فصل اول

« واژگان و اصطلاحات متداول در مهندسی صنایع »

واژگان و اصطلاحات متداول در مهندسی صنایع

Accident rate (نرخ تصادف، نرخ وقوع تـصادف)A measure of the disabling accidents occurring in any specified exposure of workers to employment hazards. 1.Frequency rate – the number of disabling or lost- time accidents in an exposure of 1 million labor-hours worked.2.Severity rate: the total number of lost labor-days charged to disabling accidents during an exposure of 1 million labor-hours worked.

Accounts receivable (حساب‌های دریافتی) Payments owed for products sold.

Accuracy (دقـت) Degree of correctness or exactness. The relationship between the mean value of a large number of measurements and the objective true value of the quality or metric measured .

Activity (فعالیـت) (Time study usage)The number of times a given operation or occurrence is repeated during a given period, usually a year.

Activity network (شـبکه فعالیـت(هـا)) A representation of two particular aspects of a project: (1) the precedence relationship among the activities and (2)the duration of each activity.

Administration (سـازمان، سـاز وکـار، اداره) The function that is concerned with the determination of the general objectives, major policies, and organizational structure of an enterprise.

Algorithm (الگوریتم) A prescribed set of well-defined rules for the solution of a problem in a finite number of steps.

Allowance (زمـان خـستگی مجـاز) A time increment included in the allowed time for an operation to compensate the worker for production lost due to fatigue and normally expected interruptions, such as for personal and minor, Unavoidable delays. It is usually applied as a percentage of the normal or leveled time in the standard.

Americans with Disabilities Act (ADA) (سند (قـانون) آمریکـایی‌هـای دارای نـاتوانی) Federal law that provides for access to products and services for all.

Assemble (سرهم کردن، مونتـاژ کـردن) The basic element employed when one or more objects are put on or into another object so that they fit or contact each other in a predetermined relation to form a unit.

Assembly (مونتاژ) Two or more parts or subassemblies joined together to form a complete machine, structure, or other article.

Assembly line (خط مونتـاژ) The arrangement of machines ,equipment , material, and workers that permits the work in process to progress sequentially from operation to operation until the product(or product component) has been assembled.

Attitude survey (بررسـی رفتـاری) A study of the opinions and attitudes of employees concerning established policies ,practices. working conditions, or some other facet of employee relations; a morale survey.

Automaticity (خودکـار بـودن، عملکـرد خودکـار) The degree to which an operator can perform hand, arm ,leg , or body motions or motion patterns without apparent mental direction as a result of practice.

Automation (اتوماسیون، خودکار سازی) A substitution of machine labor for human labor, either manual or intellectual.

Autonomation (خودمختاری سازی) The transfer of human intelligence to automated machinery so that the machine can detect the production of a single defective part and immediately stop while asking for help .In Japanese: jidoka.

Average straight time hourly earnings (متوسط عواید مستقیم ساعتی) Pay rate for a given job class for one regular hour on the job or clocked in.

Avoidable delay (تاخیر قابـل اجتنـاب) Any time during an assigned work period that is within the control of the worker and which he uses for idling or for doing things unnecessary to the performance of the operation. Such time dose not include allowance for personal requirements, fatigue , and unavoidable delays.

(B)

Back flush (کاهش سریع ، بازگشت سریع) To deduct component inventory when production is recorded.

Backward scheduling (زمانبندی رو به عقب) Selecting the due date of an order .From this date the manufacturing system determines the suggested start time.

Balance (توازن، تعادل) 1.The quality of motion sequence that promotes the development of rhythm and automaticity.2.As applied to progressive-related operations ,it is the condition in which the standard times required for each successive operation are approximately equal and the work flows steadily or at a desired rate from one operation to the next.

Balanced line (خط متوازن) A series of progressive-related operations with approximately equal standard time for each ,arranged so that work flows at a desired steady rate from one operation to the next.

Balancing delay (تأخیر تعادلی) The delay that occurs when one body member or person performs its work faster than another body member or person because of different motions due to the requirements of the layout or the required sequence of motions .The faster member or person must wait for the slower member or person, or must work more slowly to finish the work simultaneously with the slower body member or person.

Base wage rate (نرخ دستمزد پایه) The amount of pay per hour, or other unit of time ,established to compensate the worker for the requirements and conditions associated with a job. It is generally determined through job evaluation.

Basic division of accomplishment(work) ((بخش پایه‌ای کار (عملکرد) The smallest element of activity or inactivity used in any particular system of motion analysis .See Therblig .

Basic element (بخش پایه‌ای) See Basic division of accomplishment.

Basic motion (حرکت پایه‌ای) See Basic division of accomplishment.

Basic Motion Time(BMT) Study (مطالعه زمان حرکت پایه‌ای) A system of predetermined motion time standards .The essence of the system lies in the arbitrary definition of a basic motion as one time standard for procedures that are composed of human motions controlled only by the individual perform -ing them, and to do so without resorting to time study. An allied purpose is to facilitate the analysis of methods.

Batch processing (فرآوری دسته‌ای) Collection of data over a period of time to be sorted and processed as a group during a particular machine run .

Benchmark (ترازیابی) A typical job engineered performance standard .Sorted by skill and task area ,each benchmark contains a step- by- step operation method description, standard time and frequency for each step, Total time for the job , and the standard work group. Or range of time , into which the job falls.

Benchmarking (ترازیابی کردن) Comparison of existing practices to best practices in use for a given type of enterprise.

Benefit-cost ratio (نسبت فایده ـ هزینه) The monetary estimate of benefits, advantages . or gains from a project divided by the monetary costs of the project .

Bill of Material (BOM) ((لیست مواد (درخت محصول)) A list of all components and the quantity of those components needed to produce a product.

Binomial distribution (توزیع دو جمله‌ای) A frequency distribution that applies to events or phenomena that can be classified dichotomously.

Bit (بیت) A binary digit; a quantum of information; a single pulse in a group of pulses .

Bonus (پاداش) The portion of wages, In excess of base wages and overtime earnings, derived from incentive plan payments.

Break-even chart (نمودار نقطه سر به سری) A graphic representation of the relation between total income and total costs for various levels of production and sales indicating areas of profit and loss.

Break-even point (نقطه سر به سر) The level of sales or saving where profits start.

Break point (نقطه شکست) 1.The end of an element in a work cycle and the point at which a time study reading is made. 2. A specified place in a computer routine where the routine may be inter- rupted by external intervention or by a monitor routine.

Budget (بودجه) An organized statement of expected income and expenditures for a definite period to provide a criterion for judging performance during that period.

Buffer inventory ((موجودی بافر (کانبان)) See Kanban.

Burden (بار، بالا سری) See Overhead .

Business Process Reengineering(BPR) (مهندس مجدد فرایند کسب وکار) A fundamental rethinking and radical redesign of business processes to achieve dramatic improvement in the critical measures of performance such as cost, quality, productivity ,and speed.

Byte (بایت) A sequence of adjacent binary digits operated on as a unit and usually shorter than a word.

(C)

Capacity (ظرفیت) The maximum amount of customer demand that can be satisfied over a certain period of time.

Capacity bottleneck (گلوگاه ظرفیت) A machine or workstation that constricts or limits the flow or output of production to less than the demand.

Capacity constraint (محدودیت ظرفیت) The limiting factor in the capacity bottleneck.

Cell layout (چیدمان سلول) A shop floor grouping of machines and workers common to several products arranged to minimize material handling, work in process, and space requirements. Since mate- rial is moved by hand from one operation to the next, pallets and containers are only staged at the beginning and end points of the cell, not at each operation or machine.

