

Test Information
Guide:
College-Level
Examination
Program[®]

2015-16

Information Systems

CLEP TEST INFORMATION GUIDE FOR INFORMATION SYSTEMS

History of CLEP

Since 1967, the College-Level Examination Program (CLEP®) has provided over six million people with the opportunity to reach their educational goals. CLEP participants have received college credit for knowledge and expertise they have gained through prior course work, independent study or work and life experience.

Over the years, the CLEP examinations have evolved to keep pace with changing curricula and pedagogy. Typically, the examinations represent material taught in introductory college-level courses from all areas of the college curriculum. Students may choose from 33 different subject areas in which to demonstrate their mastery of college-level material.

Today, more than 2,900 colleges and universities recognize and grant credit for CLEP.

Philosophy of CLEP

Promoting access to higher education is CLEP's foundation. CLEP offers students an opportunity to demonstrate and receive validation of their college-level skills and knowledge. Students who achieve an appropriate score on a CLEP exam can enrich their college experience with higher-level courses in their major field of study, expand their horizons by taking a wider array of electives and avoid repetition of material that they already know.

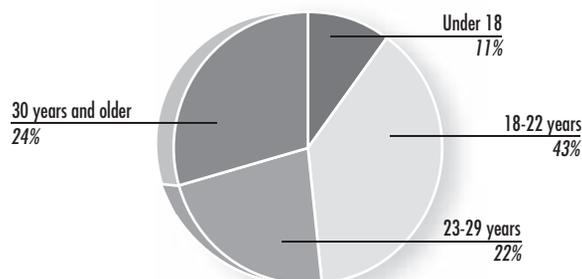
CLEP Participants

CLEP's test-taking population includes people of all ages and walks of life. Traditional 18- to 22-year-old students, adults just entering or returning to school, high-school students, home-schoolers and international students who need to quantify their knowledge have all been assisted by CLEP in earning their college degrees. Currently, 59 percent of CLEP's National (civilian) test-takers are women and 46 percent are 23 years of age or older.

For over 30 years, the College Board has worked to provide government-funded credit-by-exam opportunities to the military through CLEP. Military service members are fully funded for their CLEP exam fees. Exams are administered at military installations

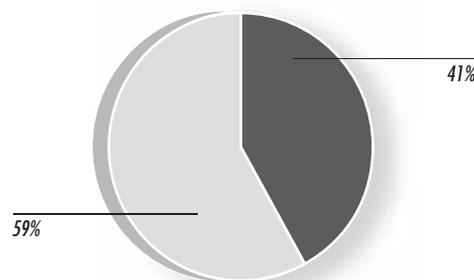
worldwide through computer-based testing programs. Approximately one-third of all CLEP candidates are military service members.

2014-15 National CLEP Candidates by Age*



* These data are based on 100% of CLEP test-takers who responded to this survey question during their examinations.

2014-15 National CLEP Candidates by Gender



Computer-Based CLEP Testing

The computer-based format of CLEP exams allows for a number of key features. These include:

- a variety of question formats that ensure effective assessment
- real-time score reporting that gives students and colleges the ability to make immediate credit-granting decisions (except College Composition, which requires faculty scoring of essays twice a month)
- a uniform recommended credit-granting score of 50 for all exams
- “rights-only” scoring, which awards one point per correct answer
- pretest questions that are not scored but provide current candidate population data and allow for rapid expansion of question pools

CLEP Exam Development

Content development for each of the CLEP exams is directed by a test development committee. Each committee is composed of faculty from a wide variety of institutions who are currently teaching the relevant college undergraduate courses. The committee members establish the test specifications based on feedback from a national curriculum survey; recommend credit-granting scores and standards; develop and select test questions; review statistical data and prepare descriptive material for use by faculty (*Test Information Guides*) and students planning to take the tests (*CLEP Official Study Guide*).

College faculty also participate in CLEP in other ways: they convene periodically as part of standard-setting panels to determine the recommended level of student competency for the granting of college credit; they are called upon to write exam questions and to review exam forms; and they help to ensure the continuing relevance of the CLEP examinations through the curriculum surveys.

The Curriculum Survey

The first step in the construction of a CLEP exam is a curriculum survey. Its main purpose is to obtain information needed to develop test-content specifications that reflect the current college curriculum and to recognize anticipated changes in the field. The surveys of college faculty are conducted in each subject every few years depending on the discipline. Specifically, the survey gathers information on:

- the major content and skill areas covered in the equivalent course and the proportion of the course devoted to each area
- specific topics taught and the emphasis given to each topic
- specific skills students are expected to acquire and the relative emphasis given to them
- recent and anticipated changes in course content, skills and topics
- the primary textbooks and supplementary learning resources used
- titles and lengths of college courses that correspond to the CLEP exam

The Committee

The College Board appoints standing committees of college faculty for each test title in the CLEP battery. Committee members usually serve a term of up to four years. Each committee works with content specialists at Educational Testing Service to establish test specifications and develop the tests. Listed below are the current committee members and their institutional affiliations.

Q Chung, <i>Chair</i>	Villanova University
Tammy Arthur	Mississippi College
Robert Cerveny	Florida Atlantic University
David Noel	University of Central Oklahoma
Patricia Sendall	Merrimack College

The primary objective of the committee is to produce tests with good content validity. CLEP tests must be rigorous and relevant to the discipline and the appropriate courses. While the consensus of the committee members is that this test has high content validity for a typical introductory Information Systems course or curriculum, the validity of the content for a specific course or curriculum is best determined locally through careful review and comparison of test content, with instructional content covered in a particular course or curriculum.

The Committee Meeting

The exam is developed from a pool of questions written by committee members and outside question writers. All questions that will be scored on a CLEP exam have been pretested; those that pass a rigorous statistical analysis for content relevance, difficulty, fairness and correlation with assessment criteria are added to the pool. These questions are compiled by test development specialists according to the test specifications, and are presented to all the committee members for a final review. Before convening at a two- or three-day committee meeting, the members have a chance to review the test specifications and the pool of questions available for possible inclusion in the exam.

