

*BEST BMET
CBET STUDY GUIDE
MODULE TWO
ANALOG * DIGITAL*



3 March, 2009

1. The EXCLUSIVE-OR gate will output a 'logic 1' if
 - a. both inputs are 'logic 0'
 - b. both inputs are 'logic 1'
 - c. one input is 'logic 1' and one input is 'logic 0'
 - d. any input is a 'logic 1'
 - e. both answers 'b' and 'c' above

2. During normal operation of a P-channel JFET, the gate voltage is
 - a. positive with respect to the source
 - b. negative with respect to the source
 - c. the same as the drain voltage
 - d. the same as the source voltage

3. A silicon-controlled rectifier is usually turned on with a
 - a. positive pulse (relative to the cathode) applied to its anode
 - b. negative pulse (relative to the cathode) applied to its anode
 - c. positive pulse (relative to the cathode) applied to its gate
 - d. negative pulse (relative to the cathode) applied to its gate

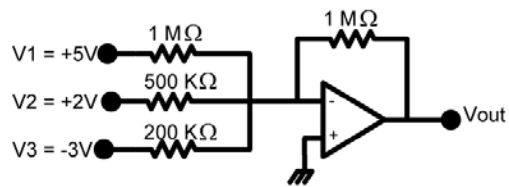
4. In an NPN transistor amplifier, making the base voltage less positive with respect to the emitter
 - a. decreased collector current
 - b. increases collector current
 - c. does not affect collector current
 - d. will cut-off the transistor

5. The peak-inverse voltage rating for a diode refers to the maximum the
 - a. cathode can be more positive than the anode potential
 - b. anode can be more positive than the cathode potential
 - c. cathode can be more positive than ground
 - d. anode can be more positive than ground

6. Another name for the 'one shot' circuit is
- Schmitt trigger
 - astable multivibrator
 - monostable multivibrator
 - bistable multivibrator
7. The binary sum of 110011 and 10101 is
- 11001
 - 10101
 - 1001000
 - 1011101
 - 110111
 - none of the above
8. A two-input NAND gate will have a 'low' output
- if either input is 'high'
 - only if both inputs are 'high'
 - only if both inputs are 'low'
 - if either input is 'low'
9. A simplified form of the Boolean algebra expression $A + B + AB$ is
- A
 - AB
 - 0
 - 1
 - $A + B$

10. Refer to the pages of drawings and schematics; see Drawing 15. The output voltage (V_{out}) for the summer circuit is

- a. +6 volts
- b. +3 volts
- c. -3 volts
- d. -5.23 volts
- e. none of the above



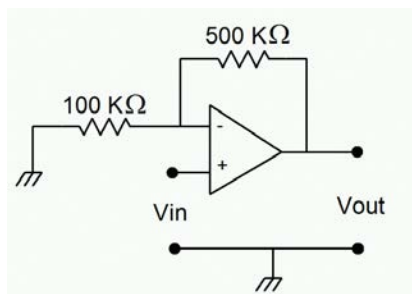
11. The binary product of 1101 and 101 is

- a. 110111 in base two
- b. 65 in base ten
- c. 77 in octal
- d. all of the above
- e. none of the above

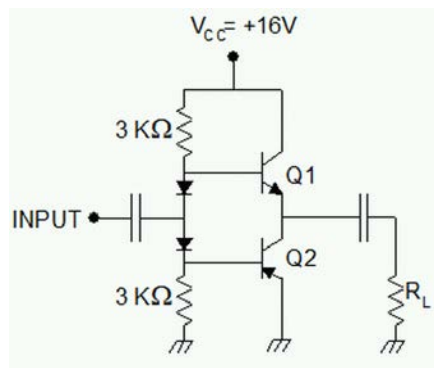
The correct answer is B.

