TEST BANK

Systems Architecture

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TRUE/FALSE

1. Some experimental computers have used quantum physics to perform data storage and computation.

    ANS: T   PTS: 1   REF: 22

2. The Difference Engine computed logarithms by moving gears and other mechanical components.

    ANS: T   PTS: 1   REF: 22

3. Mechanical computers were used during World War I to compute trajectory tables for naval guns and torpedoes.

    ANS: F   PTS: 1   REF: 22

4. Mechanical computation devices cannot perform complex calculations.

    ANS: F   PTS: 1   REF: 23

5. A machine capable of addition can perform multiplication by executing the addition function multiple times.

    ANS: T   PTS: 1   REF: 23

6. The biggest impetus for the change to electronic computing devices came during World War I.

    ANS: F   PTS: 1   REF: 23

7. Electronic computers addressed most shortcomings of mechanical computation.

    ANS: T   PTS: 1   REF: 23

8. Light can be used as a basis for computation.

    ANS: T   PTS: 1   REF: 24

9. Optics have little advantage in most areas of computing technology.

    ANS: F   PTS: 1   REF: 24

10. Optical processors might be easier to fabricate than current processors and are better matched to optical communication technologies.

    ANS: T   PTS: 1   REF: 24

11. In classical physics, a subatomic particle, such as a photon, can be in multiple places at one time.

    ANS: F   PTS: 1   REF: 24

12. All computers are automated computing devices, and all automated computing devices are computers.

ANS: F   PTS: 1   REF: 26

13. A typical computer system must have much more secondary storage capacity than primary storage capacity.

    ANS: T   PTS: 1   REF: 33

14. A personal digital assistant is a laptop computer that emphasizes small size, reduced weight, low cost, and wireless networking and is capable of performing only light-duty tasks, such as Web browsing, e-mailing, and word processing.

    ANS: F   PTS: 1   REF: 35

15. Workstation hardware capabilities depend on the resources being shared and the number of simultaneous users.

    ANS: F   PTS: 1   REF: 36

16. The primary role of software is to translate users' needs and requests into CPU instructions that, when executed, produce a result that satisfies the need or request.

    ANS: T   PTS: 1   REF: 44

17. The need or idea that motivates a request for computer processing is stated at a specific level.

    ANS: F   PTS: 1   REF: 45

18. Windows OSs tend toward an all-inclusive approach to system software, bundling most system software functions in the OS.

    ANS: T   PTS: 1   REF: 48

19. IBM introduced the first mass-market microcomputer in 1971.

    ANS: F   PTS: 1   REF: 51

20. The evolution of Microsoft OSs is a good example of how software development depends on hardware technology.

    ANS: T   PTS: 1   REF: 52

21. The 80386 provided hardware support for running multiple programs simultaneously, simplified partitioning primary storage among programs, and provided mechanisms for preventing programs from interfering with one another.

    ANS: T   PTS: 1   REF: 52

22. Multiple-core CPUs in Pentium processors resulted in major changes to CPU internals.

    ANS: F   PTS: 1   REF: 52

23. Today, a computer is considered useful even if it doesn't have the capability to interact with other computers.

ANS: F   PTS: 1   REF: 53

24. The number and complexity of network functions and components have grown as network technology has matured and become more widespread.

ANS: T   PTS: 1   REF: 53

25. Devices such as printers and secondary storage arrays cannot be attached directly to the network.

ANS: F   PTS: 1   REF: 54

26. One computer can use the CPU or storage but not the I/O devices of another.

ANS: F   PTS: 1   REF: 54

27. Allocating and accessing resources are complex when a user or program can request resources that aren't on the local computer and aren't managed by locally installed system software.

ANS: T   PTS: 1   REF: 54

28. System software has the intelligence needed to make and respond to external resource requests, and most operating systems include support for both functions.