At the meeting, the committee determines whether the questions are appropriate for the test and, if not, whether they need to be reworked and pretested again to ensure that they are accurate and unambiguous. Finally, draft forms of the exam are reviewed to ensure comparable levels of difficulty and content specifications on the various test forms. The committee is also responsible for writing and developing pretest questions. These questions are administered to candidates who take the examination and provide valuable statistical feedback on student performance under operational conditions.

Once the questions are developed and pretested, tests are assembled in one of two ways. In some cases, test forms are assembled in their entirety. These forms are of comparable difficulty and are therefore interchangeable. More commonly, questions are assembled into smaller, content-specific units called testlets, which can then be combined in different ways to create multiple test forms. This method allows many different forms to be assembled from a pool of questions.

Test Specifications

Test content specifications are determined primarily through the curriculum survey, the expertise of the committee and test development specialists, the recommendations of appropriate councils and conferences, textbook reviews and other appropriate sources of information. Content specifications take into account:

- the purpose of the test
- the intended test-taker population
- the titles and descriptions of courses the test is designed to reflect
- the specific subject matter and abilities to be tested
- the length of the test, types of questions and instructions to be used

Recommendation of the American Council on Education (ACE)

The American Council on Education's College Credit Recommendation Service (ACE CREDIT) has evaluated CLEP processes and procedures for developing, administering and scoring the exams. Effective July 2001, ACE recommended a uniform credit-granting score of 50 across all subjects (with additional Level-2 recommendations for the world language examinations), representing the performance of students who earn a grade of C in the corresponding course. Every test title has a minimum score of **20**, a maximum score of **80** and a cut score of **50**. However, these score values cannot be compared across exams. The score scale is set so that a score of **50** represents the performance expected of a typical C student, which may differ from one subject to another. The score scale is not based on actual performance of test-takers. It is derived from the judgment of a panel of experts (college faculty who teach the course) who provide information on the level of student performance that would be necessary to receive college credit in the course.

Over the years, the CLEP examinations have been adapted to adjust to changes in curricula and pedagogy. As academic disciplines evolve, college faculty incorporate new methods and theory into their courses. CLEP examinations are revised to reflect those changes so the examinations continue to meet the needs of colleges and students. The CLEP program's most recent ACE CREDIT review was held in June 2015.

The American Council on Education, the major coordinating body for all the nation's higher education institutions, seeks to provide leadership and a unifying voice on key higher education issues and to influence public policy through advocacy, research and program initiatives. For more information, visit the ACE CREDIT website at www.acenet.edu/acecredit.

CLEP Credit Granting

CLEP uses a common recommended credit-granting score of 50 for all CLEP exams.

This common credit-granting score does not mean, however, that the standards for all CLEP exams are the same. When a new or revised version of a test is introduced, the program conducts a standard setting to determine the recommended credit-granting score (“cut score”).

A standard-setting panel, consisting of 15–20 faculty members from colleges and universities across the country who are currently teaching the course, is appointed to give its expert judgment on the level of student performance that would be necessary to receive college credit in the course. The panel reviews the test and test specifications and defines

the capabilities of the typical A student, as well as those of the typical B, C and D students.* Expected individual student performance is rated by each panelist on each question. The combined average of the ratings is used to determine a recommended number of examination questions that must be answered correctly to mirror classroom performance of typical B and C students in the related course. The panel’s findings are given to members of the test development committee who, with the help of Educational Testing Service and College Board psychometric specialists, make a final determination on which raw scores are equivalent to B and C levels of performance.

*Student performance for the language exams (French, German and Spanish) is defined only at the B and C levels.

Information Systems

Description of the Examination

The Information Systems examination covers material that is usually taught in an introductory college-level business information systems course. Questions test knowledge, terminology and basic concepts about information systems as well as the application of that knowledge. The examination does not emphasize the details of hardware design and language-specific programming techniques. References to applications such as word processing or spreadsheets do not require knowledge of a specific product. The focus is on concepts and techniques applicable to a variety of products and environments. Knowledge of arithmetic and mathematics equivalent to that of a student who has successfully completed a traditional first-year high school algebra course is assumed.

The examination contains approximately 100 questions to be answered in 90 minutes. Some of these are pretest questions and will not be scored. The time candidates spend on tutorials and providing personal information is in addition to the actual testing time.

Information Systems textbooks differ on the precise definition of the systems development process or life cycle. To avoid ambiguity, CLEP defines the systems development process as consisting of the following discrete phases or stages:

1. Planning
 2. Analysis
 3. Design
 4. Implementation
 5. Maintenance
-

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- Bluetooth® is a registered trademark of Bluetooth SIG, Inc.
- Java® is a registered trademark of Oracle America, Inc.

- Javascript® is a registered trademark of Oracle America, Inc.
- W3C® is a registered trademark of Massachusetts Institute of Technology.

Knowledge and Skills Required

Questions on the Information Systems examination require test-takers to demonstrate knowledge of the following content. The percentage next to each main topic indicates the approximate percentage of exam questions on that topic.

10% Office Applications

- Productivity software (word processing, spreadsheet, presentation package, database package)
- Operating systems (memory management, file management, interfaces, types of OS)
- Office systems (e-mail, conferencing, collaborative work, document imaging, system resources)

15% Internet and World Wide Web

- Internet and other online services and methods (World Wide Web, protocol, Web search engines, Web bots, intranet, cloud computing, communications, push/pull technology, W3C)
- Web browsers (URLs, protocols, standards, history, cookies, resource allocation)
- Web technologies (HTML, XML, Javascript)
- Website development (analysis, design, functionality, accessibility)

15% Technology Applications

- Specialized systems (knowledge management, expert systems, TPS/OLTP, DSS, GIS, BI, workflow management, project management)
- E-commerce/E-business (EDI, standards, tools, characteristics, types of transactions, business models)
- Enterprise-wide systems (ERP, CRM, SCM)
- Data management (data warehousing, data mining, networking, security, validation, migration, storage, obsolescence)
- Business strategies (competition, process reengineering, process modeling, TQM, Web 2.0)
- Information processing methods (batch, real-time, transaction)