12. Refer to the pages of drawings and schematics; see Drawing 16. The gain of the operational amplifier circuit shown is

- a. 1
- b. 5
- c. 6
- d. 50,000



13. The largest number that can be represented by a 16-bit binary number is
- 65,535 in base ten
 - 1FFF in hexadecimal
 - 77777 in octal
 - all of the above
14. The two's complement of 101101 is
- 010011
 - 010010
 - 101101
 - 0101111
15. The decimal equivalent of binary 110101 is
- 41
 - 55
 - 31
 - 05
 - none of the above
16. Refer to the pages of drawings and schematics; see Drawing 17. In the circuit shown, the emitter voltage of Q2 would be about
- +16 volts
 - +12 volts
 - +8 volts
 - +3 volts
 - +0.7 volt



17. The two transistor amplifier configurations that produce output currents that are in-phase with their input currents are
- the common base and the common emitter
 - the common collector and the common emitter
 - the common emitter and the emitter follower
 - the common base and the emitter follower
18. If the J and K inputs of a TTL JK flip-flop are both 'high', then
- the Q output will toggle when the flip-flop is clocked
 - the Q output will remain 'high' when the flip-flop is clocked
 - the Q output will remain 'low' when the flip-flop is clocked
 - the Q output will not change when the flip-flop is clocked
19. Refer to the pages of drawings and schematics; see Drawing 3. The truth table below represents the logic decisions for

A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

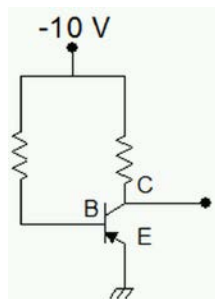
- AND gate
 - OR gate
 - NAND gate
 - EXCLUSIVE OR gate
20. The NOT gate is the same as
- an inverter
 - a converter
 - a multiplier
 - a duplexer

21. The 4-bit binary equivalent of the decimal number 5 is

- a. 0110
- b. 0111
- c. 0101
- d. 1010

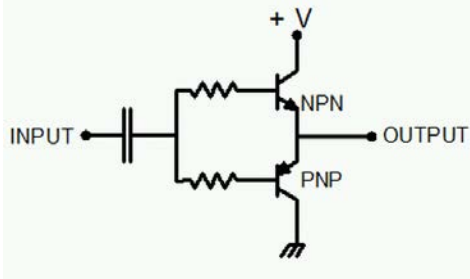
22. Refer to the pages of drawings and schematics; see Drawing 4. In the circuit shown below, the transistor lead that will have the highest current when the transistor is conducting is

- a. E
- b. B
- c. C
- d. E and B

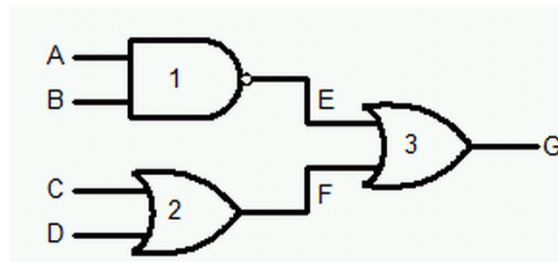


23. Refer to the pages of drawings and schematics; see Drawing 7. The transistors in the circuit shown below are used for audio output. Using alternative forms of transistors eliminates the output transformer and produces a purer audio signal. This type of circuit is called

- a. class C amplifier
- b. complementary
- c. Darlington pair
- d. differential



24. A byte is usually understood to be
- 4 bits
 - 8 bits
 - 32 bits
 - 16 bits
25. Microcomputer RAM is used for
- permanent storage
 - address decoding
 - temporary storage
 - volatile storage
26. Refer to the pages of drawings and schematics; see Drawing 8. When testing the circuit below with a logic probe, it was found that the probe blinked at F, G, and H. This shows that

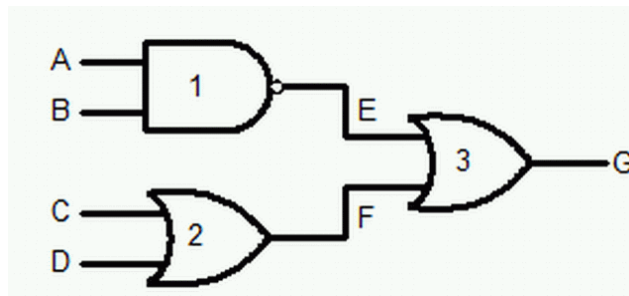


- the OR gate 3 is OK
- the OR gate 2 is OK
- the AND gate 1 is OK
- at least one input gets through to G