Check study ((مطالعه بازنگری (بازمطالعه) See Restudy.

Computer-Aided Design (CAD) (طراحی به کمک کامپیوتر) A computer-aided drafting system that reduces the time to make 2D or 3D engineering drawing of floor plans, parts, and assemblies .Used to determine space requirements and flow, and allows for comparison of several alternatives and selection of the optimum one.

Concurrent engineering (مهندسی همزمان) simultaneous, coordinated efforts of all phases of engineering in product development.

Consistency (سازگاری) The degree of uniformity or agreement that exists among the actual times recorded for two or more repetitions of the same element during a time study.

Constant element (عنصر (المان) ثابت) 1. An element for which the leveled or normal time is always the same, regardless of the characteristics of the parts being worked on, as long as the method and the working conditions are unchanged .2.An element for which, under a specified set of conditions , the standard time allowances should always be the same. Example :Raise spindle a definite distance on a drill press of a certain size and make.

Continuous stopwatch method (روش زمانگیری متوالی / پیوسته) A continuous stopwatch observation method in which the cumulative time from the start of the first element is recorded in a series, rather than the element time from the start to end of element.

Control charts (نمودار کنترل، چارت کنترل) A chart in which some observed or computed property of a product or process is plotted, usually in the order of production, for the purpose of ascertaining the nature of the variation in the process and the possible need for corrective action.

Control system (سیستم کنترلی) An administrative system that has as its primary function the collection and analysis of feedback from a given set of functions for the purpose of controlling those functions.
Control may be implemented by monitoring and systematically modifying and systematically modifying parameters or policies used in those functions, or by preparing control reports that initiate useful action with respect to significant deviations and exceptions.

Cost center (مرکز هزینه) Any subdivision of an organization comprising workers, equipment, areas, activities , or combination of these that is established for the purpose of assigning or allocating costs.

Cost of goods sold (هزینه کالاهای فروخته شده) Labor, material, and overhead cost spent to produce finished products.

Cost reduction report (گزارش کاهش هزینه) A form designed to allow easy comparison of two or more methods, plans, designs, and the link on the basis of known or anticipated costs and savings.

Coverage (پوشش کاری (درصد راندمان)) Hours on standard compared to total work hours, expressed as a percentage.

Critical path (مسیر بحرانی) The sequence of jobs or activities in a network analysis project such that the total duration of the project is equal to sum of the durations of individual jobs in the sequence. There is no time leeway or slack (float) in any activity along the critical path. That is , if the time to complete one or more jobs in the critical path increases , the total time increases. See Network Analysis.

Critical Path Method (CPM) (روش مسیر بحرانی) A network technique for scheduling resources to accomplish a certain job within time constraints, preferably where time and cost estimates can be obtained with a relatively high degree of certainty.

Cross-functional team (تیم میان ـ عملیاتی) A tea composed of members from different functional areas or departments for better communication and synergy.

Cumulative lead time (زمان سررسید تجمعی) The sum of all standard lead times for all departments; used to schedule the arrival of parts in a department.

Cutting speed (سرعت برش) The relative velocity, usually expressed in meters(feet) per minute, between a cutting tool and the surface of the material from which it is removing stock.

Cycle time (زمان سیکل گردش کاری) The total time required to complete one repetition of an operation.

Cycle timing (زمان سنجی سیکل گردش کاری) 1.Observance of the total time required to complete a cycle. 2 .A time study technique used to time work elements that are too short to time in the usual manner. It consists of timing a cycle of a periodically recurring series of elements, first including and then excluding the element for which the time is needed. The needed time for element is obtained by subtraction.

(D)

Data processing (پردازش اطلاعات) The performance of certain functions on a selected body of information Four basic clerical functions are involved, whether they are performed manually or mechanically: input, the introduction of raw data the system; manipulation, the arrangement of data into a desired pattern; computation, the process by which arithmetic operations are performed on the data: and output ,the presentation of the results of manipulation and computation in the required form .These functions, together with the controls exercised over them, constitute a data processing system.

Day rate (نرخ (مزد) روزانه) Rate of compensation for day work as differentiated form incentive work .Usually expressed in terms of money paid of time.

Day work ((کار روز (مزد)) Work for which the hourly or daily compensation is not directly on the quantity of production ,as is the case in incentive work.

Debug (خطایابی) To isolate and remove all malfunctions from machines or equipment or all mistakes from a routine.

Decimal hour stopwatch ((ساعت زمان سنجی دهدهی (برحسب ساعت)) A two- handed timing device whose morement may be stanted or stopped manually and whose large outer dial is divided into 100 spaces, each of which represents 0.0001 hour The position of the small hand on a smaller, inner dial indicates time in hours to two decimal places.

Decimal minute stopwatch ((ساعت زمان سنجی دهدهی (برحسب دقیقه)) A two-handed timing device whose movement may be started or stopped manually and whose large outer dial is divided into 100 spaces, each of which represents 0.01 minute .The position of the large hand on the large dial indicates in minutes to two decimal places, and the position of the small hand on a smaller, inner dial indicates time in whole minutes.

Degree of flexibility (میزان درجه) انعطاف پذیری) A measure of how quickly an enterprise can adapt to change.

Delay(تاخیر) A period during which conditions (except those that intentionally change the physical or chemical characteristics of an object) do not permit or require immediate performance of the next planned action.

Delay allowance (تاخیر مجاز)1.a time increment included in a time standard to allow for contingencies and minor delays beyond the control of the worker.2 A separate credit (in time or money) to compensate the worker on incentive for a specific instance of delay not covered by the piece rate or standard.

Depreciation (استهلاک) The actual decline in the value of an asset to exhaustion, wear and tear,and obsolescence.

Differential piecework (کارمزد قطعه اضافی) A wage incentive plan that employs two or more piece rates. One piece rate is paid if the expected output is not attained. A higher piece rate is paid if the expected output is attained or exceeded .While originally devised by F.W. Taylor to provide only two piece rates, modifications of the plan provide for more than two.

Direct costing (هزینه یابی مستقیم) A cost method that charges to inventory , in addition to direct labor and direct material, those manufacturing costs that vary directly as a result of manufacturing the product.

Direct labor (نیروی کار مستقیم) work that alters the composition, condition, conformation, or construction of the product, the cost of which can be identified with and assessed against a particular part, product, or group of parts or products accurately and without undue effort and expense.

Direct labor standard (استاندارد نیروی کار مستقیم) A specified output or time allowance established for a direct labor operation.

Direct material (مواد اولیه مستقیم) All material that enters into and becomes part of the finished product (including waste),the cost of which can be identified with and assessed against a particular part, product, or group of parts or products accurately and without undue effort and expense.

Disassemble (دمونتاژ) The basic element denoting the removal of a part of a unit or assembly.

Dispose ((دورریز (ضایع کردن)) An element of a total operation that involves the laying aside and releasing or otherwise getting rid of a part, assembly, tool, hand, or other object during or at the end of the operation.

Downtime (زمان توقف) A period of time that is usually equal to or greater than a specified minimum during which an operation is halted due to a lack of materials a machinery breakdown. or the like.

Drop delivery (ارسال (جابجایی) نزولی) 1. The method of moving an object in the workplace by gravity. 2.A method whereby a chute or container is so placed that when work on a part in question is finished it will fall or drop into a chute or container or onto a conveyor with little or no transport by the worker. 3. The laying aside of a part by releasing it so that it falls or moves a way from the work area either through the force of gravity or by mechanical or other means.

