



考試科目： 工程英文

系所名稱： 輪機工程學系碩士在職專班不分組

1.答案以橫式由左至右書寫。2.請依題號順序作答。

將下列四段英文翻譯成中文

1. (35%)Utilizing quality costs for decision making

Quality costs can be used as a justification for actions taken to improve the product or service. Typically, investments in new equipment, materials, or facilities require the project sponsor to determine which project will provide the greatest return on investment. These calculations traditionally include information on labor savings, production time savings, and ability to produce a greater variety of products with better quality. The “better quality” aspect of these calculations can be quantified by investigating the costs of quality, particularly the failure costs. It is important to determine the costs of in-process and incoming material inspection, sorting, repair, and scrap as well as the intangible costs associated with having a nonconforming product or service reach the customer. Making a decision with more complete quality information, such as product appraisal costs, can help determine the true profitability of a product or service.

Once quality costs are identified, those reviewing the project can determine if the money for the project is being well spent to prolong the growth of the company. Identifying and quantifying quality costs has a twofold benefit. Cost savings are identified and quality is improved. By improving the quality performance of a company, the company also improves its quality costs.

2. (15%)Introduction to mechanism and kinematics

Imagine being on a design and development team. The team is responsible for the design of an automotive windshield wiper system. The proposed vehicle is a sports model with an aerodynamic look and a sloped windshield. Of course, the purpose of this wiper system is to clean water and debris from the windshield, giving clear vision to the driver. Typically, this is accomplished by sweeping a pair of wipers across the glass.

3. (35%) Trends in manufacturing

This section considers several trends that are affecting the materials, processes, and systems used in manufacturing. These trends are motivated by technological and economic factors occurring throughout the world. Their effects are not limited to manufacturing; they impact

society as a whole. The discussion is organized into the following topics areas: (1) lean production and Six Sigma, (2) globalization, (3) environmentally conscious manufacturing, and (4) microfabrication and nanotechnology.

Lean production is based on the Toyota Production System developed by Toyota Motors in Japan. Its origins date from the 1950s, when Toyota began using unconventional methods to improve quality, reduce inventories, and increase flexibility in its operations.

Six Sigma was started in the 1980s at Motorola Corporation in the United States. The objective was to reduce variability in the company's processes and products to increase customer satisfaction. Today, Six Sigma can be defined as "a quality-focused program that utilize worker teams to accomplish projects aimed at improving an organization's operational performance".

4. (15%) Hooke's Law

Suppose a flexible spring is suspended vertically from a rigid support and Then a mass m is attached to its free end. The amount of stretch, or elongation, of the spring will, of course, depend on the mass: masses with different weights stretch the spring by differing amounts. By Hooke's law, the spring itself exerts a restoring force F opposite to the direction of

Elongation and proportional to the amount of elongation s . Simply stated, $F = ks$, where k is a constant of proportionality called the spring constant. The spring is essentially characterized by the number k . For example, if a mass weighing 10lb stretches a spring 1/2 ft, then $10 = k(1/2)$ implies $k = 20$ lb/ft.