27. A logic analyzer indicates
- the logic state of many points
 - rise and fall times
 - hex code
 - a and b

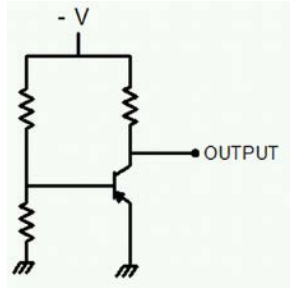
28. An S-R flipflop is
- monostable
 - astable
 - bistable
 - multistable

29. Refer to the pages of drawings and schematics; see Drawing 1. In the circuit shown, the equation that describes H is

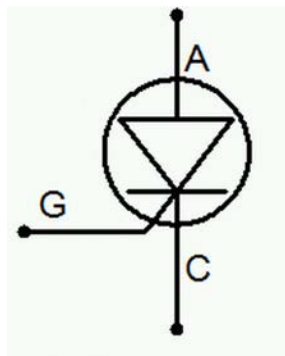


- $\overline{A + B(CD)}$
 - $AC + BD$
 - $AB + C + D$
 - $A + B + CD$
30. A forward biased diode made of germanium will have a voltage drop such that the anode will be
- positive with respect to the cathode
 - negative with respect to the cathode
 - positive with respect to the anode
 - negative with respect to the anode

31. Refer to the pages of drawings and schematics; see Drawing 9. The bipolar transistor in the circuit shown is

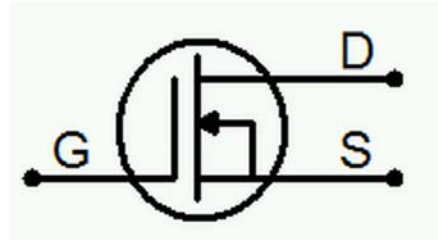


- a. an NPN, biased correctly
 - b. an NPN, biased incorrectly
 - c. an PNP, biased incorrectly
 - d. an PNP, biased correctly
32. Refer to the pages of drawings and schematics; see Drawing 10. The symbol shown is a



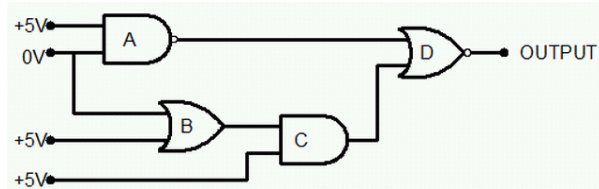
- a. triac
- b. silicon-controlled rectifier
- c. diac
- d. one shot

33. Refer to the pages of drawings and schematics; see Drawing 11. The symbol shown is an



- a. N-channel unijunction
b. N-type SCR
c. N-type SCN
d. N-type mosfet
34. In binary, $101101 + 110100 =$
- a. 1100001
b. 1011001
c. 1110011
d. 110010
35. Sequential logic circuits consist of circuits requiring
- a. a timing circuit
b. memory devices
c. a logical device
d. a and b
36. Positive logic is the assignment of logic levels where
- a. the most positive level is a binary 1
b. the most negative level is a binary 0
c. a and b
d. the most positive level is a binary 0

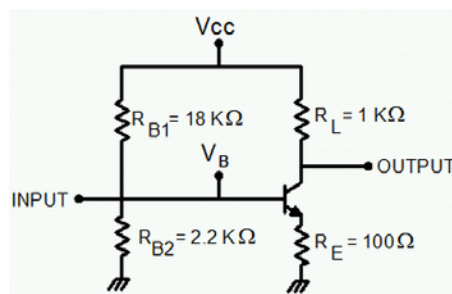
37. Refer to the pages of drawings and schematics; see Drawing 13. The logic circuit shown below has four inputs. If +5 V = binary 1 and 0 V = binary 0, the output will be



- a. binary 1
 - b. binary 0
 - c. can't tell from the information given
 - d. a and b
38. With reference to logic circuits, the term synchronous refers to a:
- a. Regenerative circuit
 - b. Circuit operation under clock control
 - c. Circuit operation without clock control
 - d. Circuit operation that changes states after propagation delays
39. A NAND gate is an active ...
- a. device
 - b. high
 - c. low
 - d. can be high or low
 - e. all of the above
40. A trailing-edge-triggered JK flip-flop is one that changes states when the clock pulse switches from binary ... to binary ...
- a. 0, 0
 - b. 00,
 - c. 11,
 - d. 01,
 - e. 1, 1