فصل سوم

« گزیده متون و مقالات (مفاهیم نو در مهندسی صنایع) »

گزیده متون و مقالات (مفاهیم نو در مهندسی صنایع)

1) INTRODUCTION TO INDUSTRIAL ENGINEERING

Born in the late nineteenth century, industrial engineering is a dynamic profession whose growth has been fueled by the challenges and demands of manufacturing, government, and service organizations throughout the twentieth century. It is also a profession whose future depends not only on the ability of its practitioners to react to and facilitate operational and organizational change but, more important, on their ability to anticipate, and therefore lead, the change process itself.

The historical events that led to the birth of industrial engineering provide significant insights into many of the principles that dominated its practice and development throughout the first half of the twentieth century. While these principles continue to impact the profession, many of the conceptual and technological developments that currently shape and will continue to mold the practice of profession originated in the second half of the twentieth century.

2) PRODUCTIVITY DEFINED

Productivity generally expresses the relationship between the quantity of goods and services produced (output) and the quantity of labor, capital, land, energy, and other resources to produce it (input). When measured, productivity is often viewed as a relationship between output and single measure of input, such as labor or capital. When there are multiple input measures or indices, the equation becomes very complex, often requiring subjective weightings. This is where the seemingly simple definition of output versus input becomes complex and confusing.

The understanding of productivity has been further complicated by a growing realization that simply producing effectively does not necessarily mean one is productive. One must be producing what the marketplace needs, when it needs it, and at a competitive price. The ideal of meeting customer needs and expectations without error or waste has now entered the equation. This suggests that anything produced that the market dose not want can not be considered an output when calculating productivity. So now the output side of the calculation is also complex.

An example of this growing complexity can be seen examination of labor productivity. Industrial engineers have often placed most of their focus on the input. When considering labor productivity, the input is simply the quantity of labor expended. In a more sophisticated analysis, the industrial engineer will also consider things such as how effective the labor is by measuring performance, utilization, and method levels.

Even with this level of sophistication, the industrial engineer has typically only considered the value of the parts produced or the total standard hours produced as the output. The parts produced might sit in inventory, be sold at a discount, or may never be sold. Unless more attention is given to the output, making sure what is produced is meeting a customer demand, the industrial engineer will only be helping to improve the production of waste.

The definition of productivity must always reflect a comparison of output to input. The details of the definition depend on what is considered output and input. There is no perfect definition to suit each situation. The definition an organization uses should be a direct reflection of the purpose for making the measurement. In many cases, the purpose of making the measurement is to benchmark improvement. If that is the case, then the definition should

reflect the organization's measures of success. For example, if profitably delivering flawless products to the customer in a timely manner at a competitive price is considered success, then the organization's definition of productivity should reflect each aspect of that statement. Once the definition is constructed and productivity is measured, then the organization may use it to benchmark improvement and to analyze deficiencies.

3) ENGINEERING ECONOMICS: FUNDAMENTAL PRINCIPLES

Before developing the mathematical models appropriate to evaluating capital proposals, it will be useful to identify the fundamental principles that give rise to the rationale of capital allocation. Moreover, some of these principles lead directly to the quantitative techniques developed subsequently.

1. Only feasible alternative should be considered. The capital budgeting analysis begins with determination of all feasible alternatives, since courses of action that are not feasible, because of certain contractual or technological considerations, are properly excluded.
2. Using a common unit of measurement (a common denominator) makes consequences commensurable. All decisions are made in a single dimension, and money units – dollars, pounds, euros, yens, and so forth – seem to be most generally suitable. Of course, not all consequences may be evaluated in money terms. (See principle 9)
3. Only differences are relevant. The prospective consequences that are common to all contending alternatives need not be considered in an analysis because including them affects all alternatives equally.
4. All sunk costs are irrelevant to an economic choice. A sunk cost is expense or revenue that has occurred before the decision. All events that take place before a decision are common to all the alternatives, so sunk costs are not difference among alternatives.
5. All alternatives must be examined over a common planning horizon. The planning horizon is the period of time over which the prospective consequences of various alternatives are assessed. (The planning horizon is often referred to as the study period or period of analysis.)
6. Criteria for investment decisions should include the time value of money and related problems of capital rationing.
7. Separable decisions should be made separately. This principle requires the careful evaluation of all capital-allocation problems to determine the number and type of decisions to be made.
8. The relative degrees of uncertainty associated with various forecast should be considered. Because estimates are only predications of future events, it is probable that the actual outcomes will differ to a greater or lesser degree form the original estimates. Formal consideration of the type and degree of uncertainty ensures that the quality of the solution is evident to those responsible for capital-allocation decisions.
9. Decisions should give weight to consequences that are not reducible to monetary units. The irreducible as well as monetary consequences of proposed alternatives should be clearly specified to give managers of capital all reasonable data on which to base their decisions.

4) METHODS ENGINEERING AND WORKPLACE DESIGN: A BACKGROUND

Methods engineering is a systematic technique for the design and improvement of work methods, for the introduction of those methods into the work place, and for engineering their solid adoption. Methods engineering is one of the two basic industrial engineering (IE) techniques, the other being work measurement. In fact, these two were the starting point of IE and have been thoroughly researched and widely applied since the days of Frederick W.Taylor, Frank B.Gilbreth, and Lillian M.Gilberth. Later, the various IE techniques were continually refined and range of their application broadly expanded. And as part of that trend, the two main IE techniques were also changed and continually refined.

Nevertheless, they continue to hold their key position as the two cores technologies of IE. Methods engineering provides a unified and thorough system for (a) analyzing the present work situation, identifying problems bringing out improvement ideas and selecting the best of those, and then (b) after implementation of improvement standardizing the new methods, insuring their adoption, and measuring and evaluating their impact. As such, methods engineering has historically provided a backbone for the advancement of IE, and other IE techniques have broadened the range of the application of methods engineering and led to its further development and refinement.

In the past, methods engineering focused on manufacturing processes and operations as the main target for improvement, but in recent years its scope has increased to include indirect work, office work, and service work, Similarly, in the past the main approach was improvement of the existing work system, but recently, application of methods engineering has shifted to the design of new work system that did not previously exist. Likewise, the ultimate objective behind design and improvement of work system through the application of methods engineering has also broadened. Whereas in the objective was the improvement of labor productivity, today such objectives as balance between operator and work system from ergonomic viewpoint and the adaptation of the work system to the

environment from an ecological viewpoint are becoming important.

5) MESUREMENT OF WORK: AN INTRODUCTION

Work measurement is used to develop standard times needed to perform operations. Time standards have traditionally been defined as the time required by an average skilled operator, working at a normal pace, to perform a specified task using a prescribed method, allowing time for personal needs, fatigue, and delay. Time standards, work standards and standards of all types are clerical, pieces of management information that apply to manufacturing, assembly, clerical, and other work.

Standards provide information essential for the successful operation of an organization:

Data for scheduling: Production schedules cannot be set, nor can delivery dates be promised, unless times for all operation are known.

Data for staffing: the number of workers required cannot accurately be determined unless the time required to process the existing work is known. Continuing management of the workforce requires the use of labor variance reports. Labor variance reports are also useful for determining changes in work methods, especially the subtle or incremental changes.

Data for line balancing: The correct number of workstation for optimum work flow depends on the processing time, or standard, at each workstation. Operation times and setup times are key pieces of this information.

Data for materials requirement planning: MRP systems cannot operate properly without accurate work standards.

Data for system simulation: Simulation models cannot accurately simulate operation unless times for all operations are known.

Data for wage payment: to be equitable, wages generally must be related to performance. Comparing expected performance with actual performance requires the use of work standards.