15% Hardware and Systems Technology

- Devices (processing, storage, input and output, telecommunications, networking)
- Functions (computer, telecommunications, network hardware)
- Network architectures (local area, wide area, VPN, enterprise)
- Computer architectures (mainframe, client/server, operating systems)
- Wireless technologies (Wi-Fi, cellular, satellite, mobile, GPS, RFID)

10% Software Development

- Methodologies (prototyping, SDLC, RAD, CASE, JAD, Agile)
- Processes (feasibility, systems analysis, systems design, end-user development, project management)
- Implementation (testing, training, data conversion, system conversion, system maintenance, post-implementation activities, post-implementation review, documentation)
- Standards (proprietary, open source)

10% Programming Concepts and Data Management

- Programming logic (Boolean, arithmetic, SQL)
- Methodologies (object-oriented, structured)
- Data (concepts, types, structures, digital representation of data)
- File (types, structures)
- Database management systems (relational, hierarchical, network, management strategies)

25% Social and Ethical Implications and Issues

- Economic effects (secure transactions, viruses, malware, cost of security)
- Privacy concerns (individual, business, identity theft)
- Property rights (intellectual, legal, ownership of materials, open-source software)
- Effects of information technology on jobs (ergonomics, virtual teams, telecommuting, job design)
- Technology's influence on workforce strategies (globalization, virtual teams, telecommuting, outsourcing, insourcing)
- Careers in IS (responsibilities, occupations, career path, certification)
- Computer security and controls (system, application, personal computer, disaster recovery)
- Social networking (benefits, risks, ethics, technology, Web 2.0)

Sample Test Questions

The following sample questions do not appear on an actual CLEP examination. They are intended to give potential test-takers an indication of the format and difficulty level of the examination and to provide content for practice and review. Knowing the correct answers to all of the sample questions is not a guarantee of satisfactory performance on the exam.

Directions: Some of the questions or incomplete statements below are followed by five suggested answers or completions. Select the one that is best in each case.

Some of the questions ask you to select one or more answer choices from a list of choices. For these questions, select all that apply.

Some of the questions refer to a table in which statements appear in the first column. For each statement, select the correct property by checking the appropriate cell in the table.

- File extensions such as .txt, .bmp, and .mp3 are used to identify a file's
 - output
 - creator
 - size
 - location
 - format
- Which of the following network technologies allows secure transmission of data over an unsecured public network link between private networks?
 - Local area network
 - Wide area network
 - Virtual private network
 - Intranet
 - Extranet
- Which of the following is a goal of green computing?
 - Reducing the potential for a computer to become infected with malware
 - Reducing the number of people experiencing computer vision syndrome
 - Reducing power consumption of computers and peripherals
 - Optimizing the human-computer interface
 - Building relationships between computer manufacturers and environmental groups
- Which of the following is (are) true about EDI?
 - The EDI documents generally contain the same information that paper documents do.
 - The speed in which the documents are exchanged is much faster than that of paper documents.
 - Transmission of EDI documents is less accurate than that of paper documents.
 - I only
 - II only
 - III only
 - I and II only
 - I, II, and III
- A spreadsheet contains the values 4 and 6 in cells C4 and D4, respectively. What value will be displayed in cell F4 if it contains the formula $(C4^2+D4/4)$?
 - 2.5
 - 5.5
 - 16
 - 17.5
 - 128
- Which of the following would NOT be considered an input device for a computer system?
 - Image scanner
 - Webcam
 - Keyboard
 - Mouse
 - PC speaker

7. In a relational database, each column represents
- (A) a record
 - (B) an attribute
 - (C) a key
 - (D) an entity
 - (E) a file
8. Which of the following violates intellectual property rights?
- (A) Software piracy
 - (B) Data mining of social networks
 - (C) Launching a denial of service attack
 - (D) Hacktivism
 - (E) Spamming
9. Conversion of data files is part of which of the following phases of the system development process?
- (A) Analysis
 - (B) Design
 - (C) Implementation
 - (D) Development
 - (E) Maintenance
10. Which of the following technologies does NOT facilitate knowledge management?
- (A) Blogs
 - (B) Wikis
 - (C) Web conferencing
 - (D) Desktop sharing
 - (E) Biometrics
11. The American Charity Association, a nonprofit foundation, has a home page on the World Wide Web. Which of the following is the most likely URL for its home page?
- (A) <http://www.charity.gov>
 - (B) <http://www.charity.edu>
 - (C) <http://www.charity.com>
 - (D) <http://www.charity.org>
 - (E) <ftp://www.charity.aca>
12. What is the principal function of an operating system?
- (A) To provide an interface between the hardware and the application software
 - (B) To defragment storage devices to optimize file access
 - (C) To process transaction information
 - (D) To create and maintain organizational databases
 - (E) To scan for viruses
13. A business often identifies that its software has been trademarked by using a unique symbol or attaching the letters TM to its name. What is the purpose of the trademark?
- (A) To eliminate unauthorized copying and distribution
 - (B) To identify the software as available for use, free of charge
 - (C) To identify and differentiate the product's brand
 - (D) To assure the user that the software is properly licensed and ready to use
 - (E) To assure the user that the software contains unique features not found in other products
14. What term identifies the measure of accuracy, completeness, and currency of data?
- (A) Data dependency
 - (B) Data integration
 - (C) Data integrity
 - (D) Data redundancy
 - (E) Data visualization
15. The special formatting language used to create Web pages is called
- (A) HTML
 - (B) XML
 - (C) Perl
 - (D) Java
 - (E) Script

