

Part A: Vocabulary

Directions: Choose the word or phrase (1), (2), (3), or (4) that best completes each sentence. Then mark the correct choice on your answer sheet.

- 1- He is a woman of ----- who has never abandoned his principles for the sake of making money.
1) utility 2) integrity 3) treaty 4) acrimony
- 2- The loud sound of the radiator as it released steam became an increasingly annoying -----.
1) interval 2) perception 3) zenith 4) distraction
- 3- Jackson's poor typing skills were a ----- to finding employment at the nearby office complex.
1) hindrance 2) supplement 3) confirmation 4) versatility
- 4- The judge dismissed the extraneous evidence because it was not ----- to the trial.
1) obedient 2) treacherous 3) pertinent 4) vulnerable
- 5- Because biology is such a ----- subject, it is subdivided into separate branches for convenience of study.
1) deficient 2) consistent 3) broad 4) mutual
- 6- In addition, physicians may have difficulty in deciding that an illness can be ----- the job. Many industrial diseases mimic sickness from other causes.
1) attributed to 2) precluded from 3) refrained from 4) exposed to
- 7- Mechanics was one of the most highly developed sciences ----- in the Middle Ages.
1) extracted 2) persisted 3) resolved 4) pursued
- 8- In the absence of death from other causes, all members of a population may exist in their environment until the ----- of senescence, which will cause a decline in the ability of individuals to survive.
1) ratio 2) onset 3) core 4) output
- 9- Before the invention and diffusion of writing, translation was ----- and oral; persons professionally specializing in such work were called interpreters.
1) subsequent 2) unilateral 3) eventual 4) instantaneous
- 10- Public attitudes toward business regulation are somewhat -----; most people resent intrusive government rules, yet they expect government to prevent businesses from defrauding or endangering them.
1) cogent 2) emotional 3) ambiguous 4) indifferent

Part B: Cloze Test

Directions: Read the following passage and decide which choice (1), (2), (3), or (4) best fits each space. Then mark the correct choice on your answer sheet.

The variety of successful dietary strategies (11) ----- by traditionally living populations provides an important perspective on the ongoing debate about how high-protein, low-carbohydrate regimens such as the Atkins diet compare with (12) ----- underscore complex carbohydrates and fat restriction. The fact that both these schemes produce weight loss is not surprising, (13) ----- both help people shed pounds through the same basic mechanism: (14) ----- major sources of calories. When you create an energy deficit —that is, when you consume fewer calories (15) ----- —your body begins burning its fat stores and you lose weight.

- | | | | |
|---------------------|---------------------------|--------------------|------------------|
| 11- 1) employed | 2) are employed | 3) is employed | 4) then employed |
| 12- 1) those that | 2) the ones they | 3) that which | 4) they |
| 13- 1) in fact | 2) although | 3) likewise | 4) because |
| 14- 1) limit | 2) limiting | 3) which limit | 4) with limiting |
| 15- 1) are expended | 2) that they are expended | 3) than you expend | 4) to expend |

PART C: Reading Comprehension

Directions: Read the following passage and answer the questions by choosing the best choice (1), (2), (3), or (4). Then mark the correct choice on your answer sheet.

Passage 1:

A long time ago, back in the "good old days," engineering was considered the art and science of making trade-offs. In many respects, it still is, but the pressures of the present-day marketplace are so persistent and so relentless, that it is often hard for us to appreciate that we can make trade-offs. It used to be said, with conviction, that of quality, schedule, and price, the customer could have any two, but not all three. Today, however, customers want all three; and if they cannot get them from one source, there is always someone else willing to promise them.

To compete in this marketplace, we need all the tools, knowledge, and resources we can obtain and learn to use effectively. In this section, Design of Experiments (DoE) and reliability engineering are recommended as effective tools for meeting today's market challenges. While each is effective in its own right, they are quite formidable when combined.

Design of Experiments (DoE) and reliability are different types of subjects. DoE is a means of obtaining and organizing knowledge, while reliability is a feature of a product. They are alike, however, in that they are applicable across the entire range of the product design, development, and use cycle. They are also alike in that they are most effective when used as tools by professionals in disciplines not usually associated with them, such as design engineering, process engineering, and even marketing and product procurement. Reliability is best assured when it is designed into the product by the design engineer, and built into the product by production personnel, rather than calculated externally by reliability professional. Likewise, DoE is best applied to a product design by the product engineer or to the production process by those responsible for production, rather than by a statistician whose career goal is to conduct experiments. These very useful methods are best assimilated if one takes a long, wide, and skeptical view of them. That is, the one who learns best is one who maintains a healthy innocence about a subject, who never forgets what is known from other sources, who never lets go of common sense, and who never forgets basic questions such as: What can go wrong? How will we know it went wrong? What will we do if it does go wrong? . How can we prevent its going wrong or mitigating its effects?

16- What is the main difference between DoE and reliability?

- 1) Reliability is a measure but DoE is a methodology.
- 2) Reliability is considered by engineers whereas DoE IS conducted by statisticians.
- 3) The main difference is about the disciplines in which they could be effective.
- 4) Reliability is more important than DoE in product design.

17- The first paragraph tells us that ----- .

- 1) balancing conflict features in a product does not help in today's markets
- 2) today's customers seek several quality characteristics from individual sources
- 3) a long time ago, engineers tried to collect whatever customers want into a single product
- 4) nowadays, the market requirements enforce manufacturer to release a set of products which meets customer's needs

18- The synonym of "Design" in "Design of Experiments" is ----- .