Data for costing: Ultimately, the profitability of an organization lies in its ability to sell products for more than it costs to produce them. Work standards are necessary for determining not only the labor component of costs, but also the correct allocation of production costs to specific products.

Data for employee evaluation: in order to assess whether individual employees are performing as well as they should, a performance standard is necessary against which to measure the level of performance.

6) ERGONOMICS AND SAFETY: AN INTRODUCTION

When attempting to ergonomically analyze, evaluate, and redesign the workplace, the most valuable tool at an engineer's disposal is access to information. Ergonomics information in particular can provide the engineer with appropriate procedures for identifying potential hazards, quantifying specific risk factors, and developing feasible solutions for those jobs associated with work-related musculoskeletal disorders (WRMSDs).

This information can also yield design specifications that maximum human comfort or performance. The purpose of this chapter is to supply the engineer with various resources for ergonomics information. These resources can fall into one of there following categories: print, human/institutional, and electronic. The list of reference sources to follow is not exhaustive. These materials will, however, provide the nonspecialist whit a starting point to develop the basic tools necessary when conducting rudimentary ergonomic evaluations.

The information provided by the resources listed in this chapter will be based on of three types of ergonomics research, as defined by Sanders and McCormick (1993): descriptive, experimental, and evaluative.

Descriptive Research

These resources document collected data used by ergonomists in making many workplace design decisions. Such resources may include data tables that characterize a population by specific physical characteristics, subjective responses (i.e., preference), and physiological indices (e.g., heart rate). Descriptive resources can also provide information that assesses the magnitude and scope of a particular ergonomics-related problem (such as the incidence and severity of trauma disorders in industry).

Experimental Research

These resources document research that tests the effects of some variable (e.g., treatment) on human performance, behavior, or physiological response. Such research centers on the relative difference in human performance/response under various treatment conditions. The information found in experimental resources can be based on laboratory research or on data collected from field expeditions to actual industrial operations. The ergonomics professional can use information found in experimental resources to justify changes he or she may propose for the working environment. Experimental resources may also contain analytical tools useful for hazard evaluation and ergonomic intervention.

Evaluative Research

These resources seek to describe the performance and behavior of people using the system (e.g., workstation) or product (e.g., toothbrush). In evaluative research, the effect of something (system or product) on human performance, behavior, or physiological response is the primary focus. Most good evaluative research is conducted under conditions representative of those in which the system or product begin tested will actually be used. In addition, the subjects selected for good evaluative research are representative of the ultimate user population for the particular system or product. Evaluative resources can include case studies, which document the specific procedures involved in the ergonomic modification of a workstation, along with the benefits incurred from such an intervention. The ergonomic professional can use evaluative resources to assist in developing his or her own creative and effective ideas for improving a particular work environment from an ergonomics perspective.

One should note that a single source (print, human/institutional, and electronic) may possess information that is related to more than one category (descriptive, experimental, and evaluative) of ergonomics research.

7) TOTAL REWARDS DEFINED

Overview

Over the last few decades, American companies have endured (and survived) a difficult period during which world markets evolved and produced new competitors while traditional consumer and industrial demand flagged. American companies went back to the drawing boards to reinvent themselves. They shrank, they reengineered, they developed a process focus, and they implemented broad technological solutions.

The concept of competition changed, as did the concept of markets. The result has been the most dynamic economy seen in this country in a generation and a new emphasis on process improvement and change. Through such trials, organizations have come to realize that effective enterprise change cannot happen with a workforce that is not to task. It became

Clear that to make it all work, a dedicated, inventive, and dynamic workforce was needed. Achieving success with change demands an effective workforce. As a result, human resources including compensation have moved towards the center stage as a source of ideas and tools to ensure that an effective workforce is achieved. Successful companies, therefore, think strategically about compensation.

• Every dollar spent on compensation is held accountable for its contributions to the operation's performance

•Every dollar spent on compensation is treated as an investment in the continued success of the organization.

Total compensation includes the following four components:

1. Base pay level

Base pay is the amount of cash compensation paid on a regular basis (pay period). It is generally a measure of a position's worth to the organization given the duties its incumbents carry out and the competitive wage rate for that work in the external labor market.

2. Base pay progression

Base pay progression defines movement of base pay over time. Traditionally, increases are based on longevity with the company and merit, but increasingly, it is base on the acquisition of business-
related skills and competencies.

3. Variable pay

Variable pay is cash compensation that dose not roll into base pay. Variable pay is generally based on some measure of performance, either an individual measure, a team measure, or an organizational measure.

4. Benefits and indirect compensation

Benefits and indirect compensation are less tangible forms of compensation that companies offer, such as insurance or flexible hours. Although this is not cash that goes into an employee's pocket, this can have just as strong an effect, and a successful total compensation package will consider benefits and indirect compensation an equally integrated component of total rewards.

Taken together, the components of total rewards offer organizational leadership a powerful "toolbox" for motivating and developing the workforce into an industry leader. Companies that have been successful in compensation strategy have worked long and hard to develop their compensation package. Gone are the days when pay was a cost of doing business: today, it is consider an investment in organizational performance.

The case of an electronics company start-up illustrates how effective total compensation strategy can drive performance. The company established a new center for manufacturing a broad line of consumer electronics products in the early 1990s. The plant's mission was to become the world's leading supplier of products in the market. Management decided on the following strategies to achieve this mission:

• The plant would be based on high involvement principles.

• The workforce would work in teams.

• The manufacturing processes would be based on continuous improvement.

The start-up site represented a particular challenge because of its location in an area characterized by failed start-ups and labor- management conflicts. How did this company escape the ghosts in their new location that threatened a successful start-up? A major step involved taking a strategic look at total rewards.

Base Pay Level

The company designed base pay to accomplish primarily attraction and retention, particularly for high skilled employees. The objective was to ensure a stable workforce.

Base Pay Progression

A skill-based pay program was implemented. As employees grew skills were relevant to the manufacturing process, they could expect pay to grow to a target rate representing fair pay for a fully qualified process operator/technician. To encourage team development and cohesiveness, half of the pay steps were based on mastery and practice of team skills. The requirement ensured that the workforce grew both the technical and team skills that the company needed.

Variable Pay

To en courage continuous improvement, a variable pay called GoalSharing was implemented. GoalSharing provided additional pay as incentive for achieving continuous improvement on key process metrics (the "dials on the dashboard"). GoalSharing resulted in employee team focused on constantly improving the key measure of the business.

Benefits and Indirect Compensation

The company provided a competitive level of benefits (health, disability, pension, and savings plan). Beyond these elements, the most important element of indirect compensation was the working environment defining the plant's culture. It was an opportunity to be associated with a respected, growing company and to work on teams. Empowerment provided the freedom to aggressively pursue performance goals and ensured that the plant would become an employer of choice in the area.

Taking the time up front to develop a total rewards strategy ensured that compensation would contribute to a successful start-up. Today, almost a decade later, the plant is widely benchmarked as a best practice. The facility has high-involvement teams, with very low turnover and higher levels of labor productivity.

Every year in the new economy, stories like this one are increasingly common as companies base their success on strategically designed total rewards. Enlightened approaches to total rewards have been the key to the newfound strength of American companies, and will be the base for American competitive advantage in the twenty-first century.

8) FACILITIES PLANNING: A BACHGROUND

Determining the location of a new site or relocating from an existing site can have an astoundingly large impact on the bottom line. However, to truly assess this financial impact, all direct and indirect factors must be considered in totality. For example, a new site must be consistent with the future direction of the firm, including growth. In the age of the Internet, determining the right site is even more critical because of the growing impact of technology on an organization. Internet technology and the growth e-commerce affects distribution models (inbound and outbound disintermediation of distributors) and impacts labor because of new work processes such as telecommuting.