16. Which of the following best characterizes data in a data warehouse?
- (A) Historical
 - (B) Normalized
 - (C) Relational
 - (D) Volatile
 - (E) Up-to-date
17. Which of the following is designed to allow a team to discuss a topic over an extended period of time while keeping the responses organized by topic?
- (A) Data library
 - (B) File sharing
 - (C) Push technology
 - (D) Internet telephony
 - (E) Threaded discussion group
18. Which of the following is NOT a correct characterization of batch processing?
- (A) It allows immediate updating of master files.
 - (B) It provides physical batch totals to be used in control procedures.
 - (C) It provides efficient updating of master files.
 - (D) It is most applicable for processing routine periodic activities.
 - (E) It allows efficient scheduling of processing.
19. Which of the following best describes how GPS units function?
- (A) The receiver sends out regular query pulses and waits to receive responses from a GPS satellite.
 - (B) The receiver is passive and listens for the regular signals from GPS satellites, which are then processed to find the distance from the satellites.
 - (C) The receiver sends out radio signals that are reflected back by satellites and detected by the unit.
 - (D) The receiver acts as a homing beacon that is tracked by the GPS satellites, which periodically send out position updates for each tracked receiver.
 - (E) The receiver can detect an invisible electronic grid projected onto Earth's surface and compares the location on this grid to a stored map of Earth.
20. Which of the following is the most likely negative consequence of participating in a social networking website?
- (A) Unintended disclosure of private information
 - (B) Increase in spam
 - (C) Infection by a virus
 - (D) Download of a cookie containing personal preferences
 - (E) Download of spyware
21. Voice and speech recognition technologies can be found in which of the following applications?
- I. Automated transcription
 - II. Security and access control
 - III. Batch processing
- (A) I only
 - (B) II only
 - (C) I and II only
 - (D) I and III only
 - (E) I, II, and III

22. Assume that a file consists of the following records.

<u>Product Number</u>	<u>Product</u>	<u>Model Year</u>
BEC111	WIDGET	2015
ABC123	GADGET	2014
SBB003	WIDGET	2013
XPL222	GADGET	2014
MAS120	GADGET	2010

The computer is instructed to sort this file in ascending order with Product as the primary sort key, Model Year as the secondary sort key, and Product Number as the tertiary sort key. If this file is printed in sorted order, which record will be the third printed?

- (A) BEC111 WIDGET 2015
- (B) ABC123 GADGET 2014
- (C) SBB003 WIDGET 2013
- (D) XPL222 GADGET 2014
- (E) MAS120 GADGET 2010

23. Which of the following is a potential benefit of telecommuting to the employer?

Select all that apply.

- (A) Eliminates employee commuting time
- (B) Facilitates recruiting a larger pool of prospective employees
- (C) Increases flexibility in handling of unexpected work after typical business hours
- (D) Reduces stress of supervisors
- (E) Improves communication between employees

24. What is the primary difference between an intranet Web page and an Internet Web page?

- (A) Transport protocol
- (B) Transmission rate
- (C) Restriction of access
- (D) Physical proximity to server
- (E) Use of secure socket layers

25. Which of the following explains why digital networks can transmit different types of data?

- (A) Networks can accommodate different types of computers.
- (B) Network connections can be made via satellites.
- (C) Data can be transmitted as either digital or analog signals.
- (D) Storage capacity is not an issue.
- (E) Each data type can be represented by strings of bits.

26. A disaster recovery plan to safeguard a company's computer system can be used for all of the following occurrences EXCEPT

- (A) a flood, fire, or other natural disaster
- (B) a massive long-term power outage
- (C) system upgrades and hardware maintenance
- (D) computer sabotage
- (E) a major viral infection of computer systems

27. In a company of more than 3,000 employees, which of the following is the most likely title of the person who recommends enterprise-wide upgrades of computer hardware?

- (A) Chief Information Officer
- (B) Chief Technology Officer
- (C) Chief Financial Officer
- (D) Systems Analyst
- (E) Information Resources Manager

28. A user has visited several websites, making purchases, initiating searches, and filling out online forms. Which of the following could the user access to revisit the websites?

- (A) Cookies
- (B) Main memory
- (C) Internet preferences
- (D) Web privacy settings
- (E) Web browser history

29. A network administrator is LEAST likely to recommend which of the following technologies to share large quantities of information in a knowledge management system?
- (A) E-mail
 - (B) Wiki
 - (C) Intranet
 - (D) Discussion board
 - (E) Shared network drive
30. Which of the following is a major benefit of object-oriented programming?
- (A) The development of logical steps to achieve the object of the program
 - (B) The use of subroutines that optimize the program's objective
 - (C) The creation of objects that can be used or modified for use in future applications
 - (D) The freedom for programmers to create objects unique to each program
 - (E) The defining of objects as static entities that do not relate to each other
31. Which of the following is NOT part of input data controls in the context of information processing?
- (A) reasonableness checks
 - (B) check digit verification
 - (C) program debugging
 - (D) syntax checks
 - (E) batch totals
32. When applied to the development of computer systems, the term "ergonomics" means
- (A) designing computer systems to maximize the cost-benefit ratio
 - (B) incorporating human comfort, efficiency, and safety into the design of the human-machine interface
 - (C) following the systems development life cycle
 - (D) fostering development team interaction through the use of computer-aided software engineering tools
 - (E) optimizing the throughput rate by adjusting the operating system interrupts
33. What is the term that refers to the downloading of live video, audio, or animation in such a manner that the user can begin to access the content before the download is complete?
- (A) Spooling
 - (B) Streaming
 - (C) Flaming
 - (D) Spamming
 - (E) Queuing
34. Which of the following is (are) true about customer relationship management systems?
- I. They focus on the connection between suppliers, manufacturers, and customers.
 - II. They enable employees in all departments to have a consistent view of customers.
 - III. They focus on customer retention.
- (A) I only
 - (B) I and II only
 - (C) I and III only
 - (D) II and III only
 - (E) I, II, and III
35. Which of the following best describes a worm?
- (A) A virus that spreads via the Internet or a computer network
 - (B) A program that is installed on a computer without the user's knowledge
 - (C) A virus that masquerades as another active program
 - (D) A program that traces user activity
 - (E) A program that replicates itself repeatedly, using up system resources
36. Which of the following is true about open-source software?
- Select all that apply:
- (A) It usually provides product support.
 - (B) Its source code is freely available.
 - (C) It is copyrighted.
 - (D) It is shareware.

