

Science Reasoning Test Explanations

PASSAGE I

- The correct answer is D.** According to Scientist 1, “Recent studies by researchers at Northeastern University and the University of Victoria may suggest that dark matter ... does not actually exist.” Additionally, Scientist 1 goes on to say that, “a galaxy, seen collectively, has its own gravity and essentially drives its own rotation at a constant rate.” This information best supports answer choice D.
- The correct answer is G.** The process of elimination is a good approach to correctly answering this question. Scientist 2 believes that dark matter is responsible for the warped shape of galaxies such as the Milky Way, so eliminate answer choice F. Both scientists conclude that not all questions about the universe have been answered, which supports answer choice G. Only Scientist 2 believes that cosmic microwave radiation suggests the presence of dark matter, and neither scientist believes that dark matter can be easily observed in the universe, so eliminate answer choices H and J.
- The correct answer is B.** According to the passage, Scientist 2 believes that dark matter can explain many cosmological phenomena. Therefore, you can eliminate answer choice A. Scientist 2 does not indicate that dark matter is visible using modern instruments, only that its effect on other objects in the universe can be detected; eliminate answer choice C. Scientist 2 does not suggest that dark matter was ever a part of the general theory of relativity, so eliminate answer choice D.
- The correct answer is J.** Both scientists mention the existence of warped galaxies in their discussions regarding the existence of dark matter in the universe. Clearly, this phenomenon is critical to their viewpoints, so eliminate answer choices F and G. Scientist 2 references Newtonian physics in order to suggest the existence of dark matter in order to explain the additional gravitational pull needed to account for warped galaxies, so eliminate answer choice H.
- The correct answer is B.** According to Scientist 2, “Without the existence of dark matter, the Magellanic Clouds would not have sufficient mass to have such a strong effect on the bend of the Milky Way galaxy.” If it were discovered that the Magellanic Clouds are actually more massive than previously thought, Scientist 2’s theory

would be weakened. The other answer choices are not supported by the passage.

- The correct answer is F.** The main point of difference between the two positions is whether dark matter exists. Scientist 1 believes that it does not, while Scientist 2 believes that it does. The other answer choices are not supported by the passage.
- The correct answer is A.** According to Scientist 1, the new research suggesting that dark matter does not actually exist is based upon Einstein’s theory of general relativity. If Einstein’s theory were flawed, Scientist 1’s position would be seriously weakened. The other answer choices are not supported by the passage.

PASSAGE II

- The correct answer is F.** According to the passage, “Contact fungicides, because they do not penetrate the plant tissue, are more easily washed off the leaf by rain. This results in a shorter residual control period and more frequent re-application of the fungicide.” Table 1 indicates that *boscalid* is a contact fungicide, so it should be applied more frequently than the others listed.
- The correct answer is C.** The passage states that, “Fungicide applications should not be initiated after the R5 growth stage.” There is nothing in the passage to indicate that *chlorthalonil* should not be applied during any growth stage.
- The correct answer is G.** According to the passage, “research has shown that the most critical time to protect soybean plants with fungicides is from the R1 through R5 growth stages. Fungicide applications should not be initiated after the R5 growth stage.” This information best supports answer choice G.
- The correct answer is D.** According to the passage, “ASR infections generally begin in the lower leaf canopy ... Coverage as dense as 400 spray droplets per square inch is considered ideal.” Therefore, you can predict that if fewer than 400 droplets of any fungicide were applied, the chances of the plant becoming infected with ASR would increase.
- The correct answer is H.** According to Table 2, systemic fungicides are most effective because they are absorbed into the leaf tissue and translocated throughout the plant. Table 1 indicates that *myclobutanil* is a systemic fungicide. Because the question asks you to put the fungicides in order

of increasing effectiveness, *myclobutanil* should be last on the list. Eliminate answer choices F and J. The data indicate that contact fungicides are the least effective and that *boscalid* is a contact fungicide. Therefore, *boscalid* should be first on the list.

13. **The correct answer is B.** According to the passage, “research has shown that the most critical time to protect soybean plants with fungicides is from the R1 through R5 growth stages. Fungicide applications should not be initiated after the R5 growth stage.” Because growth stage R6 is characterized by a full seed, fungicide should NOT be applied during the full seed stage.