ANS: T   PTS: 1   REF: 55

29. A computer system requires at least two hardware devices to connect to a network.

ANS: F   PTS: 1   REF: 55

30. A physical network can be implemented with a dizzying array of technologies and architectural approaches.

ANS: T   PTS: 1   REF: 55

MULTIPLE CHOICE

1. The term _____ describes the structure, interaction, and technology of computer system components.
   a. systems design   c. information architecture
   b. enterprise architecture   d. systems architecture

   ANS: D   PTS: 1   REF: 21

2. Storing data optically involves using a(n) _____ and an optical disc's reflective coating.
   a. laser   c. lamp
   b. LED   d. magnet

   ANS: A   PTS: 1   REF: 22

3. Early mechanical computation devices were built to perform _____.
   a. text processing   c. repetitive mathematical calculations
   b. mathematical simulation   d. repetitive mechanical operations

   ANS: C   PTS: 1   REF: 22

4. In a computation device, a(n) _____ is driven by a spring and pendulum, and each swing of the pendulum allows a gear to move one step under pressure from the spring.
   a. kerosene clock
   b. analog clock
   c. aluminum clock
   d. mechanical clock

   ANS: D   PTS: 1   REF: 23

5. A particle of light is called a _____.
   a. muon
   b. photon
   c. quantum
   d. meson

   ANS: B   PTS: 1   REF: 24

6. Data can be represented as _____ and stored directly, such as an image as a hologram.
   a. waves of particles
   b. waves of light
   c. pulses of light
   d. pulses of radiation

   ANS: C   PTS: 1   REF: 24

7. Data can be represented as pulses of light and stored indirectly, such as _____.
   a. on the surface of a DVD
   b. on the surface of a magnetic disk
   c. in the blocks of flash memory
   d. the groves of a record

   ANS: A   PTS: 1   REF: 24

8. _____ signals can carry more data than electrical signals.
   a. Mechanical
   b. Digital
   c. Optical
   d. Quantum

   ANS: C   PTS: 1   REF: 24

9. _____ physics describes the behavior of matter at a subatomic level.
   a. Einsteinian
   b. Newtonian
   c. Relativity
   d. Quantum

   ANS: D   PTS: 1   REF: 24

10. Quantum physics describes subatomic behavior with _____.
    a. physical rules
    b. mathematical rules
    c. physical laws
    d. a combination of physical rules and mathematical laws

    ANS: B   PTS: 1   REF: 24

11. In a modern digital computer, data is represented by groups of _____.
    a. qubits
    b. photons
    c. bits
    d. waves

    ANS: C   PTS: 1   REF: 24

12. Any matter that stores data in multiple simultaneous quantum states is called a _____.
    a. qubit
    b. bit
    c. limit
    d. quantum

    ANS: A   PTS: 1   REF: 25

13. In classical physics, a group of 3 bits can store only one of ____ possible values at a time.
    a. 6   c. 12
    b. 8   d. 24

    ANS: B   PTS: 1   REF: 25

14. A(n) ____ is a program in which different sets of instructions are applied to different data input values.
    a. system   c. solution
    b. problem   d. algorithm

    ANS: D   PTS: 1   REF: 27

15. The CPU contains a few internal storage locations called ____, each capable of holding a single instruction or data item.
    a. the ALU   c. shifters
    b. registers   d. the compiler

    ANS: B   PTS: 1   REF: 31

16. In current computer hardware, main memory is implemented with silicon-based semiconductor devices commonly called ____.
    a. Flash   c. ROM
    b. PROM   d. RAM

    ANS: D   PTS: 1   REF: 32

17. A ____ is a computer system designed to meet a single user's information-processing needs.
    a. microcomputer   c. supercomputer
    b. mainframe   d. minicomputer

    ANS: A   PTS: 1   REF: 34

18. A ____ is designed for one purpose—rapid mathematical computation.
    a. supercomputer   c. microcomputer
    b. mainframe   d. server

    ANS: A   PTS: 1   REF: 35

19. The term ____ can describe computers as small as microcomputers and as large as supercomputers.
    a. mainframe   c. server
    b. client   d. grid

    ANS: C   PTS: 1   REF: 35

20. A ____ is a group of similar or identical computers, connected by a high-speed network, that cooperate to provide services or run a single application.
    a. cloud   c. blade
    b. cluster   d. grid

    ANS: B   PTS: 1   REF: 38

21. A ____ is a circuit board that contains most of a server.
    a. grid   c. cluster
    b. cloud   d. blade

    ANS: D   PTS: 1   REF: 39

22. _____ are typically implemented by installing software on each machine that accepts tasks from a central server and performs them when not busy doing other work.
    a. Grids   c. Clusters
    b. Clouds   d. Blades

    ANS: A   PTS: 1   REF: 39

23. A _____ is a set of computing resources with front-end interfaces and back-end resources.
    a. grid   c. cloud
    b. cluster   d. blade