Traditionally, site selection decision makers strictly looked at real estate costs as the determining factor. However, potential labor cost savings can be much greater than real estate costs. Additional factors such as proximity to suppliers/customers, when quantified, can also outweigh the real estate cost considerations. A well-structured model can provide real estate manager with a tool to evaluate all the direct and indirect factors in a cost-benefit analysis for site selection, relocation, or expansion.

As corporations implement data warehousing solutions, the data required for effective modeling is more easily available. The increasing use of information technology to gather data for the move, model the move, and generate financial analysis enables manager to make quicker decision based on sound criteria and wider consensus. One such software model, as discussed in this chapter, is base on combination of using spreadsheet software with decision-making software.

The spreadsheet model analyzes the one-time cost and benefits associated with relocating to any number of possible sites. Theses potential sites are presented in a scenario format, each with varying assumptions. Each assumption is flexible so as to provide the user with a "what if" analysis capability. The purpose of the model is to provide site selection decision makers with a matrix of the costs and benefits of each potential scenario relative to one another.

تست‌های طبقه‌بندی شده فصل سوم

متن زیر را با دقت بخوانیدو سؤالات ۱ تا ۳ مربوط به این متن است.

In decision making under risk, the decision maker operates with less information than in the case of decision making under certainty .One may ask the question: Suppose that additional information can be obtained ; what will its value be to the decision maker? This discussion will be limited to the case where the obtained information changes the situation form one of risk to one of certainty ,that is, the decision maker, prior to the time a decision is to be made , is assumed to acquire perfect information ,information describing exactly which state of nature will occur next.(The frequency distribution of occurrences of the states of nature does not change – one just learns with certainty which state will occur next.)

The decision maker faces two decisions when perfect information is involved. First, if the perfect information were available, which alternative should be selected? Second should the perfect information be acquired ? The second decision is on the comparison of the benefit of the perfect information with its cost.

1- The difference between decision making under risk and under certainty is that, …… .

(مهندسی صنایع ـ سیستم‌های اقتصادی و اجتماعی و مدیریت سیستم و بهره‌وری ـ سراسری ۷۷)

1) in the second case we have information
2) in the first case we have more information
3) the second one is more dangerous
4) the first one is more difficult.

2- According to the passage, by getting more information the decision maker …… .

(مهندسی صنایع ـ سیستم‌های اقتصادی و اجتماعی و مدیریت سیستم و بهره‌وری ـ سراسری ۷۷)

1) can have a high frequency of occurrences of the states of nature
2) can describe the exact state of nature
3) can increase his knowledge of the world
4) can be sure which state of nature will occur next

3- According to the passage, when perfect information is needed we should ….. .

(مهندسی صنایع ـ سیستم‌های اقتصادی و اجتماعی و مدیریت سیستم و بهره‌وری ـ سراسری ۷۷)

1) immediately obtain it
2) consider its usefulness in comparison with its cost
3) decide upon the most expensive alternative
4) change the situation from one of risk to on of certainty

متن زیر را به دقت بخوانید. سوالات ۴ تا ۱۱ مربوط به این متن است.

Departmentalization by function is probably the most common form in modern enterprises. Finance, production, and sales functions are most typical , although research, engineering , and personnel also frequently – especially in larger organizations .In a sense, all organizations some functional departmentalization, simply because the division of labor by function seems such a natural way of doing things. A second advantage of departmentalizing by function is that groups of people performing similar tasks with similar can be formed..The resultant minimization of redundancies may lead to increased efficiencies. A third advantage is that one executive can take command of, and be responsible for, a single type of activity, without having to divide his time and energy among a variety of seemingly dissimilar tasks, thus facilitating the coordination of similar activities.

There are, of course, some disadvantages to functional departmentalization. The coordination of activities that cut across various function is not facillitated. One usually has to travel a long way up
the hierarchy to find a manager whose span includes the two or more functions about which a decision is required. In fact , the manager in question may be the president .Such an arrangement is cumbersome at best and may be grossly inefficient and wasteful of managers' time and energies.

A second , though similar, disadvantage is that effective control- especially financial –is difficult,for costs cannot easily be attributed to individual products.

Finally, departmentalization by function only accentuates the narrow specialized viewpoints that the division of labor produces. A manager who spends all his time in production, for example, may find it exceedingly difficult to consider company problems.

The relative disadvantanges of departmentalizing by function may make other forms of departmentalization more attractive. For example, a firm may decide to organize according to product .Under product departmentalization an executive is in charge of and responsible for all activities – for example, engineering , production , finance, and

فصل ضمیمه

« آزمون‌های نمونه »

آزمون‌های نمونه

IN THE NAME OF THE ALMIGHTY

History chronicles a small portion of the past that was suitable for print!

Winston Churchill

1- The institute encouraged the participations of teachers by providing them with travel expenses and lodgings.
1 2 3 4

2- In the novel, everyone they encounter try to thwart their efforts.
1 2 3 4

3- The beauty of Cyprus, with it's olive-covered mountains, sandy beaches, historical monuments, and picturesque villages is legendary.
1 2 3 4

4- It's the dream of every mountaineer to climb Everest, the world highest peak.
1 2 3 4

5- While searching for gold, the Spanish found Grand Canyon to be an impassably barrier
1 2 3 4

6- During the bleak winter, food became too scarce that starvation was widespread.
1 2 3 4

7- Belgian chocolate is considered by many to be finest in the world
1 2 3 4

8- Scientists worry that the continued future use of certain pollutants will damage ozone.
1 2 3 4

9- The Aswan High Dam has protected Egypt of the famines of countries in neighborhood.
1 2 3 4

10- Concorde could fly across the Atlantic without refueling and carrying eleven tons of freight
1 2 3 4

11- The war firstly … the economy of the country.
1) acquainted 2) disturbed 3) evaluated 4) justified

12- The new agreement between the two countries has … benefits for both nations.
1) revolt 2) faithful 3) clerical 4) mutual

13- Agricultural experts believe that the use of more up-to-date methods would improve our … .
1) fashion 2) race 3) efficiency 4) anxiety

14- The use of animals for plowing still … in many undeveloped countries.
1) imitates 2) judges 3) prevails 4) calculates

15- I wouldn't like to … on the reasons for her resignation.
1) preserve 2) speculate 3) depreciate 4) settle

16- I wouldn't like to … on the reasons for her resignation.
1) warned 2) modified 3) assembled 4) carried on

17- The workers start their work on … every day.
1) hypothesis 2) schedule 3) duration 4) prejudice

18- A … of bad events made the Roman Empire decline.
1) rank 2) confess 3) chancellor 4) succession

19- "Commitment" means ….
1) component 2) confusion 3) supervision 4) promise

20- I can see that she likes her job very much, because she works with great ….
1) enthusiasm 2) evidence 3) routine 4) millennium

21- We offered him our … on his good exam results.
1) generation 2) corruption 3) congratulation 4) depression

22- Management must take … responsibility for the late delivery.
1) rare 2) ultimate 3) outstanding 4) sound

23- He was … because of his incompetence in doing his duties.
1) pretended 2) permitted 3) persevered 4) fired

24- The manager agreed to give the workers a raise … that they would promise to work harder.
1) because 2) if 3) provided 4) for

25- Have you … on what you want to do next?
1) accused 2) made up your mind 3) tolerated 4) overthrown

26- Inexperienced people are … to failure.
1) exposed 2) imposed 3) supposed 4) disposed

27- The workers are … by the amount of decline in the company.
1) revealed 2) flourished 3) demoralized 4) expired

28- The company's profit has been steadily falling and the new managing director is to … it.
1) serve 2) sever 3) reverse 4) reserve

29- … means "the state of being fully grown or developed".
1) Transition 2) Maturity 3) Crisis 4) Turnaround

30- Too much … on statistical analyses can sometimes be the sign of weakness.
1) reliance 2) honesty 3) assistance 4) taste

IN THE NAME OF GOD

Some men see things as they are and say, "Why"?
I dream things that never were and say, "Why not"?

