MOCK BOARD EXAMINATION IN ELECTRONICS ENGINEERING (D)

June 8, 2009

1. What is the stunt value needed to make a 50 Ω 0-1 mA meter into a 0-50 mA meter?
   a. 1 Ω
   b. 1.01 Ω
   c. 5.55 Ω
   d. 1.11 Ω

2. What are the two methods of expressing the Sensitivity of a meter?
   a. Ω/V
   b. full scale deflection
   c. full scale current
   d. a and c only

3. What do pointers or underdamped meters do?
   a. Oscillate above and below the value
   b. Move too fast to indicate value
   c. Move to the correct reading rapidly but does not overshoot
   d. Move slowly and will not indicate rapid variations adequately

4. What do pointers on overdamped meters do?
   a. Oscillate above and below the value
   b. Move too fast to indicate value
   c. Move to the correct reading rapidly but does not overshoot
   d. Move slowly and will not indicate rapid variations adequately

5. Indicate which is not a way producing damping in meters.
   a. shunt coil
   b. multiplier
   c. aluminum coil form
   d. air paddle

6. Which is the most sensitive meter from among the choices?
   a. 0-50 μA
   b. 0-10 mA
   c. 0-1 mA
   d. 0-100 mA

7. What is the Ω/V sensitivity of a 0-2 mA meter?
   a. 500 Ω/V
   b. 40 k Ω/V
   c. 50 Ω/V
   d. 5 k Ω/V

8. What is the Ω/V sensitivity of a 0-25 μA meter?
   a. 500 Ω/V
   b. 40 kΩ/V
   c. 50 Ω/V
   d. 5 kΩ/V

9. What would be the value of the multiplier used with a 50-μA movement, 300-V meter?
   a. none of these
   b. 20 kΩ
   c. 0.015 Ω
   d. 6 mΩ

10. If a 20 kΩ/V meter with 5kΩ internal resistance is used in an ohmmeter with 3V battery, what internal resistance is required in the meter to produce proper zeroing?
    a. 60 kΩ
    b. 20 kΩ
    c. 16.67 Ω
    d. none of these

11. On most ohmmeters where is the 0-Ω graduation?
    a. far left
    b. far right
    c. both left and right
    d. none of these

12. On what range on multirange ohmmeters is the meter most likely to be dangerous to equipment being tested?
    a. High R
    b. Mid R
    c. none of these
    d. Low R

13. What does VOM mean?
    a. Volt-ohm-milliammeter
    b. Volt-ohm-milliampere meter
    c. Volt-ohm-meter
    d. none of these

14. What is required to convent a dc EVM to an ac-reading EVM?
    a. DC to AC converter
    b. AC probe
    c. both AC probe and DC to AC converter
    d. none of these

15. The time interval that a waveform is high (or low) is the _____ of the signal.
    a. pulse width
    b. pulse length
    c. pulse position
    d. duty cycle

16. A Wheatstone bridge is balanced if
    a. the ratio of resistors on one side of the bridge is one while the ratio of resistors on the other side is infinity
    b. the ratio of resistors on one side of the bridge is greater than the

ratio of resistors on the other side
c. the ratio of resistors on one side of the bridge equals the ratio of resistors on the other side
d. the bridge uses identical resistors

17. The pointer of an indicating instrument is in the final deflected position, the _____ is zero.
    a. deflecting torque
    b. controlling torque
    c. damping torque
    d. frictional
18. A moving system force in analog instruments which causes the moving system to deflect from its zero position.
    a. Deflecting force
    b. Damping force
    c. Return-to-zero force
    d. Controlling force

19. A moving system force in analog instruments which ensures that the deflection of the pointer for a given value of measured quantity always has the same value.
    a. Damping force
    b. Controlling force
    c. NRZ force
    d. Deflecting force

20. All voltmeters except one of the following are operated by the passage of current.
    a. Moving-iron
    b. Dynamometer
    c. Electrostatic
    d. Permanent-magnet moving coil

21. Disc is made of what material in eddy current damping?
    a. Conductor and non-magnetic material
    b. Conductor and magnetic material
    c. Non-conductor and non-magnetic material
    d. Non-conductor and magnetic material

22. The time interval between pulses is called
    a. pulse frequency
    b. pulse delay
    c. pulse duration
    d. pulse period

23. An oscilloscope provides easy measurement of _____ values.
    a. Instantaneous
    b. Rms
    c. peak to peak
    d. average

24. An element in electronics which serves as a protection against overload?
    a. Resistor
    b. Transistor
    c. Semiconductor
    d. Fuse

25. How does an ohmmeter behave if its positive lead is connected to the cathode of a diode while negative to anode?
    a. Has infinite high resistance
    b. Has unstable resistance
    c. Has very low resistance
    d. Has decreasing resistance