37. Which of the following is a database whose data are scattered across several physical servers?
- (A) Data mine
 - (B) Data warehouse
 - (C) Relational database
 - (D) Distributed database
 - (E) Integrated database
38. When developing a website, which of the following activities should occur closest to the end of the process?
- (A) Creating the navigation structure
 - (B) Purchasing a domain name
 - (C) Verifying all the hyperlinks
 - (D) Designing the style sheets
 - (E) Finalizing the graphics
39. Which of the following can support cloud-based application development and deployment?
- (A) Communications as a service
 - (B) Platform as a service
 - (C) Infrastructure as a service
 - (D) Software as a service
 - (E) Network as a service
40. Application software is designed to be compatible with the
- (A) Internet browser
 - (B) LAN configuration
 - (C) operating system
 - (D) programming language
 - (E) hardware interface
41. An online storefront developer should test the different versions of which of the following in order to ensure usability for all users?
- (A) Database management systems
 - (B) Hypertext markup languages
 - (C) Compilers
 - (D) Web browsers
 - (E) Search engines
42. Which of the following statements is true regarding client/server architecture?
- (A) The server computer accepts commands from a number of computers that are its clients.
 - (B) The server computer manages a number of computers that it services.
 - (C) The server computer is connected to a number of computers that provide it with services.
 - (D) The client computer is connected to a number of computers that provide it with clients.
 - (E) The client computer manages a number of computers being served by it.
43. For which of the following consumer applications would there be the LEAST justification to access a national credit history database?
- (A) Credit card
 - (B) Mortgage
 - (C) Student loan
 - (D) Savings account
 - (E) Automobile lease
44. Metadata is best described as which of the following?
- (A) End-user data
 - (B) Data about data
 - (C) Data stored in a Web file format
 - (D) Data gathered by spyware
 - (E) Data returned by an Internet search engine

Directions: Choose among the corresponding environments in the columns for each entry by clicking on your choice. When you click on a blank cell a check mark will appear. No credit is given unless the correct cell is marked for each entry.

45. Which of the following is a reason to use a virtual team model as opposed to an on-site team model?

	Yes	No
There are personality conflicts among team members.		
Team members have different physical locations.		
Team members have difficulty reaching consensus.		

Click on your choices.

46. Which of the following is NOT an advantage of having an entire department using the same office software suite?

- (A) Lower cost per application than if purchased individually
- (B) Ease of moving data between suite applications
- (C) Ease of moving data between users in the same department
- (D) Ease of installation and maintenance
- (E) Optimal functionality of individual application packages

47. Which of the following problem-solving techniques allows users to start with high-level information and then select more specific, lower-level details?

- (A) Ad hoc analysis
- (B) Exception reporting
- (C) Drill-down analysis
- (D) RFM analysis
- (E) Cluster analysis

48. The Bluetooth standard uses what transmission method for data transfer?

- (A) Infrared
- (B) Ethernet cable
- (C) Radio waves
- (D) Satellite
- (E) Wi-Fi

49. Which of the following is (are) legal for the purchaser of a DVD?

- I. Copying the DVD for personal use
 - II. Copying the DVD and giving the copy to a friend for free
 - III. Copying the DVD and giving the copy to a friend for a fee
- (A) None
 - (B) I only
 - (C) II only
 - (D) I and II only
 - (E) I, II, and III

50. Which of the following describes a website that provides access to multiple services such as news, weather, sports, and stock indexes?

- (A) Host
- (B) Portal
- (C) Domain
- (D) Hot site
- (E) Home page

51. The required components for a LAN include each of the following EXCEPT a
- (A) networking protocol
 - (B) cabling standard
 - (C) network interface card
 - (D) unique address for each node
 - (E) print server
52. Which of the following is true about user passwords?
- (A) They should be changed only by the administrator.
 - (B) They must be no more than eight characters in length.
 - (C) They are requested by CAPTCHAs.
 - (D) They are most secure when they consist of letters, numbers, and special characters.
 - (E) They are required to be unique.
53. Which of the following statements is (are) true concerning multiuser database management systems?
- I. They can increase the standardization of data.
 - II. They can increase the need to store data in many different locations in the database.
 - III. They can increase access to and availability of information.
- (A) I only
 - (B) II only
 - (C) I and II only
 - (D) I and III only
 - (E) I, II, and III
54. Developers quickly create a version of a system and give it to the users for feedback. The developers then use the users' feedback to revise the system. This process repeats until the users approve the system. This method of developing a system is called
- (A) waterfall
 - (B) prototyping
 - (C) object-oriented
 - (D) end-user development
 - (E) joint application design
55. Which of the following is NOT true of social networking sites?
- (A) It is unethical for a company recruiting prospective employees to track their presence on and posts to social networking sites.
 - (B) Any unethical activity on a social networking site could have negative consequences outside the site.
 - (C) Some sites enable members to share material with many other members simultaneously.
 - (D) Some sites enable members to maintain contact with other members.
 - (E) Some sites facilitate access to commercial sites.
56. Which of the following information technology processes is used to produce documents that are duplicate, uneditable digital copies?
- (A) Word processing
 - (B) Photocopying
 - (C) Document imaging
 - (D) Desktop publishing
 - (E) OCR scanning
57. Which of the following is NOT a means of secondary storage?
- (A) External hard drive
 - (B) Cache memory
 - (C) USB flash drive
 - (D) Cloud storage
 - (E) CD-RW

