Chapter 23

Computer System Fundamentals

Name _____ Date _____

Instructor _____ Score _____

Objective: After studying this chapter, you will be able to compare computer systems to the human body's nervous system, and describe the input, processing, and output sections of a basic computer system.

Cybernetics

1. Define *cybernetics*.

_____

_____

_____

2. The brain uses billions of cells interconnected by linking cells called _____. _____

Computer Circuit Advantages

3. Name four reasons computers are being used in modern vehicles.

_____

_____

_____

_____

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_____

Digital Electronics

4. Digital electronics is a field of study dealing with the ways a computer uses on-off signals to produce _____. _____

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5. In the binary numbering system, *on* is represented by _____ and *off* is represented by _____. _____ _____

6. A pattern of eight bits is called a(n) _____. _____

7. A(n) _____ is an electronic circuit that produces a specific output voltage for given input voltages. _____

8. Name three common computer gates.

_____

_____

9. A truth table is a chart that shows what the _____ of a gate will be with different _____. _____ _____

Integrated Circuits

10. Define *integrated circuit*.

_____

_____

_____

Computer Signals

11. Define *computer signal*.

_____

_____

_____

12. (Analog, Digital) _____ signals are on-off signals, like those produced by a rapidly flipping switch. _____

13. (Analog, Digital) _____ signals gradually change in strength. _____

14. If a scope is connected to a sensor that generates a signal voltage, a(n) _____ can be viewed on the scope. _____

15. Name four waveforms.

_____

_____

_____

For questions 16–18, match the following terms and identifying phrases.

_____ 16. The percentage of *on* time compared to total cycle time.

_____ 17. How much voltage is present in the wave.

_____ 18. How fast a voltage signal changes over time.

(A) Pulse width
(B) Signal amplitude
(C) Duty cycle

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Name _____

Computer System Operation

19. What are the three stages of computer system operation?

_____

_____

20. A computer system _____ is a simple service manual drawing that shows how the sensors, the actuators, and the computers interact. _____

Sensors

21. _____, or transducers, change a physical condition into an electrical signal. _____
22. (Passive, Active) _____ sensors are variable resistance sensors. _____
23. (Passive, Active) _____ sensors produce their own voltage signal internally. _____
24. Name four sensor classifications.

_____

_____

_____

25. The computer sends a reference voltage to a(n) _____ sensor so a signal can be fed back for processing. _____
26. The reference voltage is typically around _____ volts. _____
27. The sensor alters the reference voltage by changing its internal _____. _____
28. Intake air temperature (IAT) sensor measures the temperature of intake air as it enters the _____. _____
29. Manifold absolute pressure measures outside air pressure in relation to _____ inside the engine intake manifold. _____
30. The sensor that measures outside air pressure around the engine is called _____ pressure sensor. _____
31. The sensor that threads into the fuel rail to monitor the amount of gasoline pressure available at the inlet of the fuel injectors is called the _____ sensor. _____
32. The crankshaft position sensor measures _____, _____, and _____. _____

_____

_____

33. The sensor that measures the amount of intake air flowing into the engine is the _____ sensor. _____

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34. A(n) _____ sensor is usually a piezoelectric sensor that detects engine pinging, preignition, or detonation so the ECM can retard ignition timing or reduce turbocharger boost pressure. _____

35. Which sensor measures the position of the exhaust gas recirculation valve pintle?

_____

36. The sensors that detect a collision to shut off the fuel pump and engine are _____ sensors. _____

37. Define *circuit sensing*.

_____

_____

_____

Computers

38. Name four terms used in place of *computer*.

_____

_____

_____

For questions 39–41, match the following terms and identifying phrases.

_____ 39. Used to monitor and control the engine, transmission, and other systems.

_____ 40. Processes data from sensors and other, less powerful control units.

_____ 41. Uses sensor inputs to control engine idle speed, fuel injection, ignition timing, emission control devices, and other operating parameters.

(A) Vehicle control module

(B) Powertrain control module

(C) Engine control module

42. Define *computer housing*.

_____

_____

_____

43. A(n) _____ is a plastic or fiberboard insulator with flat metal conductors printed on its surface to connect and hold components. _____

44. The _____ is usually the largest integrated circuit in a computer and analyzes data from sensors and compares it to known good operating values in memory. _____

45. Memory chips store _____ data. _____

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Name _____

_____ 46. A computer _____ simply strengthens various signals inside the computer.
(A) memory chip
(B) circuit board
(C) amplifier
(D) output driver

_____ 47. The _____ converts battery and generator voltage into lower, cleaner dc voltage that can be safely used by the ECM circuits, dash displays, and sensors.
(A) conditioner
(B) microprocessor
(C) buffer
(D) voltage regulator

_____ 48. A _____ alters signals for use by other chips and circuits in the computer.
(A) conditioner
(B) microprocessor
(C) buffer
(D) voltage regulator

_____ 49. A _____ is a device that can serve as a temporary storage area for data.
(A) conditioner
(B) microprocessor
(C) buffer
(D) voltage regulator

For questions 50–52, match the following terms and identifying phrases.

_____ 50. Stores information or data temporarily.

_____ 51. Stores permanent data that is more specific than other stored data.

_____ 52. Stores data that cannot be removed from memory.

(A) Random access memory
(B) Read only memory
(C) Programmable read only memory

53. Name two types of PROM.

_____

_____

_____

54. _____ allows the computer to have an adaptive strategy. _____

55. _____ drivers control flow through the actuators. _____

Actuators

56. Define *actuator*.

_____

_____

_____

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57. Name three categories of actuators.

_____

_____

58. A(n) _____ has tiny wire windings that form an electromagnet that moves a metal core or plunger when energized. _____

59. What actuator reacts to a small control signal from the computer to control a much higher current flow to large components or systems? _____

60. When a computer turns on an actuator, it normally provides the device with a(n) _____ circuit. _____

61. Name four common actuators used on late-model vehicles.

_____

_____

Computer Networks

62. Define *computer network*.

_____

_____

_____

63. Computer interaction in vehicles is known as _____. _____

64. The signals traveling through the _____ are coded to indicate which computers the signals are being sent to, and in what order the signals should be processed. _____

65. (Serial, Parallel) _____ communication involves the use of several wires to exchange multiple bits of data simultaneously. _____

66. (Serial, Parallel) _____ communication uses only one wire to exchange digital data. _____

For questions 67–69, match the following terms and identifying phrases.

_____ 67. Several of the vehicle's ECMs wired to a single conductor.

_____ 68. Each ECM wired in a series, or loop.

_____ 69. One main processing ECM and several less complete ECMs work as a network.

(A) Star configuration
(B) Bus configuration
(C) Ring configuration

70. _____ conductors are conventional insulated wires that carry data signals between computers. _____

71. _____ conductors consist of two insulated wires that are wound into a spiral. _____

72. Twisted-pair conductors can be _____ or _____. _____

_____

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Name _____

73. What type of conductor is encased in a metal shield to further reduce electromagnetic interference?

_____

74. Two complementary digital signals with opposing polarities are known as a(n) _____. _____

75. In a (CAN, LIN) _____, the signal from one computer is sent to all other computers in the network. _____

76. A (CAN, LIN) _____ operates at a relatively low speed and is less expensive to manufacture. _____

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