fifteen years ago, a quasar was observed that was found to be located 8 billion light years away. If our universe is approximately 15 billion years old, when did the quasar emit the light that we observe?
	1. 15 years ago
	2. 7 billion years ago
	3. 8 billion years ago
	4. 15 billion years ago
	5. 23 billion years ago
9. How long will it take for you to see the light from a star that just formed 250 light years away?
	1. 100 years
	2. 150 years
	3. 250 years
	4. 300 years
10. What is a light year?
	1. An interval of time
	2. A measure of length
	3. An indication of speed
	4. All of the above
11. Because the speed of light is constant, a light-year \_\_\_\_\_\_\_\_\_.
	1. is a fixed distance
	2. is a fixed amount of time
	3. is a distance that varies depending on how fast the light is going
	4. is an amount of time that varies depending on how fast the light is going
12. Sirius, the brightest star in the sky, is 9 light-years away. If you go out and look at Sirius tonight, you will be seeing it \_\_\_\_\_\_\_\_\_\_\_.
	1. as it was 9 light years ago
	2. as it was 9 years ago
	3. as it is now
	4. as it will be 9 light years in the future
	5. as it will be 9 years in the future
13. Which of the following is true about the light received from distant stars?
	1. The source is always younger than it appears
	2. The source is always older than it appears
	3. Light may be received from a star before the star is born
	4. Light may be received from a star after the star dies
	5. A&C
	6. B&D
14. Suzie is 11 years old and lives on a planet 17 light years away. If you two communicate through radio transmission, how old will she be when she receives your response to the question she asked?
	1. 11 years old
	2. 17 years old
	3. 28 years old
	4. 45 years old
	5. 56 years old
15. Three people on distant planets send you a message. Brian’s message arrives first, followed by Matt’s and finally Jack’s. If they are all the same age when they sent the message, which one of them is located farthest from you??
	1. Jack
	2. Matt
	3. Brian
	4. They are all the same age
16. On your 24th birthday you send a photo of yourself to your 47 year-old mother, who is on an extended vacation at Planet Yogi. If your photo reaches her when she turns 80, how many light years away is Planet Yogi?
	1. 53 light years
	2. 33 light years
	3. 24 light years
	4. 71 light years
17. Star Lo will undergo a supernova this year. Earth is located 44,000 light years away from Star Lo and Planet Zorba is located halfway between Earth and Star Lo. How long will it be until the supernova from Star Lo will be visible from Planet Zorba?
	1. 88,000 years
	2. 44,000 years
	3. 22,000 years
	4. Insufficient information to answer
18. Star A is 80 light years away and Star B is 30 light years away. If both stars supernova simultaneously right now, when would the light from these events reach you?
	1. Star A’s light would reach you in 80 years and Star B’s light would reach you in 30 years
	2. Star A’s light would reach you in 30 years and Star B’s light would reach you in 80 years
	3. Star A’s light would reach you 50 years before Star B’s light
	4. The light from Star A and Star B would reach you immediately
19. Which of the following do we see from Earth as it is now, with no time delay?
	1. The Andromeda Galaxy
	2. A star at the edge of the Milky Way Galaxy
	3. The Sun
	4. Alpha Centauri (the nearest star to our solar system)
	5. None of the above
20. Monica is 25 years old and lives on a planet at the edge of the Milky Way galaxy. If she wants to send a message to Earth, what is the oldest she could be if she receives a response?
	1. 25,025
	2. 50,025
	3. 75,025
	4. 150,025

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| --- | --- |
| Planet | Year photo was sent |
| Tres | 1982 |
| Boor | 1911 |
| Dime | 2001 |

1. Use the table above to answer this question. Photos were sent from each of the three planets, traveled at the speed of light, and all reached Earth today. Which of the following correctly ranks the distances of the three planets, from closest to Earth to furthest from Earth?
	1. Tres < Boor < Dime
	2. Dime < Boor < Tres
	3. Boor < Dime < Tres
	4. Dime < Tres < Boor
	5. None of the above
2. Use the table above to answer this question. If the photos from all three planets traveled at the speed of light and reached Earth today, how far away is Planet Tres?
	1. 29 light years away
	2. 100 light years away
	3. 9 light years away
	4. None of the above

