Electronics - 2010

1. The current flowing $3K\Omega$ resistance in the circuit given in Figure (1) will be :

   (a) 10 mA

   (b) 7 mA

   (c) 4 mA

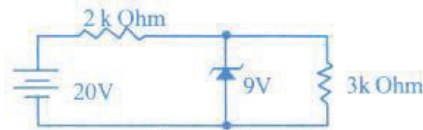   (d) 3 mA

Figure (1)

2. The value of h_i and h_r for the circuit shown in Figure (2) respectively are :

   (a) 10 ohm, – 0.2

   (b) 20 ohm, – 0.4

   (c) 30 ohm, – 0.5

   (d) 40 ohm, – 1.0

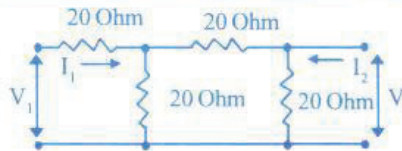**Figure (2)**

3. A p-n junction diode is a

   (a) linear device

   (b) passive device

   (c) unilateral device

   (d) active linear device

4. Zener breakdown in a p-n junction results due to :

   (a) impact ionization

   (b) rupture of covalent bonds

   (c) thermal instability

   (d) barrier lowering

5. The dc and ac load line of a transistor :

   (a) intersect with each other

   (b) have positive slope

   (c) are parallel to each other

   (d) are parallel to voltage axis

6. Identify the false statement. The common collector amplifier offers :

   (a) low output impedance

   (b) high voltage gain

   (c) high input impedance

   (d) high current gain

7. In case of MOSFET the voltage at which the drain current saturates is known as :

   (a) punch-through voltage

   (b) breakdown voltage

   (c) pinch-off voltage

   (d) threshold voltage

8. Which of the following is not possible to fabricate in IC technology ?

   (a) Resistor

   (b) Capacitor

   (c) Diode

   (d) Inductor

9. The value of the resistance R for maximum power transfer in the network shown in Figure (3) is :
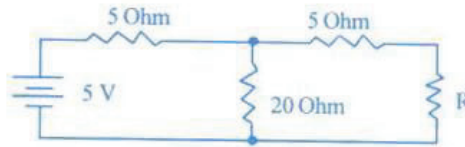
(a) 25Ω
(b) 10Ω
(c) 9Ω
(d) 5Ω

Figure (3)

10. The circuit shown in Figure (4a) has the Norton equivalent circuit shown in Figure (4b). The value of I_{eq} and R_{eq} respectively will be :

(a) 0.25A, 5Ω
(b) 0.50A, 10Ω
(c) 5A, 40Ω
(d) 10A, 20Ω
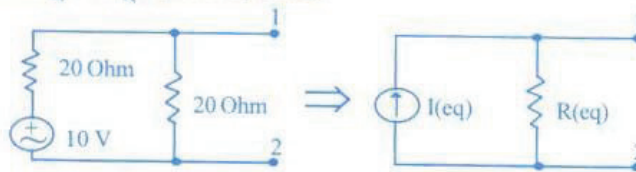

Figure (4a)   **Figure (4b)**

11. The energy stored in a capacitor at any instant is given by :

(a) one half of the product of the capacitance and the square of the voltage across it at that instant

(b) the product of the capacitance and the square of the voltage across it at that instant

(c) one half of the product of the capacitance and the voltage across it at that instant

(d) the product of the capacitance and the voltage across it at that instant

12. The power factor is given by :

(a) peak power times 0.707
(b) the ratio of the true power to apparent power
(c) sine of the phase difference between voltage V and current I
(d) cos of the phase angle between true power and apparent power

13. A power amplifier has gain of 20dB and an input voltage level of 2mV. Assuming that the input and output impedances are the same. The voltage level at the amplifier output will be :

(a) 5 mV   (b) 10 mV
(c) 20 mV   (d) 40 mV

14. $\dfrac{a}{(s+b)}$ is the transfer function that realizes the characteristics of a :

    (a) high pass filter   (b) band pass filter

    (c) band reject filter   (d) low pass filter

15. When 1011_2 is multiplied by 101_2 the result will be :

    (a) 111101   (b) 111011

    (c) 110111   (d) 111110

16. A two input XOR gate has inputs A and B, the output of the gate is given by :

    (a) $A\,B + \bar{A}\ \bar{B}$ (b) $\bar{A}\,B + A\,\bar{B}$

    (c) $A(\bar{A} + B)$ (d) $A\,B$

17. The number of inputs and outputs in a full adder respectively are :

    (a) 3 and 2   (b) 3 and 3

    (c) 2 and 2   (d) 2 and 1

18. The logical expression $A + AB$ on simplification reduces to :

    (a) AB (b) A

    (c) $A + B$ (d) B

19. Identify the false statement from the following :

    (a) ECL gate do not saturate

    (b) Complementary outputs are available with ECL gate

    (c) The power dissipation in ECL logic gates is low relative to the other logic families

    (d) Capacitive loading limits the fan out in ECL gate

20. The gray code of the binary number 101010_2 is :

    (a) 010101_2 (b) 010110_2

    (c) 111011_2 (d) 111111_2

21. The characteristic values of power dissipation and propagation delay time for Low power Schottky TTL devices are respectively :