PASSAGE III

14. **The correct answer is H.** According to the passage, “sea cucumbers are wormlike and tend to burrow.” The echinoderm pictured most resembles a worm so it is likely a sea cucumber.
15. **The correct answer is C.** According to Table 1, sea lilies are *crinoids*. Table 2 shows that sea lilies are most likely found in offshore mud and ooze, which best supports answer choice C.
16. **The correct answer is F.** According to Table 1, the feeding method of *halothurian* (sea cucumbers) is to swallow mud and sand; therefore, it is most likely that sea cucumbers burrow into the mud and sand in search of food. The other answer choices are not supported by the passage.
17. **The correct answer is B.** According to Table 1, *asteroids* (starfish) are predatory and use their tube feet to move. Table 2 indicates that starfish can be found on the deep-sea floor. This information best supports answer choice B.
18. **The correct answer is G.** According to the passage, “sea cucumbers are wormlike and tend to burrow.” Table 1 indicates that sea cucumbers feed by swallowing mud and sand, digesting any organic material, and ejecting whatever is left over. Sea cucumbers in large numbers could, simply by feeding, alter the physical and chemical composition of the sea floor. The other answer choices are not supported by the data.

PASSAGE IV

19. **The correct answer is C.** The passage states that the average starting weight of the guinea pigs in each group was 50 g. According to Table 2, the guinea pigs in Group 5 had the highest average

weight after 8 weeks (98 g). Guinea pigs in this group were given Feed V.

20. **The correct answer is J.** According to Table 1, the guinea pigs that were fed a grain-based feed with vitamin supplements (Group 2, Feed Q) gained an average of 32 grams over 8 weeks ($82 - 50 = 32$). Therefore, on average, these guinea pigs gained 4 grams per week ($32 \div 8 = 4$).
21. **The correct answer is C.** According to the question, the guinea pigs in Group 9 would receive Feed V (the same as Group 5) and a vitamin supplement. According to Table 2 and the information in the passage, the guinea pigs in Group 5 had the greatest average weight and height after 8 weeks. Additionally, the guinea pigs given a vitamin supplement (like in Group 6) showed more growth than the guinea pigs that did not receive vitamin supplements (such as Groups 7 and 8). Therefore, if Group 9 is given Feed V with vitamin supplements, the guinea pigs will most likely be even larger than those in Group 5, which best supports answer choice C.

22. **The correct answer is J.** The best way to answer this question is to examine each of the answer choices, and eliminate those that are not supported by the data in Table 2.

Answer choice F: Group 7 is the control group. Group 6 was given Feed W. It is not true that the guinea pigs in Group 6 are twice as long as the guinea pigs in Group 7 so eliminate answer choice F.

Answer choice G: Group 5 was given Feed V. It is not true that the guinea pigs in Group 5 weigh three times more than the guinea pigs in Group 7, so eliminate answer choice G.

Answer choice H: Group 8 was given Feed Y; guinea pigs in this group did not have the greatest average length, so eliminate answer choice H.

Answer choice J is correct, because it is true that the guinea pigs in Group 7, who received Feed X, are similar in both weight and length to the guinea pigs in Group 8, who received Feed Y.

23. **The correct answer is B.** The only difference between Group 3 (the control group) and Group 4 is that the guinea pigs in Group 4 were fed fruits and vegetables in addition to a grain-based feed. The students can hypothesize that those fruits and vegetables must have a relatively low nutritional value, since the guinea pigs in Group 4 did not grow any more than did the guinea pigs in the control group.

24. **The correct answer is F.** According to the results of the experiments, the guinea pigs in Group 8 gained the least amount of weight ($74 - 50 = 24$ grams) and had the smallest increase in average length ($23.25 - 20 = 3.25$ cm).