    ANS: C   PTS: 1   REF: 39

24. "_____" is the concept that the per-unit cost of producing goods or providing services decreases as the organization size increases.
    a. Economies of scale   c. Economies of balance
    b. Economies of measure   d. Economies of growth

    ANS: A   PTS: 1   REF: 43

25. A(n) _____ is a stored set of instructions for responding to a specific request, much as you might look up a recipe to prepare a particular dish.
    a. operating system   c. compiler
    b. computer system   d. application program

    ANS: D   PTS: 1   REF: 45

26. _____ is targeted to general-purpose tasks that support many application programs and users.
    a. Application software   c. Niche software
    b. System software   d. Commodity software

    ANS: B   PTS: 1   REF: 46

27. Most application software is used by _____.
    a. end users   c. engineers
    b. programmers   d. administrators

    ANS: A   PTS: 1   REF: 46

28. In the "layered approach," knowledge of the machine's physical details is embedded into system software and hidden from users and application programmers. This is commonly referred to as _____.
    a. machine dependence   c. machine independence
    b. virtualization   d. abstraction

    ANS: C   PTS: 1   REF: 47

29. The _____ software layer has utility programs used by end users and system administrators to manage and control computer resources.
    a. system services   c. machine dependent
    b. machine independent   d. system management

    ANS: D   PTS: 1   REF: 47

30. The _____ software layer has utility programs used by system management and application programs to perform common functions

a. system management   c. machine independent
b. system services   d. machine dependent

ANS: B   PTS: 1   REF: 47

31. ____ software describes programs used to develop other programs.
a. Application development   c. Systems
b. Application design   d. Application modeling

ANS: A   PTS: 1   REF: 49

32. A ____ is a program that translates instructions in a programming language into CPU instructions.
a. compiler   c. program translator
b. linker   d. parser

ANS: C   PTS: 1   REF: 49

33. ____ is typically the cheapest component of current information systems.
a. System software   c. Middleware
b. Hardware   d. Application software

ANS: B   PTS: 1   REF: 50

34. The ____ chip provided integrated memory caches, enhanced computational capabilities, and
increased raw CPU speed. Windows 95 was developed to take better advantage of this chip's
capabilities.
a. 8088   c. 80386
b. 80286   d. 80486

ANS: D   PTS: 1   REF: 52

35. ____ improved memory access and raw CPU speeds and added features such as support for
higher-speed system buses, pipelined instruction execution, and multimedia processing instructions.
a. Pentium processors   c. 80x86 processors
b. Multiple-core CPUs   d. PowerPC processors

ANS: A   PTS: 1   REF: 52

36. A ____ consists of hardware and software components that enable users and computer systems to
share information, software, and hardware resources.
a. computer system   c. computer environment
b. computer network   d. computer platform

ANS: B   PTS: 1   REF: 53

37. The complexity of modern networks arises from the huge quantity of ____.
a. connected resources   c. distributed resources
b. local resources   d. cloud services

ANS: C   PTS: 1   REF: 53

38. In the early days of networks, the only important distributed resource was ____.
a. raw data   c. a simple database
b. raw text   d. e-mail

ANS: A   PTS: 1   REF: 53

39. In essence, system software plays two roles in each network resource access: _____.
   a. system and reply   c. server and resource
   b. client and server   d. request and response

   ANS: D   PTS: 1   REF: 55

40. A _____ network is a complex combination of communication protocols, methods of data transmission, and network hardware devices.
   a. logical   c. physical
   b. virtual   d. tangible

   ANS: C   PTS: 1   REF: 55

COMPLETION

1. A simple definition of a(n) _____ is any device that can accept numeric inputs, perform computational functions, such as addition and subtraction, and communicate results.

   ANS: computer

   PTS: 1   REF: 22

2. The most famous of the mechanical computation devices is the _____, built by Charles Babbage in 1821.

   ANS: Difference Engine

   PTS: 1   REF: 22

3. In a(n) _____ device, the movement of electrons performs essentially the same functions as gears and wheels in mechanical computers.

   ANS: electronic computing

   PTS: 1   REF: 23

4. A moving photon's _____ can be harnessed to perform computational work.

   ANS: energy

   PTS: 1   REF: 24

5. _____ data communication is now common in computer networks that cover large distances.

   ANS: Optical

   PTS: 1   REF: 24

6. _____ are expected to gradually supplant electronics during the 21st century.

   ANS: Optics

   PTS: 1   REF: 24

7. Current computer technology is based on principles of _____ physics developed during the 17th through 20th centuries, including electronics, magnetism, and optics.

