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https://www.100test.com/kao_ti2020/124/2021_2022_GRE_E6_9C_80_E6_96_B0_E7_c86_124082.htm (20) ness and fitness. What would be the shape of the combustion chamber? Where should the valves be placed? Should it have a long or short piston? Such questions have a range of answers that are supplied by experience, by physical requirements, by limitations of available (25) space, and not least by a sense of form. Some decisions, such as wall thickness and pin diameter, may depend on scientific calculations, but the nonscientific component of design remains primary. Design courses, then, should be an essential element (30) in engineering curricula. Nonverbal thinking, a central mechanism in engineering design, involves perceptions, the stock-in-trade of the artist, not the scientist. Because perceptive processes are not assumed to entail “hard thinking,” nonverbal thought is sometimes seen as a primitive (35) stage in the development of cognitive processes and inferior to verbal or mathematical thought. But it is paradoxical that when the staff of the Historic American Engineering Record wished to have drawings made of machines and isometric views of industrial processes for (40) its historical record of American engineering, the only college students with the requisite abilities were not engineering students, but rather students attending architectural schools. It courses in design, which in a strongly analytical (45) engineering curriculum provide the background required for practical problem-solving, are not

provided , we can expect to encounter silly but costly errors occurring in advanced engineering systems. For example , early models of high-speed railroad cars loaded with sophisticated (50) controls were unable to operate in a snowstorm because a fan sucked snow into the electrical system. Absurd random failures that plague automatic control systems are not merely trivial aberrations ; they are a reflection of the chaos that results when design is assumed to be primarily a problem in mathematics. 21. In the passage , the author is primarily concerned with (A) identifying the kinds of thinking that are used by technologists (B) stressing the importance of nonverbal thinking in engineering design (C) proposing a new role for nonscientific thinking in the development of technology (D) contrasting the goals of engineers with those of technologists (E) criticizing engineering schools for emphasizing science in engineering curricula 22. It can be inferred that the author thinks engineering curricula are (A) strengthened when they include courses in design (B) weakened by the substitution of physical science courses for courses designed to develop mathematical skills (C) strong because nonverbal thinking is still emphasized by most of the courses (D) strong despite the errors that graduates of such curricula have made in the development of automatic control systems (E) strong despite the absence of nonscientific modes of thinking 23. Which of the following statements best illustrates the main point of lines 1-28 of the passage ? (A) When a machine like a rotary engine malfunctions , it is the technologist who is best equipped to repair it. (B) Each

component of an automobile—for example , the engine or the fuel tank—has a shape that has been scientifically determined to be best suited to that component's function (C) A telephone is a complex instrument designed by technologists using only nonverbal thought (D) The designer of a new refrigerator should consider the designs of other refrigerators before deciding on its final form. (E) The distinctive features of a suspension bridge reflect its designers' conceptualization as well as the physical requirements of its site.

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