It is the year 2020. You have just received pictures, at the same time, of all of the dogs listed in the table below. All of the pictures were taken and sent on the day each dog was born. Also shown in the table is the current age of each dog.

|  |  |
| --- | --- |
| Dog’s name  | Current age |
| Kepler | 7 years |
| Galileo | 4 years |
| Newton | 10 years |
| Einstein | 1. years
 |

1. Using the information above, what year was it when Einstein sent his photo?
	1. 2010
	2. 2012
	3. 2028
	4. 2016
2. Using the information above, which dog sent its picture first?
	1. Kepler
	2. Galileo
	3. Newton
	4. Einstein
	5. They all sent their pictures at the same time
3. Using the information above, which dog lives at the location closest to you?
	1. Kepler
	2. Galileo
	3. Newton
	4. Einstein
	5. Cannot be determined
4. Using the information on the previous page, if Newton were to get in a spaceship headed for Earth that travels at half the speed of light, how much time would it take him to reach you?
	1. 10 light-years
	2. 10 years
	3. 20 light-years
	4. 20 years
5. The star Sirius is 9 light-years away. If you were to go out and observe it through a telescope with 9x magnifying power, what would you see?
	1. Sirius as it was 9 years ago
	2. Sirius as it is now
	3. Sirius as it will be 9 years from now

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| --- | --- |
| Star | Distance from Earth (in light years) |
| Acha | 20,000 |
| Olly | 90,000 |

1. Use the table above to answer this question. If Acha is 30,000 years old, how old would it appear to an observer located halfway between Acha and Earth?
	1. 5,000 years old
	2. 10,000 years old
	3. 20,000 years old
	4. 30,000 years old
	5. Insufficient information to answer
2. Use the table above to answer this question. Olly is destroyed when it is 40,000 years old. How old will Olly appear to an observer on Earth when this occurs?
	1. 20,000 years old
	2. 40,000 years old
	3. 50,000 years old
	4. An observer on Earth will not see the light from Olly yet
	5. Insufficient information to answer
3. You are observing Star Delta and Star Epsilon, two main sequence stars with the exact same mass. They both appear to be 10 years old. Which of the following could be true?
	1. Both stars are 10 years old and 10 light-years away from you.
	2. Both stars are 20 years old and 30 light-years away from you.
	3. Star Delta is 20 years old and 20 light-years from Earth, while Star Epsilon is 30 years old and 30 light-years away from Earth.
	4. Star Delta is 30 years old and 20 light-years away from Earth, while Star Epsilon is 20 years old and 10 light years away from Earth.
	5. More than one of the above.
4. You are observing a star that is 250 million light years away. You find that the light from the star is 30 million years old, and that the star has a lifetime of 120 million years. How long will it be until Earth receives light from the supernova that occurs at the end of the life of the star?
	1. 250 million years
	2. 120 million years
	3. 90 million years
	4. 160 million years
5. You are observing a star that is 250 million light years away. You find that the light from the star is 30 million years old, and that the star has a lifetime of 120 million years. How long ago did the supernova at the end of the star’s life occur?
	1. 250 million years ago
	2. 120 million years ago
	3. 90 million years ago
	4. 160 million years ago
6. You see the formation of an O-type main sequence star that appears to be 2 billion light years away. What would you see if you could see the star in real time?
	1. A Giant
	2. A black hole
	3. A white dwarf
	4. An O-type main sequence star
7. Three people on distant planets send you a message at the same time. Brian’s message arrives first, followed by Matt’s and finally Jack’s. If they are all the same age when you receive the last message, who was the youngest when they sent the message?
	1. Jack
	2. Matt
	3. Brian
	4. They were all the same age