58. The capability of computerized systems to store and exchange information poses a potential threat to the individual's right to
- (A) free speech
 - (B) privacy
 - (C) equal access to information
 - (D) assembly
 - (E) consumer protection
59. Which of the following is NOT a characteristic of a decision support system, as it is usually defined?
- (A) It can be used as an aid in solving ad hoc problems.
 - (B) It is useful for what-if analysis.
 - (C) It is intended to help managers make decisions.
 - (D) It makes the one best or optimal decision.
 - (E) It uses appropriate statistical and mathematical models.
60. Which of the following uses the Internet, as opposed to using the public switched network, to enable voice communication?
- (A) TCP/IP
 - (B) VoIP
 - (C) EFT
 - (D) EDI
 - (E) PBX
61. Which data model uses two-dimensional tables to represent data structures?
- (A) Relational
 - (B) Hierarchical
 - (C) Network
 - (D) Navigational
 - (E) Object-oriented
62. Which of the following types of systems development methods would be appropriate when a company does not have an expert IS department?
- I. Outsourcing
 - II. Traditional SDLC
 - III. RAD
- (A) I only
 - (B) II only
 - (C) III only
 - (D) I and III only
 - (E) I, II, and III
63. The process of planning, scheduling, and overseeing the development of a new information system is called
- (A) systems analysis
 - (B) software engineering
 - (C) feasibility assessment
 - (D) project management
 - (E) programming
64. Which of the following activities CANNOT be performed in a link in an HTML document?
- (A) Sending an e-mail
 - (B) Printing the current Web page
 - (C) Moving to another location on the current Web page
 - (D) Opening another Web page in the current browser window
 - (E) Opening another Web page in a new browser window

65. A manager of a small business wants to use a computer to store information about clients, vendors, inventory (item, number, price), and orders. The manager needs to be able to sort and group data for various reports. Which of the following types of software packages would be best for this task?
- (A) Word processor
 - (B) Spreadsheet
 - (C) Database management system
 - (D) Presentation software
 - (E) System software
66. In determining whether a risk-management procedure is cost-effective, which of the following should be considered?
- I. The value of the asset being protected
 - II. The cost of the security control being considered
 - III. The likelihood of damage to the asset
- (A) I only
 - (B) II only
 - (C) III only
 - (D) I and II only
 - (E) I, II, and III
67. The process of comparing a user ID and password with stored information before allowing access to a system is
- (A) authentication and authorization
 - (B) digital certification
 - (C) password protection
 - (D) knowledge management
 - (E) customer validation
68. In considering the economic feasibility of a systems development project, which of the following would a project manager be LEAST likely to consider?
- (A) The cost of developing the system compared with the potential benefits of using the system
 - (B) The return on the initial investment on the system
 - (C) When the project will break even
 - (D) Whether the company can afford the project
 - (E) Whether the hardware can be acquired for the project
69. A program written to access and update a master database that maintains sales of tickets to an upcoming concert is
- (A) system software
 - (B) networking software
 - (C) a transaction processing system
 - (D) an operating system
 - (E) a knowledge management system
70. Which of the following user-based activities would NOT be part of a website design project?
- (A) Users being asked what information should appear on the website
 - (B) Users being asked what programming language they are most comfortable with
 - (C) Users being asked about their security concerns
 - (D) Users being asked what statistical feedback they would like to receive
 - (E) Users being instructed to look at similar websites

71. Which of the following is an advantage of outsourcing?
- (A) It enables a company to focus on core competencies.
 - (B) It decreases dependence on other organizations.
 - (C) It decreases the risk of disclosing confidential information.
 - (D) It improves managerial control.
 - (E) It enhances in-house technical expertise.
72. Batch processing is LEAST likely to be applied to
- (A) periodic merging of transaction records
 - (B) ad hoc querying of a marketing information database
 - (C) creating management reports
 - (D) transmitting monthly sales projections
 - (E) populating a data warehouse
73. Which of the following is a software agent used by some Internet search engines to generate search results?
- (A) Web bot
 - (B) TCP filter
 - (C) Auto responder
 - (D) Worm
 - (E) Indexer
74. The maintenance phase of the system development process could include all of the following activities EXCEPT
- (A) correcting errors in the software that were detected after implementation
 - (B) changing the heading on a report
 - (C) updating entries in the tax table to reflect changes in the tax rates
 - (D) adding a new function to an existing system
 - (E) performing a complete rewrite for an existing system
75. The type of network that would most likely be used to link a corporation's headquarters with its four branch offices located throughout a state is referred to as
- (A) a metropolitan area network
 - (B) a local area network
 - (C) an office area network
 - (D) a wide area network
 - (E) a broad area network
76. Goals of a supply-chain management system include which of the following?
- I. Facilitate upselling of the product
 - II. Deliver the product to the customer more rapidly
 - III. Reduce the cost of procurement
- (A) I only
 - (B) I and II only
 - (C) I and III only
 - (D) II and III only
 - (E) I, II, and III
77. Which of the following is a set of protocols used to link different types of computers over the Internet?
- (A) HTML
 - (B) HTTP
 - (C) ERP
 - (D) TCP/IP
 - (E) W3C
78. Which of the following does NOT provide data security or access security?
- (A) Data encryption
 - (B) Password protection
 - (C) Data encoding
 - (D) Biometric scan
 - (E) Digital certificate

79. Which of the following is the term used when a website automatically downloads data or files to a computer whenever new data are available or at scheduled intervals?
- (A) Web streaming
 - (B) Push technology
 - (C) Pipelining
 - (D) Spamming
 - (E) Web crawling
80. A geographic information system must have which of the following characteristics?
- I. Records have identified geographic locations.
 - II. The system uses global positioning satellites.
 - III. The system provides results in a graphic format.
- (A) I only
 - (B) I and II only
 - (C) I and III only
 - (D) II and III only
 - (E) I, II, and III
81. Managers in an organization often use spreadsheets to assist with decision making. The process of using a spreadsheet to try out alternatives is called
- (A) what-if analysis
 - (B) data mining
 - (C) flowcharting
 - (D) querying
 - (E) data manipulation
82. Having multiple operating systems installed on the same personal computer enables the user to do each of the following EXCEPT
- (A) run a proprietary operating system and an open source operating system on the same computer
 - (B) run different versions of the same operating system on the same computer
 - (C) access a larger variety of software
 - (D) create multiple IP addresses for the computer
 - (E) create a virtual server
83. Which of the following is an asynchronous technology that a virtual team can use for communication?
- (A) Conference call
 - (B) Videoconferencing
 - (C) VoIP
 - (D) E-mail
 - (E) Webinar
84. Which of the following is an application that can use RFID technology?
- Select all that apply.
- (A) Data transfer between smartphones
 - (B) Toll collection on a limited-access roadway
 - (C) Inventory management
 - (D) Credit card use
 - (E) Internet access
 - (F) Animal tracking

85. A table called “Students” consists of the following records:

<u>Name</u>	<u>Credits</u>	<u>GPA</u>
Anderson	10	3.0
Chen	9	3.2
Gomez	12	3.1
Jones	12	3.0

A user entered the following SQL command:

```
Select Name
From Students
Where Credits > 9 and GPA > 3
```

How many names would be returned based on the criteria?