26. As you increase the doping level of a crystal diode its voltage_____.
    a. destabilizers
    b. decreases
    c. increases
    d. stabilizers

27. Which are the three terminals of a bipolar transistor?
    a. cathode, plate and grid
    b. base, collector and emitter
    c. input, output and ground
    d. gate, source and sink

28. How do zener diodes widely used?
    a. Current limiters
    b. Variable resistors
    c. Voltage regulators
    d. Power collectors

29. The region in an electronic transistor that is lightly doped and very thin is referred to the _____.
    a. collector-base
    b. collector
    c. base
    d. emitter

30. A transistor acts as _____ when saturated.
    a. open circuit
    b. very low resistance
    c. very high resistance
    d. variable resistance

31. In semiconductor technology, the characteristic of a transistor in cut-off refers to a condition when _____.
    a. the transistor is at its operating point
    b. no current flows from emitter to collector

c. there is no base current
d. maximum current flows from emitter to collector

32. Which is the principal characteristic of a tunnel diode?
    a. A very high PIV
    b. A high forward current rating
    c. A high forward resistance
    d. A negative resistance region

33. A type of servo whose goal is to control the position of the load.
    a. Control servo
    b. Position servo
    c. Load servo
    d. None of these

34. Thermocouple – an electrical temperature sensing device which is composed of a pair of different kinds of metal wires joined together in three complete loops.
    a. Thermocouple
    b. Thermowire
    c. Thermopair
    d. Thermodynamics

35. One of the most common mechanical configuration in robotics.
    a. Hydraulic
    b. Hydropneumatic
    c. Pneumodraulic
    d. Pneumatic

36. A basic requirement of a closed-loop system (not present in open-loops) that present load position to be sensed.
    a. Ground
    b. Short
    c. Feedback
    d. None of these

37. A French scientist in 1852 who first coined the word gyroscope.
    a. Leon Gyronel
    b. Leon Foucault
    c. Francois LeFolt
    d. None of these

38. One advantage of hydraulic actuator in industrial robots.
    a. great force capacity handling heavy loads
    b. light loads
    c. fast reaction
    d. none of these

39. Two actuator types used in industrial robots.
    a. Pneumatic and hydraulic arm
    b. Pneumatic and jointed arm
    c. Hydraulic and jointed arm
    d. None of these

40. A servo characteristic which is the time it takes between input signal and actual movement of the load.
    a. Precision timing
    b. Resolution period
    c. Time lag
    d. None of these

41. A servo characteristic that is undesirable and is reduced through the use of high gain amplifiers.
    a. None of these
    b. Resolution period
    c. Precision timing
    d. Time lag

42. A type of synchro used in systems requiring large amounts of power and a high degree of accuracy.
    a. Tri-speed synchro
    b. System synchro
    c. Accurate synchro
    d. Differential synchro

43. Tri-speed Synchro system – a type of synchro system that is used to transmit very large quantities of data.
    a. Tri-speed synchro system
    b. System synchro system
    c. Accurate synchro system
    d. Differential synchro system

44. The special requirement of the pulse-counting accelerometer is designed for ___.
    a. Analog data
    b. Digital data
    c. Special data
    d. None of these

45. Open-loop – it is a control system that is controlled directly, and only, by an input signal.
    a. Closed-loop
    b. Open-loop
    c. Directly-controlled
    d. Signal-controlled

46. The heart of any normal computer
    a. Microcontroller
    b. electronic heart
    c. microprocessor
    d. computer heart

47. Powered one of the first portable electronic calculators
    a. 8088
    b. 4004
    c. 80386

d. 80486

48. MIPS is related to _____
    a. clock speed
    b. the process done by the microprocessor
    c. wire velocity
    d. memory

49. Sends address to memory
    a. data bus
    b. control bus
    c. address bus
    d. USB

50. The simplest ALU
    a. 8-bit adder
    b. 8-bit divider
    c. 8-bit multiplier
    d. 8-bit logic

51. Allows multiple outputs to connect a wire, but only one of them actually drive a 1 or a 0 onto the line
    a. disconnector
    b. tri-state buffer
    c. connector
    d. register

52. Which is not a function of a control bus?
    a. tell the input/output registers to latch the value currently on the data bus
    b. tell the instruction register to latch the value currently on the data bus
    c. tell the program counter to increment
    d. tell the program counter to reset to zero

53. Contains bytes of information, and the microprocessor can read or write to those bytes depending on whether the RD or WR line is signaled.
    a. ROM
    b. PROM
    c. RAM
    d. DRAM

54. When the microprocessor starts, it begins executing instructions it finds in the
    a. DOS
    b. BIOS
    c. AUTOEXEC.BAT
    d. SYSTEM.INI

55. A situation or a term used where instruction execution overlap.
    a. overflow
    b. pipelined architecture
    c. overlapped instructions
    d. execution overlap