George Bernard Shaw

1- I have hardly some money, but I think I will be able to get a loan tomorrow.
1 2 3 4

2- The new bookstore has advertised it's opening sale day for Monday.
1 2 3 4

3- The amount of sugar lost must be small, for the bag still weigh almost five pounds.
1 2 3 4

4- My brother wasn't a good student at high-school, but your sister wasn't either.
1 2 3 4

5- The dinner mom has made smells well.
1 2 3 4

6- She told me not to help him and to say him to do his own work.
1 2 3 4

7- The birds who are flying south come here in summer.
1 2 3 4

8- Scientific knowledge can not be used for. …
1) discernment 2) judgment 3) good and evil 4) dedication

9- Industrial engineering can materially … its standing in the company by the conduct of its staff.
1) engrave 2) scare 3) fuse 4) enhance

10- In batch-type manufacturing each part has … been treated as being unique in design, production and so on.
1) evolutionally 2) traditionally 3) tradition 4) evolution

11- Many varieties of coding systems and classifications are being … and used.
1) prioritized 2) developed 3) transported 4) minimized

12- It is important to get everyone really … in doing a good, productive job.
1) associated 2) inspiring 3) interested 4) significant

13- The sum of the inventory numbers for individual items is called … inventory.
1) optimization 2) supply 3) manufacture 4) aggregate

14- Investment … requires using expensive equipment, sometimes for seven days a week.
1) ustification 2) collaboration 3) mechanization 4) automation

15- Simple light … use photocells, photodiodes, and photographic paper.
1) systems 2) areas 3) sensors 4) covers

16- Design safety is an important measure to be … by human factors engineer.
1) tripled 2) incorporated 3) confined 4) collided

17- Physical activity and stresses of work cause changes in heart rate, oxygen …, and blood pressure.
1) perspiration 2) respiration 3) prosperity 4) precipitation

18- A process layout … work centers according to the general function they perform without regard to any particular product.
1) pollutes 2) depreciates 3) groups 4) delays

19- Each phase of a layout should be … before it is presented for approval.
1) checked 2) overlooked 3) ignored 4) disagreed

20- It may be necessary to make some … analysis on the output measures in order to make the. ecisions.

1) representative 2) actual 3) statistical 4) sequential

21- Life represents a(n) … from disorder to order.

1) transition 2) definition 3) examination 4) accumulation

22- In the … age we are more dealt with putting things together than with taking them apart.

1) system 2) systematic 3) systematize 4) systematically

23- A system is an … of facts, principles, or doctrines in a particular field of knowledge.

1) assemble 2) assembly 3) assemblage 4) assembler

The choosing and/or development of predictor measures (i.e. tests or other devices to measure differences among people) in personnel selection should be done systematically and on the basis of job analysis information. Recent equal employment guidelines and court decisions point to the need for tests to be job-related; basing predictor choice or development on job analysis data is the way to accomplish this.

How might we go about selecting predictor measures based on job analysis information? The goal is to link together job performance requirements and person requirements. Once these links are established, and once certain personal characteristics have been identified as important for success on the target job, we can select or develop predictors to measure each important task. Methods exist to discover these links, as shown in the example that follows.

An example is provided by Bosshardt and Lammlein's recent study. They analyzed the machinist job in a metal manufacturing company by interviewing and observing a number of incumbent machinists at work. This analysis resulted in a list of tasks that these machinists performed in the course of carrying out their job duties. The job incumbents subsequently rated the importance of each task, and those tasks judged to be considered the 'performance requirements' for the job.

24- An appropriate title for the above text could probably be. …

1) New Work Fields 2) Job Requirements
3) Job Experiences 4) Facilitating Work Areas

25- It seems that establishing connections between performance requirements and personal requirements are necessary to…

1) justify the methods through which we can provide those links.
2) prepare multiple examples for employment guidelines and court decisions.
3) select and develop predictor measures of any certain job.
4) show that different incumbents perform diversely in different occasions.

26- The approach used in the example method implies that Bosshardt and Lammlein believe…

1) performance requirements are direct results of personal requirements
2) personal requirements are direct results of performance requirements
3) performance requirements are subsequent results of personal requirements
4) personal requirements are subsequent results of performance requirements

27- It is mentioned in the text that…

1) predictor measures have recently become legally important.
2) predictor measures are legally of no importance.
3) tests yielding predictor measures are legally of no importance.
4) tests yielding predictor measures have recently become legally important.

28- The underlined 'this' refers to:

1) need 2) test 3) predictor 4) data

29- The author believes that we can select or develop predictors after … conditions are provided.

1) two 2) three 3) four 4) five

30- The underlined 'judged' has the closest meaning to:

1) made a judgment 2) provided a prediction
3) formed a confirmation 4) reached an anticipation

پاسخنامه آزمون مهندسی صنایع گرایش صنایع ـ سراسری ۸۸

بخش واژگان

راهنمایی: واژه یا عبارتی را از میان گزینه‌های (۱)، (۲)، (۳)، یا (۴) انتخاب کنید که بهترین نحو هر جمله را کامل می‌کند. سپس پاسخ صحیح را روی پاسخنامه‌تان علامت بزنید.

۱ـ گزینه «۱» معنی جمله: سگ‌ها و گرگ‌ها از اعضای گونه یکسان هستند.

۱) گونه ۲) هیولاها ۳) مخلوقات ۴) آغازیان

۲ـ گزینه «۳» معنی جمله: برای مقابله (جبران) کمبود (نقیصه) برای من قرص آهن تجویز شده است.

۱) تقصیر / شکست ۲) تغذیه ۳) کمبود / نقصان ۴) محافظت

۳ـ گزینه «۲» معنی جمله: پس از سالها پژوهش، دانشمندان این نظریه را به دانشمندی از یونان باستان منتسب نموده‌اند.

۱) تعمق کرده‌اند ۲) منتسب کرده‌اند ۳) مصور کرده‌اند ۴) افشا کرده‌اند

۴ـ گزینه «۴» معنی جمله: آنان برای ظرف پلاستیکی یک چرخه عمر ۵۰۰ ساله را در نظر می‌گیرند.

۱) مدعی شدند ۲) باقی ماندند ۳) متفرق شدند ۴) لحاظ نمودند/ در نظر گرفته‌اند

۵ـ گزینه «۳» معنی جمله: معلمین با ۴٪ افزایش حقوق توأم با عطف بماسبق از آوریل پیش موافقت نموده‌اند.

۱) از پیش رفته/ از دست رفته ۲) ما قبل (چیزی) آمدن/ پیش افتادق افتادن

۳) معطوف به گذشته/ عطف بماسبق ۴) بنیادین/ اساسی

۶- گزینه «۴» معنی جمله: اگر چه او تنها ۲۰ سال سن دارد، انعطاف شدیدی در مقابل فشار از خود نشان می‌دهد.

۱) توانمندی ۲) بلوغ ۳) صفت/ ویژگی ۴) عدم مقاومت/ انعطاف

۷- گزینه «۱» معنی جمله: مقامات مدرسه نظر و حکم قطعی در مورد دانش‌آموزانی که می‌پذیرند در اختیار دارند.