- (A) None
- (B) One
- (C) Two
- (D) Three
- (E) Four

86. The process through which a user is verified and validated to access a computer network/system is referred to as

- (A) encryption
- (B) password protection
- (C) authentication
- (D) account validation
- (E) certification

87. What is the term that describes the storage of identical data in multiple files?

- (A) Data dependency
- (B) Data integrity
- (C) Data integration
- (D) Data redundancy
- (E) Data structure

88. Under which of the following conditions can a public wireless network be used to transmit confidential data most securely?

- (A) The local computer has been scanned for viruses.
- (B) The local computer has the latest operating system and updates.
- (C) The local computer connects to the network using VPN.
- (D) All files on the local computer have been backed up.
- (E) The network password meets all security criteria.

89. Using an ERP system has which of the following advantages?

- I. It is easier to install than a typical transaction processing system.
 - II. It provides a centralized database for organizational data.
 - III. It integrates processes over the organization.
- (A) I only
 - (B) II only
 - (C) I and II only
 - (D) II and III only
 - (E) I, II, and III

90.

	A	B	C	D
1	1	2	3	4
2	2	4	6	8
3	1	2	3	4
4	2	4	6	8

The table above shows the contents of 16 cells in a spreadsheet. Cell E5 of the spreadsheet contains the formula “=B\$2+\$C2”. Cell E5 is copied to cell F6. What is the value displayed in cell F6?

- (A) 5
- (B) 7
- (C) 9
- (D) 10
- (E) 14

Study Resources

Most textbooks used in college-level introductory business information systems courses cover the knowledge and skills in the outline given earlier. The approaches to certain topics and the emphases given to them differ. It is advisable to study one or more current college textbooks to prepare for the Information Systems exam. When selecting textbooks, for each textbook check the table of contents against the knowledge and skills required for this test.

Visit clep.collegeboard.org/test-preparation for additional study resources. You can also find suggestions for exam preparation in Chapter IV of the *Official Study Guide*.

Answer Key

- | | |
|----------------|----------------|
| 1. E | 46. E |
| 2. C | 47. C |
| 3. C | 48. C |
| 4. D | 49. B |
| 5. D | 50. B |
| 6. E | 51. E |
| 7. B | 52. D |
| 8. A | 53. D |
| 9. C | 54. B |
| 10. E | 55. A |
| 11. D | 56. C |
| 12. A | 57. B |
| 13. C | 58. B |
| 14. C | 59. D |
| 15. A | 60. B |
| 16. A | 61. A |
| 17. E | 62. A |
| 18. A | 63. D |
| 19. B | 64. B |
| 20. A | 65. C |
| 21. C | 66. E |
| 22. D | 67. A |
| 23. B, C | 68. E |
| 24. C | 69. C |
| 25. E | 70. B |
| 26. C | 71. A |
| 27. B | 72. B |
| 28. E | 73. A |
| 29. A | 74. E |
| 30. C | 75. D |
| 31. C | 76. D |
| 32. B | 77. D |
| 33. B | 78. C |
| 34. D | 79. B |
| 35. E | 80. C |
| 36. A, B, C | 81. A |
| 37. D | 82. D |
| 38. C | 83. D |
| 39. B | 84. B, C, D, F |
| 40. C | 85. B |
| 41. D | 86. C |
| 42. A | 87. D |
| 43. D | 88. C |
| 44. B | 89. D |
| 45. On page 22 | 90. C |

45.

	Yes	No
There are personality conflicts among team members.		✓
Team members have different physical locations.	✓	
Team members have difficulty reaching consensus.		✓

Click on your choices.

Test Measurement Overview

Format

There are multiple forms of the computer-based test, each containing a predetermined set of scored questions. The examinations are not adaptive. There may be some overlap between different forms of a test: any of the forms may have a few questions, many questions, or no questions in common. Some overlap may be necessary for statistical reasons.

In the computer-based test, not all questions contribute to the candidate's score. Some of the questions presented to the candidate are being pretested for use in future editions of the tests and will not count toward his or her score.

Scoring Information

CLEP examinations are scored without a penalty for incorrect guessing. The candidate's raw score is simply the number of questions answered correctly. However, this raw score is not reported; the raw scores are translated into a scaled score by a process that adjusts for differences in the difficulty of the questions on the various forms of the test.

Scaled Scores

The scaled scores are reported on a scale of 20–80. Because the different forms of the tests are not always exactly equal in difficulty, raw-to-scale conversions may in some cases differ from form to form. The easier a form is judged to be, the higher the raw score required to attain a given scaled score. **Table 1** indicates the relationship between number correct (raw score) and scaled score across all forms.

The Recommended Credit-Granting Score

Table 1 also indicates the recommended credit-granting score, which represents the performance of students earning a grade of C in the corresponding course. The recommended B-level score represents B-level performance in equivalent course work. These scores were established as the result of a Standard Setting Study, the most recent having been conducted in 2009. The recommended credit-granting scores are based upon the judgments of a panel of experts currently teaching equivalent

courses at various colleges and universities. These experts evaluate each question in order to determine the raw scores that would correspond to B and C levels of performance. Their judgments are then reviewed by a test development committee, which, in consultation with test content and psychometric specialists, makes a final determination. The standard-setting study is described more fully in the earlier section entitled “CLEP Credit Granting” on page 5.

