**1 Answer the two questions from the list below.**

1. Which two meanings does the word *statistics* have?
2. What is *descriptive statistics*? How does it differ from *inferential* one?
3. What type of information is called meaningful?
4. What is *statistical interference*?
5. Give your own examples of the sample from the population.
6. How can we know whether the sample is representative or not?
7. Why do we investigate the sample not the population?
8. How are probability and statistics connected?
9. How do statistical techniques help in everyday business practice?
10. Why does Statistics suffer from a negative reputation?
11. What makes Statistics difficult to understand?
12. How does Business Statistics differ from Statistics?
13. Which basic skills does a person need to master Statistics?
14. Why should we validate facts used in statistical claims?
15. To what extant can we trust statistics in everyday life?
16. How would you explain the phrase “overstatistifying reports”?
17. What does the term *trend* mean? How to identify a trend?
18. What role do average values play in Statistics?
19. How to make sure that an average value is accurate and represents the nature of the population?
20. Why do analysts need three average indices: mean, median and mode, and not the mean only?
21. How do analysts decide which type of average to choose in their analysis?
22. Using the distribution given below calculate: mean, median, mode.
23. What does the phrase *reasonable expectation* mean?
24. What is the real value of statistical techniques?
25. What does the analysis of the past / future include?
26. What is a financial statement? What is a financial statement based on?
27. Given uncertainty of the future are absolute statistical conclusions possible?
28. How does accountants’ work differ from one of statistical analysts?
29. How to succeed in anticipating questions which have not been asked yet?
30. How do statistics expressed visually help readers to understand your report?
31. Why is it difficult to communicate the relative meaning of numbers?
32. How complex should be an efficient graph?
33. How to identify time and value for a graph?
34. How to understand the tip *Balance the graph*?
35. What are the rules for proper scaling?

**2 Render one of the texts below into English**

**Text 1**

Современную статистику отличает от «государствоведения» прошлых столетий не только значительно выросшая полнота и разносторонность содержащихся в ней сведений. В отношении характера сведений к ней теперь относят только то, что получает количественное выражение. Например, количественные данные о численности населения, пользующегося тем или иным языком в качестве своего разговорного, количественные данные о распределении населе­ния, промышленности по регионам, и т.д.

Общая черта сведений, составляющих статистику, — они все­гда относятся не к одному единичному (индивидуальному) явле­нию, а охватывают сводными характеристиками целый ряд та­ких явлений, или, как говорят, их совокупность. Индивидуаль­ное явление отличается от совокупности своей неразложимостью на самостоятельно существующие и аналогичные друг другу составные элементы. Совокупность же состоит именно из таких элементов. Исчезновение одного из элементов совокупности не уничтожает ее как таковую.

Таким образом, статистика имеет дело, прежде всего, с ко­личественной стороной явлений и процессов общественной жиз­ни. Одной из характерных особенностей статистики является то, что при изучении количественной стороны общественных явле­ний и процессов она всегда отображает качественные особеннос­ти исследуемых явлений, т.е. изучает количество в неразрывной связи, единстве с качеством.

Качество в научно-философском понимании — это свойства, присущие предмету или явлению, которые отличают данный пред­мет или явление от других. Качество — это то, что делает предме­ты и явления определенными. Пользуясь философской термино­логией, можно сказать, что статистика — это наука, изучаю­щая количественную сторону массовых общественных явлений в неразрывной связи с их качественной стороной, количествен­ное выражение закономерностей общественного развития.

Теоретической основой предмета статистики являются по­ложения социально-экономической теории и принципы диалектического метода познания.

**Text 2**

Описательная статистика позволяет с помощью специальных методов осуществить удобное представление данных для последующего анализа в виде частотных распределений, графических изображений и различных характеристик.

Общей чертой сведений, составляющих статистику, служит то, что в каждом конкретном случае объектом статистического изучения является статистическая совокупность, состоящая из качественно однородных единиц, но отличающихся по каким-то другим признакам. Качественная однородность элементов совокупности определяется исходя из цели исследования. Генеральной совокупностью называются все изучаемые однородные объекты, выборка - специально организованная часть генеральной совокупности.

Задача получения необходимой информации решается с помощью двух взаимно дополняющих принципов: выборочного метода и свертки информации. Первый предусматривает отказ от генеральной совокупности в пользу выборки, второй - заменяет всю выборку несколькими числами (ее характеристиками). Статистические характеристики различают как для генеральной совокупности, так и для выборки. Необходимо сделать несколько замечаний по применению статистических методов:

1. результаты статистического анализа могу противоречить действительности, это происходит тогда, когда исследователь не понимает проблемы либо применяемых статистических методов.
2. существует возможность умышленно вводить в заблуждение с помощью статистики.
3. в последнее время специалисты стараются применять все более тонкие статистические методы. Такой практики следует избегать, так как цель анализа не показать знание сложных аналитических методов, а правильно решить задачу.

Статистические методы в современной жизни находят свое применение в самых разнообразных областях: в экономике (исследования рынка и производства, контроль качества продукции, подбор кадрового персонала, предсказания конъюнктуры рынка и т.д.), в управлении (аппарат которого нуждается в информации о народонаселении, совокупном общественном продукте, внешней торговле). Без применения статистических методов практически невозможно никакое социально-научное исследование. С появлением компьютера, статистика проникает и в медицину, биологию, психологию и другие науки.

В зависимости от учреждений, использующих статистические методы, различают официальную и неофициальную статистику. Под официальной статистикой понимают статистические исследования и меры по сбору информации, предпринимаемые в соответствии с правительственными распоряжениями. К неофициальной статистике относят исследования, проводимые в фирмах, институтах общественного мнения и на предприятиях.