۱) حکم/ اختیار تام ۲) حضور/ مشارکت ۳) عمل گرایی/ مصلحت‌گرایی ۴) تهاجم/ قطعیت

۸- گزینه «۱» معنی جمله: پرسش‌های کوتاه احتمال استخراج پاسخ بیشتری دارند.

۱) استخراج کردن ۲) تقبل کردن ۳) درک کردن ۴) ثبت کردن

۹- گزینه «۲» معنی جمله: بسیاری از اصول در بیانیه حقوق بشر متجلی گردیده‌اند. [در بدنه آن قرار گرفته‌اند]

۱) سکنی گرفتن ۲) در بدنه قرار گرفتن ۳) اقدام کردن ۴) تسلیم شدن

۱۰- گزینه «۲» معنی جمله: دانشمندان سابقاً بر این استدلال بودند که خورشید به دور زمین می‌گردد و نه بر عکس.

۱) به نوبه خود ۲) برعکس ۳) از سوی دیگر ۴) در تقابل

بخش دوم: دستور زبان

راهنمایی: متن زیر را بخوانید و مشخص کنید کدام‌یک از گزینه‌های(۱)، (۲)، (۳)، یا (۴) به بهترین نحو جاهای خالی را پر می‌کند. سپس پاسخ صحیح را روی پاسخنامه خود علامت بزنید.

اساساً چین توسط سه نظام مذهبی و اخلاقی متأثر گردیده است: کنفوسینیزم، تائوئیسم، وبودیزم. دو مورد نخست در چین نشأت گرفتند اما بودیزم از هند و در سده‌های اول و دوم میلادی به آنجا آورده شد. عموماً کنفوسینیزم تا زمان انقلاب ۱۹۱۱ مذهب رسمی چین محسوب می‌گردید. واضع کنفوسینیزم، کنفوسیوس بود که در سده ششم پیش از میلاد متولد شد و دوران پرمشقتی زندگی نمود. وی آموخت که خوشحالی انسان از روابط میان آدمیان می‌آید؛ یعنی طریقی که بر آن افراد با یکدیگر رفتار می‌نمایند. پرسش نیاکان ـ که یک رسم قدیمی چینی است ـ به گرمی توسط از توصیه می‌گردید چرا که این امر به زنده و بدون تغییر نگه‌داشتن روش‌های کهن کمک می‌نمود. خداوند می‌بایست گرامی داشته می‌شد، اما آدمیان نمی‌توانستند چیز زیادی درباره او بدانند و نمی‌بایست برای درک موضوعات ماوراء الطبیعه تلاش می‌نمودند.

۱۱ـ گزینه «۴» ابتدا باید صفت برترین و سپس عدد آورده شود.

۱۲ـ گزینه «۲» باید فعل مجهول استفاده شود.

۱۳ـ گزینه «۳» times به معنی دوران یا زمانه صحیح است و باید توأم با صفت (troubled) بیاید.

۱۴ـ گزینه «۱» معادل حروف مخفف i.e و به معنی "یعنی"یا" به بیان دیگر" است.

۱۵ـ گزینه «۳» پس از help باید مصدور کامل (مصدر همراه باto) یا مصدور مرخم (بدونto) استفاده شود. استفاده از جراند (ing-) معنای help را عوض می‌کند.

بخش سوم: درک مطلب

راهنمایی: سه متن بعدی را بخوانید و از میان گزینه‌های (۱)، (۲)، (۳)، یا (۴) بهترین را انتخاب کنید. سپس آن را روی پاسخنامه‌تان علامت بزنید.

متن ۱

مهندسان صنایع جی‌اس ۷ (پایه ۷ در اصطلاح شغلی امریکا) معمولاً تحت نظارت مهندسی با رتبه بالاتر کار می‌کنند وقتی که مشغول انجام وظایف روزمره خود باشند که معمولاً با رویه‌های معین و تفصیلی پوشش داده می‌شود. هنگام دریافت کاری با این ویژگی‌ها، مهندسان صنایع جی‌اس ۷ بایستی مستقلاً بررسی و تحلیل مسأله موردنظر را پیش ببرند، روش‌ها و رویه‌های متناسب و تأیید شده را برای حصول به راه‌حل رضایت‌بخش اعمال نموده، تأییدیه‌های مورد نیاز برای انحرافات احتمالی Nگانه پس از آن را تأمین کرده و یافته‌ها، طرح‌ها و نتیجه‌گیری‌های خود را به شکلی مقایسه‌ای و کامل ارائه دهند. هرگاه آنان با مشکلات رویه‌ای یا فنی در تکمیل یک وظیفه محوله مواجه شدند، باید آن را با ناظر یا مهندسان رتبه بالاتر و به منظور تأمین راهنمایی لازم یا نقطه نظرات متفاوت برای رویکرد به مسأله مطرح نمایند. پروژه‌های تکمیل شده توسط بازرس بازبینی می‌گردند و او نیز به نوبه خود، ممکن است بررسی بیشتر مسأله را خواستار گردد، دقت و کفایت داده‌های مهندسی و استنتاج‌های ارائه شده را زیر سؤال ببرد، تغییراتی چند را در طرح‌های پیشنهادی یا مشخصات فنی ارائه شده متذکر گردد و یا کنکاش در راه‌حلی جایگزین را پیشنهاد نماید. مهندسان صنایع جی‌اس ۷، در هنگام دستیاری مهندسان رتبه بالاتر در تکمیل و اجرای پروژه‌های مهندسی بخش‌های زیردست که آن گروه‌ها مسؤول انجام آن هستند، تحت نظارت دقیق‌تری قرار خواهند گرفت. در مواردی از این دست، وظایفی به آن محول می‌شود که نوعاً به منظور رفع مشکلات غیرمتعارف یا سخت غربال‌گری شده و دستورالعمل‌های ویژه‌ای به منظور دنبال کردن خطوط راهنما و مسیر کاری ارائه می‌شود. مسائل و معضلات مورد مواجهه، مانند انتخاب میان روش‌های جایگزین، به بازرس / ناظر ارجاع گردیده و مورد مباحثه قرار می‌گیرند تا توضیحات، راهنمایی‌ها و یا تأییدیه ادامه کار اخذ گردند. هرگونه نیازی به انحراف از رویه‌های تعیین شده نیاز به کسب مجوز قبلی از بازرس / ناظر دارد. عملیات کاری در برگیرنده فرآیندها، رویه‌ها، یا خطوط راهنمای جدید در خلال مراحل مختلف پیشرفت کار بازنگری می‌شوند تا کاربرد مناسب روش‌ها و تکنیک‌ها تضمین گردد.

۱۶ـ گزینه «۱» متن کدام‌یک از وجوه مختلف کاری مهندسان صنایع جی‌اس ۷ را مورد بحث قرار می‌دهد؟

۱) ماهیت کنترل نظارتی اعمال شده روی کار
۲) حوزه توصیه‌ها، تصمیمات و نتایج کار
۳) ماهیت خطوط راهنمای موجود برای ارتقای عملکرد
۴) هدف و ماهیت روابط کاری فرد با فرد

◆ ◆ ◆ ◆

۱۷ـ گزینه «۳» مهندسان صنایع جی‌اس ۷ تحت نظارت شدید قرار دارند وقتی که .....

۱) وظایف محوله را مستقلاً انجام می‌دهند.
۲) تکنیک‌هایی را برای حل مسایل محوله به کار می‌گیرند.
۳) در پروژه‌هایی که در حوزه مسؤولیت مهندسان رده بالاتر قرار دارد دستیاری می‌کنند.
۴) فازهای کاری را انجام می‌دهند که از محدوده سیاست‌های تعیین شده فراتر رود.