Panel members participating in the most recent study were:

Beverly Amer	Northern Arizona University
Scott Beckstrand	College of Southern Nevada
Nora Braun	Augsburg College
Richard Bush	Lawrence Technological University
Q Chung	Villanova University
Robert Ellis	William Carey University
Jerry Fjermestad	New Jersey Institute of Technology
C. Steven Hunt	Morehead State University
Russell Jones	Arkansas State University
Brian Kovar	Kansas State University
Levi Krein	University of Mary
W. Brett McKenzie	Roger Williams University
James Nelson	New Mexico State University
Karen Sarratt Scott	The University of Texas at Arlington
Paul Schwager	East Carolina University
Dana Schwieger	Southeast Missouri State University
Judith Simon	University of Memphis
Gerhard Steinke	Seattle Pacific University
Ward Thrasher	University of Bridgeport
MaryAnne Winniford	Mesa State College
Cecelia Wright-Brown	Morgan State University

After the recommended credit-granting scores are determined, a statistical procedure called scaling is applied to establish the exact correspondences between raw and scaled scores. Note that a scaled score of 50 is assigned to the raw score that corresponds to the recommended credit-granting score for C-level performance, and a high but usually less-than-perfect raw score is selected and assigned a scaled score of 80.

Table 1: Information Systems Interpretive Score Data

American Council on Education (ACE) Recommended Number of Semester Hours of Credit: 3

Course Grade	Scaled Score	Number Correct
	80	85-90
	79	84
	78	83
	77	82
	76	80-81
	75	79-80
	74	78
	73	77
	72	75-76
	71	74-75
	70	73-74
	69	72
	68	70-71
	67	69-70
B	66	68-69
	65	67
	64	65-66
	63	64-65
	62	63-64
	61	61-62
	60	60-61
	59	59-60
	58	57-58
	57	56-57
	56	55-56
	55	53-55
	54	52-53
	53	51-52
	52	49-51
	51	48-49
C	50*	47-48
	49	45-46
	48	44-45
	47	43-44
	46	41-42
	45	40-41
	44	38-40
	43	37-38
	42	36-37
	41	34-35
	40	33-34
	39	31-32
	38	30-31
	37	29-30
	36	27-28
	35	26-27
	34	24-25
	33	23-24
	32	21-22
	31	20-21
	30	19
	29	17-18
	28	16-17
	27	14-15
	26	13-14
	25	12
	24	10-11
	23	9
	22	7-8
	21	6-7
	20	0-5

*Credit-granting score recommended by ACE.

Note: The number-correct scores for each scaled score on different forms may vary depending on form difficulty.

Validity

Validity is a characteristic of a particular use of the test scores of a group of examinees. If the scores are used to make inferences about the examinees' knowledge of a particular subject, the validity of the scores for that purpose is the extent to which those inferences can be trusted to be accurate.

One type of evidence for the validity of test scores is called content-related evidence of validity. It is usually based upon the judgments of a set of experts who evaluate the extent to which the content of the test is appropriate for the inferences to be made about the examinees' knowledge. The committee that developed the CLEP Information Systems examination selected the content of the test to reflect the content of Information Systems courses at most colleges, as determined by a curriculum survey. Since colleges differ somewhat in the content of the courses they offer, faculty members should, and are urged to, review the content outline and the sample questions to ensure that the test covers core content appropriate to the courses at their college.

Another type of evidence for test-score validity is called criterion-related evidence of validity. It consists of statistical evidence that examinees who score high on the test also do well on other measures of the knowledge or skills the test is being used to measure. Criterion-related evidence for the validity of CLEP scores can be obtained by studies comparing students' CLEP scores with the grades they received in corresponding classes, or other measures of achievement or ability. CLEP and the College Board conduct these studies, called Admitted Class Evaluation Service or ACES, for individual colleges that meet certain criteria at the college's request. Please contact CLEP for more information.

Reliability

The reliability of the test scores of a group of examinees is commonly described by two statistics: the reliability coefficient and the standard error of measurement (SEM). The reliability coefficient is the correlation between the scores those examinees get (or would get) on two independent replications of the measurement process. The reliability coefficient is intended to indicate the

stability/consistency of the candidates' test scores, and is often expressed as a number ranging from .00 to 1.00. A value of .00 indicates total lack of stability, while a value of 1.00 indicates perfect stability. The reliability coefficient can be interpreted as the correlation between the scores examinees would earn on two forms of the test that had no questions in common.

Statisticians use an internal-consistency measure to calculate the reliability coefficients for the CLEP exam.¹ This involves looking at the statistical relationships among responses to individual multiple-choice questions to estimate the reliability of the total test score. The SEM is an estimate of the amount by which a typical test-taker's score differs from the average of the scores that a test-taker would have gotten on all possible editions of the test. It is expressed in score units of the test. Intervals extending one standard error above and below the true score for a test-taker will include 68 percent of that test-taker's obtained scores. Similarly, intervals extending two standard errors above and below the true score will include 95 percent of the test-taker's obtained scores. The standard error of measurement is inversely related to the reliability coefficient. If the reliability of the test were 1.00 (if it perfectly measured the candidate's knowledge), the standard error of measurement would be zero.

An additional index of reliability is the conditional standard of error of measurement (CSEM). Since different editions of this exam contain different questions, a test-taker's score would not be exactly the same on all possible editions of the exam. The CSEM indicates how much those scores would vary. It is the typical distance of those scores (all for the same test-taker) from their average. A test-taker's CSEM on a test cannot be computed, but by using the data from many test-takers, it can be estimated. The CSEM estimate reported here is for a test-taker whose average score, over all possible forms of the exam, would be equal to the recommended C-level credit-granting score.

Scores on the CLEP examination in Information Systems are estimated to have a reliability coefficient of 0.92. The standard error of measurement is 3.01 scaled-score points. The conditional standard error of measurement at the recommended C-level credit-granting score is 3.33 scaled-score points.

¹ The formula used is known as Kuder-Richardson 20, or KR-20, which is equivalent to a more general formula called coefficient alpha.