56. Which of the following is not a basic type of circuit?
    a. the R-circuit
    b. the C-circuit
    c. the L-circuit
    d. the R-L-C-circuit

57. In each case of the basic type of circuit, current will depend upon _____.
    I. magnitude of emf
    II. Multiplying factors
    III. corresponding ohmic values
    IV. Corresponding inductance values
    a. I and II
    b. III and IV
    c. II and III
    d. I and III

58. What is the unit of inductance?
    a. Farad
    b. Ohm
    c. Henry
    d. Mho

59. Unit of capacitance.
    a. Farad
    b. Ohm
    c. Henry
    d. Mho

60. Unit of reactance.
    a. Farad
    b. Ohm
    c. Henry
    d. Mho

61. Unit of admittance.
    a. Farad
    b. Ohm
    c. Henry
    d. Mho

62. There are ____ possible series combinations of R, L, and C.
    a. 3
    b. 5
    c. 4
    d. 6

63. The behavior of a pure resistor in an a-c circuit is _____ to that in d-c circuit.
    a. not similar

b. may be similar
c. sometimes similar
d. exactly similar

64. Current and voltage phasors are _____ in resistor circuits.
    a. sometimes in phase
    b. never in phase
    c. always in phase
    d. out-of-phase

65. A pure inductor in an a-c circuit takes a current that _____.
    a. leads the impressed emf by exactly 90 electrical degrees.
    b. lags behind the impressed emf by exactly 90 electrical degrees.
    c. leads the impressed emf by the computed electrical degrees.
    d. lags behind the impressed emf by the computed electrical degrees.

66. In a system with MOS devices, the main bus loading factor is likely to be
    a. Resistive
    b. Current
    c. Capacitive
    d. Static charge

67. Which is not true regarding a CMOS inverter?
    a. Essentially no current flows for logic 0 or logic 1 input
    b. For devices of similar dimensions pmos is slower than nmos
    c. Full logical 0 and 1 levels are presented at the output
    d. Increasing the input frequency, decreases the power dissipation

68. In MOS devices, the oxide is usually
    a. MnO
    b. SiO
    c. SiO_2
    d. H_2O

69. Material usually used as gate of MOS for IC.
    a. Monocrystalline silicon
    b. Gold
    c. Polysilicon
    d. Platinum

70. A CMOS with parallel pmos and complementary series nmos is equivalent to logical
    a. nand gate
    b. nor gate
    c. and gate
    d. or gate

71. A CMOS with series pmos and complementary parallel nmos is equivalent to logical
    a. nand gate
    b. nor gate
    c. and gate
    d. or gate

72. Which of the following is the probable output if all inputs of a TTL gate are binary 1?
    a. Interdeterminate
    b. Determinable
    c. Binary 1
    d. Binary 0

73. Which is not an advantage of CMOS over TTL logic family?
    a. Lower power dissipation
    b. Greater fan-out
    c. Lower propagation delay
    d. Greater packing density

74. A _____ is a junction field effect transistor with a Schottky barrier instead of a normal semiconductor junction.
    a. biFET
    b. MOSFET
    c. MESFET
    d. JUGFET

75. It is a type of ROM the contents of which can be erased by exposure to ultraviolet radiation.
    a. EPROM
    b. PROM
    c. EEPROM
    d. EAPROM

76. It is a data manipulated by a computer program.
    a. Source program
    b. Database
    c. Object program
    d. Language

77. It is a program written in a language understandable by human.
    a. Source program
    b. Database
    c. Object program
    d. Language

78. A program written in machine language.
    a. Source program
    b. Database
    c. Object program
    d. Language

79. A program that translates instructions written in assembly language into machine code.
    a. Assembler
    b. Interpreter

c. Compiler
d. Translator

80. Invented computer mouse in 1964.
a. Douglas Engelbart
b. R G Sweet
c. Allen and Gibbons
d. Bryant Rogers

81. Invented fiber optics communications in 1966.
a. Douglas Engelbart
b. R G Sweet
c. Kao and Hockham
d. Bryant Rogers

82. Invented IMPATT diode in 1964.
a. Douglas Engelbart
b. Johnson and deLoacn
c. Kao and Hockham
d. Bryant Rogers

83. Invented TRAPATT diode in 1967.
a. Douglas Engelbart
b. Johnson and deLoach
c. Kao and Hockham
d. Prager, Chang and Weisbrod

84. Invented BARITT diode in 1968.
a. G T Wright
b. Johnson and deLoach
c. Kao and Hockham
d. Prager, Chang and Weisbrod

85. Invented IC in 1958.
a. G T Wright
b. Johnson and deLoach
c. Jack Kilby
d. Prager, Chang and Wesibrod

86. Invented the IC aluminum metallization in 1968.
a. G T Wright
b. Robert Noyce
c. Jack Kilby
d. Prager, Chang and Weisbrod