◆ ◆ ◆ ◆

۱۸ـ گزینه «۱» در زمان دریافت پروژه‌های تکمیل شده، ناظر می‌تواند همه کارهای زیر را انجام دهد به جز ..... .

۱) پیشنهاد راه‌حل برای مسایل محول شده
۲) بازنگری دقیق کار برای اطمینان از دقت فنی
۳) تصمیم‌گیری در مورد نکات و یا انحرافات قابل پرسش
۴) الزام کردن اتخاذ رویکرد جدید نسبت به مسأله

◆ ◆ ◆ ◆

۱۹ـ گزینه «۴» کلمه "which" که در خط ۱۴ اشاره دارد به:

۱) مهندسان رتبه بالاتر
۲) مهندسان صنایع
۳) بخش‌ها / قسمت‌ها
۴) پروژه‌ها

◆ ◆ ◆ ◆

۲۰ـ گزینه «۳» از متن استنباط می‌شود که مهندسان صنایع جی‌اس ۷ ..... .

۱) عموماً با مسایل پیچیده مواجه می‌گردند.
۲) وظایفی به عهده دارند که شامل تصمیم‌گیری‌هاست.
۳) روی وظایف کاری مشخص و نسبتاً محدود کار می‌کنند.
۴) مسؤولیت پروژه‌های سنگین مهندسی صنایع را به عهده دارند.

◆ ◆ ◆ ◆

متن ۲

بسیاری مسایل در مهندسی مالی نیازمند برآورد عددی یک تابع اولیه هستند. برخی مزایا شبیه‌سازی را در میان فعالان این رشته به عنوان یک روش‌شناسی برای این دسته از محاسبات محبوب ساخته‌اند. نخست، اینکه شبیه‌سازی به سادگی قابل اعمال روی بسیاری مسایل است. در بسیاری از وثیقه‌های انشعابی و مدل‌های مالی، حتی آن دسته که پیچیده یا چند بعدی هستند، تقریباً زمان اندکی لازم است تا الگوریتم شبیه‌سازی برای قیمت‌گذاری مشتق تحت آن مدل ساخته شود. همچنین، ریسک محاسبات عددی الگوریتم‌های شبیه‌سازی تقریباً نادر هستند. مهمتر از همه اینکه، با دانش و تلاش کمی می‌توان به دستاورد قابل توجهی در شبیه‌سازی مالی رسید؛ با اندکی تخصیص و سرمایه‌گذاری روی زمان، شخص می‌تواند پیش‌تر و سریع‌تر جلو رود. مزیت دوم شبیه‌سازی، عملکرد خوب آن روی مسایل چند بعدی است: نرخ سرعت همگرایی تقریب مونت کارلو بستگی به بُعد مسأله ندارد. اگرچه تکنیک‌های دیگر انتگرال‌گیری ممکن است در موارد متعدد نسبت به شبیه‌سازی مزیت داشته باشند، سرعت و نرخ همگرایی آنها با افزایش بعد مسأله کاهش می‌یابد. برای مثال، هنگام برخورد با مدل‌هایی از بازار که شامل منابع مختلف زیربنایی ریسک یا دربرگیرنده وثیقه‌های انشعابی که به شکل پیچیده‌ای به قیمت در زمان‌های متعدد وابسته‌اند، بعد مسأله افزایش می‌یابد. این موضوع مهم‌تر و مهم‌تر می‌شود وقتی که بازارهای وثیقه (اوراق بهادار) و مدیریت مالی ریسک هرچه پیچیده‌تر می‌شود. مزیت سوم شبیه‌سازی فاصله اطمینانی است که برای تقویت مونت کارلو فراهم می‌آورد. این اطلاعات ارزیابی کیفیت تقریب را ممکن می‌سازد و اجازه می‌دهد دریابیم چه میزان تلاش محاسباتی بیشتر به منظور ایجاد یک تخمین با کیفیت قابل قبول نیاز خواهد بود.

۲۱ـ گزینه «۳» این متن اساساً می‌پردازد به ..... .

۱) حوزه عمل اثربخش شبیه‌سازی
۲) چالش‌های مختص به شبیه‌سازی‌های مالی
۳) مزایای متدلوژی شبیه‌سازی مالی
۴) کاربرد شبیه‌سازی برای حل مسایل مهندسی مالی

◆ ◆ ◆ ◆

سؤالات آزمون مهندسی صنایع گرایش سیستمهای اقتصادی و اجتماعی و مدیریت سیستم و بهره‌وری ــ سراسری ۹۳

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

Passage 1:

The managers responsible for industrial production require an enormous amount of assistance and support because of the complexity of most production systems, and the additional burden of planning, scheduling and coordination. Historically this support was provided by industrial engineers whose major concern was methods, standards and the organization of process technology.

Industrial engineering originated with the studies of Taylor, Gillberts and other pioneers of mass production methods. Their work expanded into responsibilities that now include the development of work methods to increase efficiency and eliminate worker fatigue; the redesign and standardization of manufacturing process and methods for handling and transporting materials; the development of production planning and control procedures; and the determination and maintenance of output standards for workers and machines. Today the field is characterized by an emphasis on mathematical and computer modeling.

1- Which of the following questions is the one which paragraph 1 is mainly attempting to answer?

1) What makes managerial work as complex as it is now?
2) What distinguishes a manager from an industrial engineer?
3) Why are managers in need of help from industrial engineers?
4) What is the historical development of industrial engineering?

2- According to the passage, all of the following are part of the extra work complicating a manager's responsibilities EXCEPT ……

1) scheduling
2) coordination
3) the burden of planning
4) the organization of process technology

3- The word "originated" in line 5 closest in meaning to …… .

1) stemmed
2) proceeded
3) fostered
4) established

4- Which one of the following best represents the rhetorical function of paragraph 2?

1) definition
2) defining description
3) function description
4) chronological time order

5- In line 1 the word "enormous" means ……. .

1) a lot
2) huge
3) vast
4) serious

Passage 2:

Control of the project's activities is primarily concerned with monitoring and assessing actual activities and making sure they align with program goals. Monitoring involves conducting program reviews, measuring actual costs with planned costs, and testing incremental aspects of the program. It also includes managing the internal aspects of a program and monitoring external organizations that may have a stake in the program's outcome. From time to time, a program assessment is needed to determine if the overall requirement is still being addressed, adequate funds are available, the risks are being managed, and the initial acquisition strategy is sound. Organizing resources requires ensuring that appropriate staff members are in place to perform the activities required for a successful program. Recruiting, training, and motivating personnel are all part of the program manager's responsibilities. He or she must ensure that the organizational structure is optimized to perform the required tasks. Traditionally, programs have been organized functionally with hierarchical structures, each of which performs a certain task. Recently, IPTs have become popular for organizing personnel on a project. IPTs are multidiscipline teams with the authority and accountability to produce a specific product within a program.

6- What does the passage mainly discuss?

1) Project activities
2) Organizing resources
3) Monitoring project activities
4) Responsibilities of program managers

7- According to the passage, monitoring involves all of the following EXCEPT …… .

1) monitoring external organizations
2) setting program goals
3) reviewing programs
4) measuring costs

8- According to the passage, IPTs …… .

1) have the authority to organize staff
2) are responsible for hiring personnel
3) tend to organize programs functionally
4) assess specific products within a program

9- Where in the passage does the author discuss the duties of a program manager?

1) Lines 2-4
2) Lines 5-7
3) Lines 6-8
4) Lines 12-14