PASSAGE V

25. **The correct answer is B.** To answer this question, find the symbol for 403°K in the key, then find 2 hours on the x -axis. Move your finger up from the 2-hour mark until it intercepts the appropriate symbol. You will see that the symbol is at approximately 50% on the y -axis.
26. **The correct answer is J.** To answer this question, find the symbol for 423°K in the key, and then follow its movement on the graph. You will see that conversion stops at 8 hours, so eliminate answer choice F. The line is steepest from 0 to 2 hours, which suggests that this is the period during which most of the conversion took place.
27. **The correct answer is A.** In each experiment, 5% Ru/C catalyst was used. The temperature was varied in each experiment, and the conversion rates were dependent on the various temperatures. Two different types of acid were used.
28. **The correct answer is J.** The data in Table 1 and Table 2 indicate a direct relationship between time and percentage of conversion. As time increased, at each temperature the percent of acid converted also increased up to a certain point, at which time conversion stopped.
29. **The correct answer is A.** The conversion of propionic acid was studied in Experiment 2, the results of which are shown in Table 2. According to Table 2, the conversion of propionic acid at 403°K stops at 8 hours, which does not support the chemist's claim.
30. **The correct answer is H.** The results of Experiment 2 are shown in Table 2. To answer this question, find the symbol for 423°K in the key, and then follow its movement on the graph. Notice that at 12 hours, the PA is approximately 80% converted. It makes sense that, if the conversion continued, 100% of the acid would be converted sometime between 12 and 14 hours.

PASSAGE VI

31. **The correct answer is D.** The passage states that, "Levels near properly adjusted gas stoves are often 5.0 to 15.0 ppm and those near poorly adjusted stoves may be 30.0 ppm or higher."

Because Home 1 has CO levels greater than 25.0 ppm, it is the most likely home to have a poorly adjusted gas stove.

32. **The correct answer is G.** According to Table 1, Home 2 has CO levels between 15.0 and 25.0 ppm. The passage states that average CO levels in homes without gas stoves are between 0.5 and 5.0 ppm, which means the CO levels in Home 2 are above average.
33. **The correct answer is A.** The passage states that, "Levels near properly adjusted gas stoves are often 5.0 to 15.0 ppm and those near poorly adjusted stoves may be 30.0 ppm or higher. CO levels between 0.5 and 15.0 ppm are considered safe." This information best supports answer choice A. The remaining answer choices indicate safe levels.
34. **The correct answer is H.** According to Table 1, Home 4 has CO levels between 1.0 and 5.0 ppm. The passage indicates that levels between 0.5 and 15.0 ppm are considered safe. Therefore, the CO levels in Home 4 are not dangerous, so if it has a gas stove, the stove is properly adjusted and does not have to be removed.
35. **The correct answer is C.** According to the passage, "CO levels between 0.5 and 15.0 ppm are considered safe." Therefore, a CO level of 10.0, as found in Home 6, will not pose any danger to the residents.

PASSAGE VII

36. **The correct answer is G.** According to the passage, Plot B received applications of high-nitrogen fertilizer, whereas Plot A received applications of low-nitrogen fertilizer. Both Table 1 and Figure 1 indicate that the leachate from Plot B always contained higher average nitrogen levels than the leachate from Plot A. This information best supports answer choice G.
37. **The correct answer is A.** The passage states that, "The leaching of high concentrations of nitrogen into natural waterways can throw off the environmental equilibrium of the aquatic ecosystem, often resulting in an increase in plant growth that can have a negative impact on the native fish populations." Therefore, if low-nitrogen fertilizer is applied, any leachate into surrounding waterways should have low concentrations of nitrogen, and the native fish populations will not be affected.

- 38. The correct answer is H.** According to Table 1, the average nitrogen concentration in the leachate from both plots during 2003 was higher than in previous or subsequent years. Therefore, more nitrogen was leached from the soil in 2003, suggesting that this year experienced heavy rainfall during the months of the study.
- 39. The correct answer is B.** According to Table 1, only Plot A had average nitrogen concentrations less than 10 mg/L. Because this plot received a fertilizer application containing 98 kilograms of nitrogen per acre, you can conclude that the

Environmental Protection Agency would consider this application safe.

- 40. The correct answer is H.** According to the passage, the nitrogen levels in the fertilizer applied to Plot B were reduced in 2004. However, Table 1 shows that the nitrogen concentration in the leachate from Plot B was 11.8 mg/L, which is still considered unsafe. In 2005, the concentration had gone down to a safe 8.2 mg/L. Therefore, you can conclude that it will take more than one year to reach safe nitrogen levels in the leachate. The other answer choices are not supported by the data.