**3 Read one of the texts below and produce a summary.**

**Text 1**

**Accuracy in samples**

If you attempt to study an entire population and its size is too large for timely and accurate reporting, your approach will lack the efficiency that sample studies provide. Many populations (including the number of transactions occurring in a large company, units of production, or the number of customers you serve) are too diverse and too large for detailed study; thus, the use of a representative sample is a logical and time-saving alternative.

Entire populations cannot always be studied, not only because they are large, but because the purpose itself might not be served by a thorough analysis. For example, a plant manager wants to determine how long employees can work without the rate of defects increasing. If one shift produces 20,000 units per hour, it would be very expensive to work that shift for many hours without pause to find the point at which defect rates begin to rise. Similarly, a stress test applied to a sample of products would indicate the point of breakage; it would serve no purpose to apply that test to every unit manufactured.

Although it is not necessary to test entire populations, the sample must be broad enough to be fair and accurate. A key criterion in using an isolated sample is: The sample must fairly represent the popula­tion. Although this point may seem obvious, it is often ignored in sample testing. A manager may select a sample likely to help draw a predetermined conclusion—even on an unconscious level. Thus, the proper use of sampling techniques must also involve an impartial mecha­nism for selection.

Example: An auditor wants to select a sample of disbursements over the past year. The first approach is to pick 200 checks from a population of 10,000; however, the auditor picks each one by hand and unintention­ally concentrates on only one type of disbursement. It does not necessar­ily reflect the error rate of the population. As an alternative, the range of check numbers is isolated, and 200 are selected at random.

Example: A customer service manager wants to study the response time to customer requests. She first makes the selection according to the type of call; however, this approach is flawed, because response times vary by complexity of request. The sample is revised to study every twentieth call received.

Example: A company conducts a survey of existing customers to determine whether a new product will find acceptance. The first sample, however, is of customers who buy from the company regularly. Man­agement realizes that this is not representative of the "typical" or "average" customer and conducts another survey at random that is not limited to a particular type of customer.

In the last example, the flaw is obvious. It might be that repeat customers were selected in the belief that they would be most likely to respond to a survey. But that very selection made the sample unrepresen­tative. For the sample to be fair, it must be selected for the right reasons, and not for the purpose of increasing response or affecting the sample's outcome.

A sample cannot be expected to produce accurate results if condi­tions have changed since the sample information was gathered. This is a critical point, and one that is often forgotten by those who depend too heavily on statistical information without a corresponding review of the nonstatistical facts and conditions.

Example: A manager conducts a statistical study to determine how quickly newly hired employees are trained to perform their jobs. He studies a sample of employees hired last year. However, overlooked in this study is the fact that new training techniques have been put into place since those employees were hired.

We cannot always know for certain that a particular sample will be truly representative of the population, even when that sample is taken at random and current conditions are identical to the time that the sample was taken. However, random sampling docs remove all preconditions and assumptions that may be present with other methods. An auditor may unconsciously select only the largest transactions; or the customer service manager may believe that a certain type of request is representa­tive when, in fact, it is not. Even with an attempt to achieve objectivity, a poorly drawn sample will mislead and cause an inaccurate result.

**Text 2**

**The probability factor**

The reliability of a sample can be estimated with reasonable certainty under the rules of probability. In a sense, probability is the mathematical opposite of statistics: A probability is the study of results when a process

is well understood; a statistic shows us the result when we're not sure how the process occurs.

Example: If you flip a coin 100 times, heads is likely to come up 50 times. We understand that the chance is 50-50. The process is under­stood.

Example: A review of 100 coin flips shows that in one instance heads came up 53 times; in another, it came up 49 times; and in a third test, heads appeared 48 times. From these results, it may be statistically concluded that, on average, heads appears half the time. From this information, the future number of heads can be estimated statistically, even if we do not understand the process that determines the result.

You use probability estimates to judge the risk in a decision or to protect against the chance of a future loss. Even if the loss is unlikely to occur statistically, probability may demand protection.

Example: Your company owns a warehouse and stores its inventory there. The total value of the facility and goods exceeds $12 million. With the science of probability, your insurance company can tell you that a fire or other loss will occur in one of every 10,000 warehouses; thus, your chances of suffering a loss are very low. However, your company could not afford a loss of that magnitude, so it purchases insurance and pays premiums to protect its assets. Statistically, companies that install sprinkler systems suffer fewer losses than those that do not. So, your company is able to reduce its insurance costs by installing sprinklers.

In this case, probability and statistics both apply. First is the remote probability of a catastrophe—one that is unlikely to occur but that would represent a serious loss of value. Second is the statistical fact that risk— to the company and to the insurer—is drastically reduced with safety measures.

In the evaluation of business risk in many forms, probability and statistics are closely related ideas.

Using the concepts of statistical inference—carefully selecting a representative sample of a larger population—will help reduce the anal­ysis of any task to a manageable level. And as long as you select a sample on an impartial basis, the probability that it is representative will increase. Thus, the basic principles of probability can be applied to the very process you use in approaching a large-population problem and in developing a statistical base for study.

This idea is best demonstrated by referring again to the example of insuring business assets. The insurance company sets its premium rates according to historical incidents of loss. The premium charged to each policyholder must be adequate to cover the expected losses of the population of businesses with warehouses, as well as the insurer's own overhead and profit requirements. As statistical information changes, premiums are adjusted to reflect newer, updated information.

At any given time, the probability of a loss must be calculated on the likely rate of loss. However, the statistical information available to the actuaries setting rates constantly changes those rates. If more losses occur with certain types of properties, materials, or locations, that statistical information must be incorporated into the probability study. And if, by taking safety measures, a company reduces its exposure to loss, the rates may be reduced.