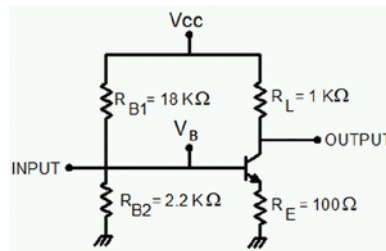
41. Unused inputs on a NAND gate should be
- a. ignored
 - b. left open
 - c. connected to a binary 0
 - d. connected to a binary 1
42. Metal Oxide Semiconductor Field Effect Transistors (MOSFET) are
- a. voltage controlled devices
 - b. current controlled devices
 - c. reactance controlled devices
 - d. hard to troubleshoot
43. The output of a two-input OR gate can be forced low by a
- a. high on either of the inputs
 - b. low on either of the inputs
 - c. high on both of the inputs
 - d. low on both of the inputs
44. Which term does not apply to RAM
- a. dynamic
 - b. static
 - c. ROM
 - d. volatile
45. A 4K memory can be bit organized as
- a. 4K x 1
 - b. 1K x 4
 - c. 512 x 8
 - d. any of the above

46. The type of diode that does not have a depletion region and turns off very fast is the:
- Silicon diode
 - Zener diode
 - Schottky diode
 - Rectifier diode
47. Which of the following is a characteristic of a bipolar junction transistor
- the collector-base junction must be forward-biased for proper transistor action
 - its beta is measured in milliamperes
 - the base current is greater than emitter current
 - it is turned on by forward biasing its base-emitter junction
48. A JFET is a device that is normally
- on
 - off
 - can be either on or off since no diode junction is used
 - cannot be determined
49. Refer to the pages of drawings and schematics; see Drawing 19 - $V_{CC} = 12\text{ V}$. The emitter current flow is approximately
- 6.4 mA
 - 64 mA
 - 3.2 mA
 - 12 mA



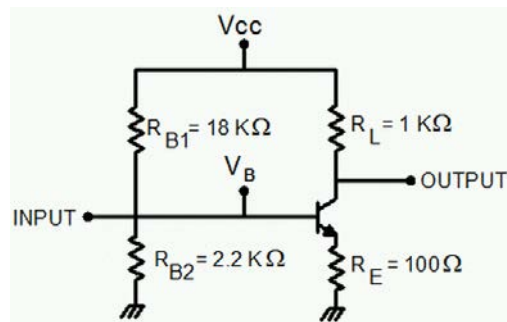
50. Refer to the pages of drawings and schematics; see Drawing 19 - $V_{CC} = 12\text{ V}$. The base current is

- a. 6.4 mA
- b. 0.7 mA
- c. 12.0 mA
- d. 7.0 mA



51. Refer to the pages of drawings and schematics; see Drawing 19. What is the circuit configuration shown

- a. common base
- b. common emitter
- c. common collector
- d. NPN transistor



52. The ones complement of binary number 10011100 is

- a. 11001110
- b. 00111001
- c. 10011101
- d. 01100011

53. The sum of the binary numbers 10010101 and 00101101 is
- 00111101
 - 11000010
 - 00111110
 - 01101000
54. A two input NAND gate has each input fed by a two input NOR gate. A consistent LOW output would indicate that
- each NOR gate always has at least one HIGH input
 - each NOR gate always has at least one LOW input
 - no assumptions can be made about the state of the NOR gate inputs
 - the NOR gates do not have any HIGH inputs
55. A kilobyte of digital memory is
- 1000 bits
 - 1000 bytes
 - 1024 bits
 - 1024 bytes
56. If the J and K inputs of a JK flip-flop are both LOW, then the
- the Q output will toggle when the flip-flop is clocked
 - the Q output will remain HIGH when the flip-flop is clocked
 - the Q output will remain LOW when the flip-flop is clocked
 - the Q output will not change when the flip-flop is clocked
57. Using Boolean algebra, the expression $A + 1$ is equal to
- A
 - 10
 - A1

58. An enhancement MOSFET is considered to be a device that is normally
- a. on
 - b. off
 - c. can be either on or off since no diode junction is used
 - d. cannot be determined
59. The main logic element used to process binary signals is called a
- a. flip-flop
 - b. gate
 - c. buffer
 - d. decoder
60. The two's complement of binary number 01100101 is
- a. 0110010
 - b. 1100110
 - c. 1001100
 - d. 1101001
 - e. 1011