ANS: classical

PTS: 1   REF: 24

8. A(n) _____ is a device that performs data manipulation and transformation functions.

ANS: processor

PTS: 1   REF: 26

9. The _____ is a general-purpose processor that executes all instructions and controls all data movement in the computer system.

ANS:
central processing unit (CPU)
central processing unit
CPU

PTS: 1   REF: 30

10. A(n) _____ computer system handles the information-processing needs of a large number of users and applications.

ANS: mainframe

PTS: 1   REF: 35

11. _____ offers flexibility in server configuration and deployment, including the ability to "resize" virtual machines easily to match changing requirements.

ANS: Virtualization

PTS: 1   REF: 37

12. A(n) _____ configuration is any arrangement of multiple computers used to support specific services or applications.

ANS: multicomputer

PTS: 1   REF: 38

13. A(n) _____ is a group of dissimilar computers, connected by a high-speed network, that cooperate to provide services or run a shared application.

ANS: grid

PTS: 1   REF: 39

14. _____ typically make use of both multicomputer configuration and virtualization.

ANS: Clouds

PTS: 1   REF: 40

15. _____'s law is the mathematical formula that describes belief that the large and powerful computers will always be more cost effective than smaller ones.

ANS: Grosch

PTS: 1   REF: 41-42

16. A(n) _____ is a set of detailed instructions for directing a computer to perform a complex task.

ANS: program

PTS: 1   REF: 45

17. _____ allocation is an important, but mostly invisible, function of system software.

ANS: Resource

PTS: 1   REF: 48

18. A(n) _____ is a collection of utility programs for supporting users and application programs, allocating resources to multiple users and application programs, and controlling access to hardware.

ANS:
operating system (OS)
operating system
OS

PTS: 1   REF: 48

19. _____ tools are tools that simulate program execution and help programmers trace errors.

ANS: Debugging

PTS: 1   REF: 49

20. _____ tools are tools that enable systems analysts and designers to develop models of information systems that are then used as the starting point for developing application programs.

ANS: System development

PTS: 1   REF: 49

21. Both system and application development software increase cost effectiveness by promoting software _____.

ANS: reuse

PTS: 1   REF: 51

22. _____ between software developers guarantees continual and rapid assimilation of new hardware technology.

ANS: Competition

PTS: 1   REF: 53

23. In the push-pull relationship of hardware power and software capability, _____ is usually the driving force.

ANS: hardware

PTS: 1   REF: 53

24. _____ is now available in many different forms, including text files, sound and video, databases, and Web pages.

ANS: Data

PTS: 1   REF: 53

25. A key function of _____ software is allocating resources to users and programs.

ANS: system

PTS: 1   REF: 54

ESSAY

1. List two limitations in mechanical computation.

ANS:
Complex design and construction

Wear, breakdown, and maintenance of mechanical parts

Limits on operating speed

PTS: 1   REF: 23

2. List two functions that are included in most operating systems.

ANS:
Program storage, loading, and execution

File manipulation and access

Secondary storage management

Network and interactive user interfaces

PTS: 1   REF: 48

3. Discuss the influence of Pentium processors on technology development.

    ANS:
    Pentium processors improved memory access and raw CPU speeds and added features such as support
    for higher-speed system buses, pipelined instruction execution, and multimedia processing
    instructions. Microsoft OS development split into two distinct paths. The first path started with
    Windows 95, which evolved into Windows 98 and finally Windows Me. Multimedia instructions
    served as a foundation for improved high-resolution graphics and audio and video. The second path
    was a new family of OSs that began with Windows NT and continued through Windows 2000 and XP.
    Increased CPU speed and improved memory management enabled Microsoft to embed more
    sophisticated memory and hardware management capabilities in Windows NT than in other Windows
    OSs. These improvements also allowed Microsoft to develop server OSs, including Windows 2000
    Server and Windows Server 2003.

    PTS: 1   REF: 52

4. List two functions that the system software must perform if a computer system makes its local
    resources available to other computers.

    ANS:
    Listen for resource requests.

    Validate resource requests.

    Deliver resources via the network.

    PTS: 1   REF: 54

5. Discuss two important ways that network communication devices differ from I/O devices.

    ANS:
    First, they're usually simpler because they don't need to convert electronic data into another form.
    Second, they must support communication at high speeds so that external resource access isn't far
    slower than access to local resources.

    PTS: 1   REF: 55