87. Invented the internet in 1969.
a. G T Wright
b. Robert Noyce
c. Jack Kilby
d. ARPANET

88. Invented the UNIX operating system in 1970.
a. Bell Labs, University of California
b. Robert Noyce
c. Jack Kilby
d. ARPANET

89. Invented the CCD in 1970.
a. Bell Labs, University of California
b. Robert Noyce
c. W S Boyle and G E Smith
d. ARPANET

90. Invented the video games in 1972.
a. Bell Labs, University of California
b. Magnavox
c. W S Boyle and G E Smith
d. ARPANET

91. Invented the I^2L integrated circuit in 1972.
a. Bell Labs, University of California
b. Magnavox
c. W S Boyle and G E Smith
d. Hart and Slob

92. Invented CATT in 1974.
a. Yu, Cady and Tantraporn
b. Magnavox
c. W S Boyle and G E Smith
d. Hart and Slob

93. Meters with moving coil are normally used for measuring _____.
a. dc only
b. ac only
c. both ac and dc
d. % of value of dc

94. Another name of PMMC instrument.
a. ferromagnetic
b. electrodynamometer
c. D' Arsonval
d. iron vane

95. Find the voltage drop developed across D' Aarsonval meter movement having an internal resistance of 1 k ohm and full deflection current of 150 micro amp.
a. 150 micro V
b. 150 kV
c. 150 V
d. 150 mV

96. It consists of a permanent magnet, moving coil, and spring and the deflection of the pointer depends upon the interaction of the magnetic fields of the current carrying coil and permanent magnet.
a. ferromagnetic
b. electrodynamometer
c. D' Arsonval
d. iron vane

97. What is the common type of meter movement?
A. Fixed coil
b. Digital
c. Farad
d. D' Arsonval

98. With no added gadget, D' Arsonval meter can be used to measure.
    a. AC
    b. AC and DC
    c. DC
    d. dynamic resistance

99. An instrument used to measure the voltage generated by human body parts in relation to the action of the human heart.
    a. ECG
    b. EEG
    c. ESC
    d. ETX

100. How many decibels gain does an amplifier if it produces 40-W output with an input of 0.016 W?
    a. 3.398 dB
    b. 33.9 dB
    c. 67.959 dB
    d. –33.9 dB

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Answer:

1. B

Solution: The meter must handle 1% of the desired full-scale reading.

0.0005 + 0.0495 = 0.05A

E= IR = (1mA) (50Ω) = 0.05V

For a full-scale reading of 0.05A, The shunt resistance will have to carry a current of 0.0495 A.

R_{SH} = 0.05 / 0.0495 = 1.01Ω or

50 x 1/100 = 0.5 – meter must handle

50 x 99/100 = 49.5 – shunt must handle

$\frac{50}{49.5}$ = 1.01Ω

2. D
3. A
4. D
5. B
6. A
7. A Sensitivity = 1/2mA = 500 Ω/V
8. B
9. D
10. A R_T = 3V / 50 μA = 60 kΩ
11. B
12. D
13. B
14. B
15. A pulse width
16. C the ratio of resistors on one side of the bridge equals the ratio of resistors on the other side
17. C Damping torque
18. A Deflecting force
19. B Controlling force
20. C Electrostatic
21. A Conductor and non-magnetic material
22. B pulse delay
23. C peak to peak
24. D Fuse
25. A has infinite high resistance
26. B decreases
27. B base, collector and emitter
28. C Voltage regulators
29. C base
30. B very low resistance
31. B no current flows from emitter to collector
32. D A negative resistance region
33. B
34. A
35. D
36. C
37. B
38. A
39. B
40. C
41. D
42. D
43. A
44. B
45. B
46. C
47. B
48. A
49. C
50. A
51. B
52. A
53. C
54. B
55. B
56. D
57. D
58. C
59. A
60. B
61. D
62. C
63. D
64. C
65. B
66. C capacitive
67. D increasing the input frequency, decreases the power dissipation
68. C SiO_2
69. C polysilicon
70. A nand gate
71. B nor gate
72. D binary 0
73. C lower propagation delay
74. C MESFET
75. A EPROM
76. B database
77. A source program
78. C object program
79. A assembler
80. A Douglas Engelbart
81. C Kao and Hockham
82. B Johnson and deLoach
83. D Prager, Chang and Weisbrod
84. A G T Wright
85. C Jack Kilby
86. B Robert Noyce
87. D ARPANET
88. A Bell Labs, University of California
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92. A Yu, Cady and Tantraporn
93. A dc only
94. C D' Arsonval
95. D 150 mV
96. C D' Arsonval
97. D D' Arsonval
98. C DC
99. A ECG
100. B 33.9 dB