



Galileo Challenge (Grades 9 and 10)

Sample Package

1. Do not start writing the contest until told to do so.
2. The first five questions are for administration purposes only; they will not count towards your final score, but must be completed if you wish to be recognized as an official contestant.
3. The 35-question multiple-choice contest corresponds to Questions 6 to 40, all of which have five possible answers – A, B, C, D, and E – only one of which is correct. Completely fill in the Scantron box that corresponds to your solution for each question. If you are unsure of this coding system, speak to the supervising teacher.
4. You may use rulers, geometric tools, and paper for rough work. Calculators are recommended.
5. Diagrams are not drawn to scale, while most numerical figures are rounded for simplicity.
6. You will have a total of sixty minutes to complete the contest.

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1. In which of the following programs are you currently enrolled? (Indicate all that apply)
(A) Gifted (B) French Immersion (C) ESL (D) Other (E) None
2. What is your grade?
(A) 8 or below (B) 9 (C) 10
3. What is your age?
(A) 13 or below (B) 14 (C) 15 (D) 16 (E) 17 or above
4. Are you willing to have your name posted on our website at <www.spacesim.org>?
(A) Yes (B) No
5. Are you interested in participating in a simulated space mission at our facilities or having a Planetarium exhibit visit your school?
(A) Yes (B) No (C) Maybe

Part A – Identify the scientific entity relating to astronomy in each question.

Each question from 6 to 15 will feature various astronomic, scientific, geographic, historic, and cultural details pertaining to a common celestial object or domain. Students are to indicate the identity of the body being described.

6. Hubble’s law accounts for the high redshift of these distant structures, luminous versions of active galaxies and a source of electromagnetic energy and light.

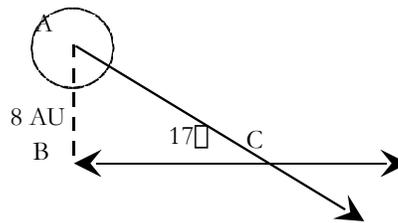
- (A) blazar (B) microquasar (C) quasar (D) black hole (E) nebula

Part B – Use your knowledge of astronomy, science, and mathematics to answer these.

Each question from 16 to 22 will provide a small amount of background material pertaining to a specific astronomic concept or entity. Using this information, as well as relevant knowledge of space science, students are to answer questions linked to the topic.

16. Pluto has an elliptical orbit whose perihelion, A, is the furthest point from its centre of attraction, C, and is 8 AU above the plane of the ecliptic. If the orbit is inclined 17° above that plane, what is the distance of Pluto from the centre of attraction, rounded to the nearest tenth?

- (A) 2.3 AU (B) 8.4 AU (C) 16.2 AU (D) 27.4 AU (E) 41.1 AU



Part C – All questions appear in sets of two dealing with the same topic.

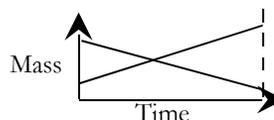
Each question pair from 23 to 36 (25-26, 27-28, 29-30, 31-32, 33-34, 35-36, 37-38, 39-40) will pertain to a specific area of astronomy. The first question from each set will usually provide background information for both itself and the second question. Each correct answer is still worth one point.

23. Within a period of five billion years, change in star mass can be modelled by a linear function. Two billion years after a red giant is formed, it has solar mass of 0.8. 4.5 billion years after this formation, its mass is 1.3. What was the mass of the red giant when it was originally formed?

- (A) 0.1 (B) 0.2 (C) 0.3 (D) 0.4 (E) 0.5

24. At the same time the previous star was formed, a red giant collapses and becomes a white dwarf. If the mass of this star can be modelled by the equation $y = -0.1x + 1.4$, after how many years will both it and the red giant have the same mass?

- (A) $2 \frac{2}{3}$ (B) 3 (C) $3 \frac{1}{3}$ (D) 5 (E) $6 \frac{1}{2}$



Part D – Answer the following questions based on the diagram given.

Students will be given a diagram or graphical object pertaining to a specific aspect of astronomy. Each question from 37 to 40 will ask the students to discern a certain piece of information from that visual aid.

Solutions:

6. (C)

7. (D)

8. (D)

9. (C)



The Ottawa-Carleton Educational Space Simulation thanks you for expressing interest in the 2007 Galileo Challenge!

If you wish to register your school for this competition, fill out the attached form or print one off from our website at <www.spacesim.org>. We are looking forward to your participation!