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https://www.100test.com/kao_ti2020/126/2021_2022_GMAT_E8_80_83_E8_AF_95_c89_126892.htm Passage 23

New observations about the age of some globular clusters in our Milky Way galaxy have cast doubt on a long-held theory about how the galaxy was formed. The Milky Way contains about 125 globular clusters (compact groups of anywhere from several tens of thousands to perhaps a million stars) distributed in a roughly spherical halo around the galactic nucleus. The stars in these clusters are believed to have been born during the formation of the galaxy, and so may be considered relics of the original galactic nebula, holding vital clues to the way of the formation took place. The conventional theory of the formation of the galaxy contends that roughly 12 to 13 billion years ago the Milky Way formed over a relatively short time (about 200 million years) when a spherical cloud of gas collapsed under the pressure of its own gravity into a disc surrounded by a halo. Such a rapid formation of the galaxy would mean that all stars in the halo should be very nearly the same age. However, the astronomer Michael Bolte has found considerable variation in the ages of globular clusters. One of the clusters studied by Bolte is 2 billions years older than most other clusters in the galaxy, while another is 2 billion years younger. A colleague of Bolte contends that the cluster called Palomar 12 is 5 billion years younger than most other globular clusters. To explain the age differences among the globular clusters, astronomers are taking a second look at “renegade” theories. One

such newly fashionable theory, first put forward by Richard Larson in the early 1970's, argues that the halo of the Milky Way formed over a period of a billion or more years as hundreds of small gas clouds drifted about, collided, lost orbital energy, and finally collapsed into a centrally condensed elliptical system. Larson's conception of a "lumpy and turbulent" protogalaxy is complemented by computer modeling done in the 1970's by mathematician Alan Toomre, which suggests that closely interacting spiral galaxies could lose enough orbital energy to merge into a single galaxy. 137. The passage is primarily concerned with discussing (A) the importance of determining the age of globular clusters in assessing when the Milky Way galaxy was formed (B) recent changes in the procedure used by astronomers to study the formation of the Milky Way galaxy (C) current disputes among astronomers regarding the size and form of the Milky Way galaxy (D) the effect of new discoveries regarding globular clusters on theories about the formation of the Milky Way galaxy (E) the origin, nature, and significance of groups of stars known as globular clusters 138. According to the passage, one way in which Larson's theory and the conventional theory of the formation of the Milky Way galaxy differs is in their assessment of the (A) amount of time it took to form the galaxy (B) size of the galaxy immediately after its formation (C) particular gas involved in the formation of the galaxy (D) importance of the age of globular clusters in determining how the galaxy was formed (A) (E) shape of the halo that formed around the galaxy 139. Which of the following, if true, would be most useful in supporting the conclusions drawn

from recent observations about globular clusters?(A) There is firm evidence that the absolute age of the Milky Way galaxy is between 10 and 17 billion years.(B) A survey reveals that a galaxy close to the Milky Way galaxy contains globular clusters of ages close to the age of Palomar 12.(C) A mathematical model proves that small gas clouds move in regular patterns.(D) Space probes indicate that the stars in the Milky Way galaxy are composed of several different types of gas. (E)(E) A study of over 1,500 individual stars in the halo of the Milky Way galaxy indicates wide discrepancies in their ages. 140. If Bolte and his colleague are both correct, it can be inferred that the globular cluster Paloma 12 is approximately(A) 5 billion years younger than any other cluster in the galaxy(B) the same age as most other clusters in the galaxy(C) 7 billion years younger than another cluster in the galaxy(D) 12 billion years younger than most other clusters in the galaxy (C)(E) 2 billion years younger than most other clusters in the galaxy 141. The passage suggests that Toomre ' s work complements Larson ' s theory because it(A) specifies more precisely the time frame proposed by Larson(B) subtly alters Larson ' s theory to make it more plausible(C) supplements Larson ' s hypothesis with direct astronomical observations(D) provides theoretical support for the ideas suggested by Larson (D)(E) expands Larson ' s theory to make it more widely applicable 142. Which of the following most accurately state a finding of Bolte ' s research, as described in the passage?(A) The globular clusters in the Milky Way galaxy are 2 billion years older than predicted by the conventional theory.(B) The ages of at least some globular clusters in the Milky

Way galaxy differ by at least 4 billion years. (C) One of the globular clusters in the Milky Way galaxy is 5 billion years younger than most others. (D) The globular clusters in the Milky Way galaxy are significantly older than the individual stars in the halo. (B) (E) Most globular clusters in the Milky Way galaxy are between 11 and 15 billion years old. 143. The author of the passage puts the word

“renegade” (line 29) in quotation marks most probably in order to (A) emphasize the lack of support for the theories in question (B) contrast the controversial quality of the theories in question with the respectable character of their formulators (C) generate skepticism about the theories in question (D) ridicule the scientists who once doubted the theories in question (E) indicate that the theories in question are no longer as unconventional as they once seemed

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