- 1) plan
- 2) decide
- 3) purpose
- 4) theme

- 19- It can be inferred from the last paragraph of the passage that ----- .
 1) DoE and reliability engineering are different in scope and application areas
 2) Bask and deep understating about the subject and the problem would increase the plicability and the effectiveness of considering reliability requirements and DoE simultaneously
 3) They are alike in assumption about the processes, input data and analysis methods, and the decisions could be made from their results
 4) Jomt consideration of reliability and DoE would always lead into the best results
- 20- The term "those" in the 10th line of the last paragraph is referred to ----- .
 1) Customer 2) Product engineer 3) Vender 4) Manufacturer

Directions: Choose the best choice (1), (2), (3), or (4) that best completes the sentence. Then mark it on your answer sheet.

- 21- The emotionally unstable person is always potentially a dangerous criminal, who causes untold misery to other persons and is a source of considerable and annoyance to law enforcement official.
 1) alleviation 2) gratitude 3) trouble 4) fortitude
- 22- Given a clear knowledge of what is expected of him, the subordinate requires in addition the definite assurance that he will have the of his superiors so long as his actions are consistent with established policies and are taken within the limits of his responsibility.
 1) support 2) authority 3) audacity 4) independence
- 23- A supervisor must his trust in people with a certain shrewdness that places him on guard against those not worthy of complete confidence.
 1) show 2) understand 3) balance 4) justify
- 24- When supervisors and subordinates trust each other, employee grievances rarely occur, and when they do appear, remedies are found.
 1) seldom 2) conscientiously 3) outrageously 4) easily
- 25- Supervisors should be trained to patterns of performance that are signs of trouble and to prepare for that trouble well in advance of the time when it is necessary to make a disciplinary decision.
 1) disparage 2) eliminate 3) require 4) recognize
- 26- It is generally accepted that a supervisor is at least as well informed about the work of his unit as are his subordinates he will fail to win their approval, which is essential to him if he is to supervise the unit effectively.
 1) unless 2) unfortunately 3) unessential 4) doubtfully
- 27- Some demands of employees will, if satisfied, result in a decrease in production. Some supervisors largely ignore such demands on the part of their subordinates and, instead, concentrate on the direction and production of work; others yield to such requests and thereby the production goals.
 1) attain 2) increase 3) value 4) neglect
- 28- The criticism that supervisors are discriminatory in their treatment of subordinates is to some extent..... , for the subjective nature of many supervisory decisions makes it probable that many employees who have not progressed will attribute their lack of success to supervisory favoritism.
 1) unavailable 2) knowledgeable 3) unavoidable 4) favorable

- 29- No training course can operate to full advantage without job descriptions, which indicate training requirements so that those parts of the job requiring the most training can be carefully analyzed before the training course is
 1) met 2) predicted 3) improved 4) started
- 30- The appraisal of the value of the employees in an organization is fundamental not only as a guide to the administration of salary schedules, promotion, demotion, and transfer, but also as a means of keeping the working force on its toes and of checking the of selection methods.
 1) recommendation 2) effectiveness 3) initiation 4) redundancy

ریاضی عمومی (۱ و ۲)

۳۱- مقدار $\int_0^1 e^{\sqrt{1-x}} dx$ ، کدام است؟

- (۱) $2\left(\frac{1}{e}-1\right)$ (۲) ۲
 (۳) $2e-1$ (۴) ۱

۳۲- فرض کنید Z_1, Z_2, Z_3, Z_4 بر محیط دایره به شعاع ۴ و به مرکز مبدأ مختصات قرار دارند؛ و رئوس یک مربع را تشکیل می‌دهند. در این صورت مقدار کدام یک از عبارات‌های زیر، با بقیه فرق دارد؟

- (۱) $Z_1^3 + Z_2^3 + Z_3^3 + Z_4^3$ (۲) $Z_1 + Z_2 + Z_3 + Z_4$
 (۳) $Z_1^2 + Z_2^2 + Z_3^2 + Z_4^2$ (۴) $Z_1^4 + Z_2^4 + Z_3^4 + Z_4^4$

۳۳- ظرفی به شکل نیمکره با شعاع ۴ سانتی‌متر را روی زمین قرار داده و درون آن تا ارتفاع ۳ سانتی‌متر از سطح زمین آب ریخته-ایم. حجم آب داخل ظرف کدام است؟

- (۱) 9π (۲) 18π
 (۳) 27π (۴) 64π

۳۴- فرض کنید $f(x) = \begin{cases} \left(1 + e^{\frac{1}{x}}\right)^{-1} & x \neq 0 \\ 0 & x = 0 \end{cases}$ باشد. در این صورت کدام گزینه صحیح است؟

- (۱) $f(x)$ در $x=0$ ، فقط پیوستگی راست دارد. (۲) $f(x)$ در $x=0$ ، پیوسته است ولی مشتق پذیر نیست.
 (۳) $f(x)$ در $x=0$ ، مشتق پذیر است. (۴) $f(x)$ در $x=0$ ، فقط پیوستگی چپ دارد.

۳۵- اگر $I = \int_0^{\pi} \frac{(\sin x)^\beta}{x^\alpha} dx$ باشد، به ازای کدام α و β های زیر I همگراست؟

- (۱) $\alpha = 2, \beta = -\frac{1}{2}$ (۲) $\alpha = \frac{1}{2}, \beta = -\frac{3}{4}$
 (۳) $\alpha = 2, \beta = \frac{1}{2}$ (۴) $\alpha = \frac{1}{2}, \beta = \frac{1}{4}$

۳۶- حاصل $\lim_{x \rightarrow +\infty} \left(\frac{\sinh x - 1}{\sinh x + 1} \right)^{\cosh x - 2}$ ، کدام است؟

- (۱) e^{-2} (۲) e^{-3}
 (۳) e^{-1} (۴) e^{-6}