    (a) 10mW, 10ns   (b) 15mW, 6ns

    (c) 2mW, 10ns   (d) 100mW, 35ns

22. With an RS latch a high S and a low R sets its output to _____ , and a low S and high R sets its output to _____ .

    (a) 0, 0   (b) 1, 0

    (c) 0, 1   (d) 1, 1

23. N number of flip-flops connected in series divide the clock frequency by a factor of :

    (a) 2^N (b) 2^{N-1}

    (c) 2^{N+1} (d) N

24. A mod-10 counter can divide the clock frequency by a factor of :

    (a) 16   (b) 10

    (c) 4   (d) 2

25. The maximum number of memory locations that an address bus with 16 bits can access is :

    (a) 16000   (b) 32536

    (c) 65536   (d) 60536

26. The 8156 is a 2,048 bit static RAM with 256 words of 8 bits each. The number of address lines this RAM has :

    (a) 256   (b) 32

    (c) 16   (d) 8

27. Identify the correct statement from the following :

    (a) It is much simpler to work with dynamic RAMs than static RAMs with regard to design complexity of the RAM chips

    (b) The static RAM contains more memory cells than dynamic RAM of the same physical size

    (c) The dynamic RAM need to refresh the memory every few milliseconds

    (d) In construction of a static RAM a MOSFET and capacitor are required.

28. The Boolean expression $(\overline{AB})\,(\overline{A}\,\overline{B})$ on simplification reduces to :

    (a) $A + B$ (b) $A \oplus B$

    (c) $A\,B$ (d) $A(A+B)$

29. The output of the circuit shown in Fig (5) will be given by :

(a) $Y = A + B$

(b) $Y = A - B$

(c) $Y = A \oplus B$

(d) $Y = \overline{A} + \overline{B}$

Figure (5)
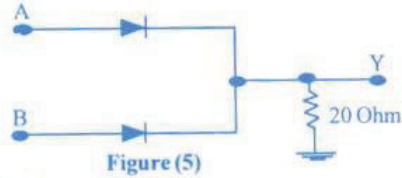
30. Adding inverters to the inputs of an AND gate produces :

(a) OR function   (b) NOR function

(c) Exclusive-OR function   (d) XNOR function

31. Identify the false statement from the following :

(a) ECL gate usually have complementary outputs

(b) ECL gate has higher power requirements

(c) ECL gate has higher noise margins than that of TTL

(d) High speed operation is not possible in case of ECL gates because the transistors saturate in ECL gates.

32. The output Y of the circuit shown in Fig. (6) is given by :

(a) $Y = A\overline{B}C$

(b) $Y = \overline{A}BC$

(c) $Y = ABC$

(d) $Y = AB\overline{C}$

Figure(6)
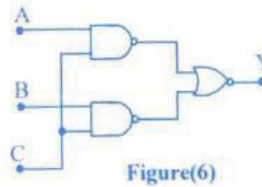
33. Ones complement of a binary number is found by :

(a) changing all zeros of the number to ones and all zeros of the number to zeros then adding 1 to the resultant number

(b) changing all zeros of the number to ones and all ones of the number to zeros

(c) changing only all zeros of the number to ones

(d) changing only all ones of the number to zeros

34. The number of restart instructions in 8085 μP is :

(a) 8   (b) 5

(c) 4   (d) 1

35. The input pins of 8085 μP chip for the interrupt signal are from :
   (a) Pins 11 to 15
   (b) Pins 6 to 10
   (c) Pins 1 to 5
   (d) Pins 14 to 18

36. On execution of the following programme :
   LXI H, !FFFH
   INX H
   MOV A, H
   ADI 10H
   STA 1000H
   HLT

   The contents of the memory location 1000H will be :
   (a) FF_H
   (b) 10_H
   (c) 30_H
   (d) $2F_H$

37. The signals carried by pins 29 and 33 of the 8085 μP respectively are :
   (a) $\overline{WR}, \overline{RD}$
   (b) HOLD, HLDA
   (c) S_0, S_1
   (d) $\overline{RESETN}, CLK$

38. If the current amplification factor α of a transistor is 0.99, the current amplification factor β of the transistor will be :
   (a) 9
   (b) 49
   (c) 79
   (d) 99

39. For a common emitter configuration, the collector current I_c for a given base current I_B is given by :
   (a) $I_C = \beta I_B + I_{CBO}$
   (b) $I_C = \beta I_B + (1 - I_{CBO})$
   (c) $I_C = \beta I_B + (1 + \beta) I_{CBO}$
   (d) $I_C = \beta I_B + \beta I_{CBO}$

40. A transistor having h-parameter $h_{ie} = 5000\Omega$, $h_{re} = 1.6 \times 10^{-4}$, $h_{fe} = 56$, $h_{oe} = 50\mu A/V$. The current gain of the CE amplifier with load resistance of 50KΩ will be :
   (a) − 8
   (b) − 16
   (c) − 32
   (d) − 64

41. The decibel equivalent of power gain 100 is :
   (a) 10dB
   (b) 20dB
   (c) 30dB
   (d) 40dB

42. Identify the false statement from the following :
   (a) In a Darlington amplifier configuration the output of one amplifier is coupled into the input of the next one by directly connecting emitter of one transistor to the base of the other transistor
   (b) Darlington amplifier provides excellent characteristics of high input impedance and low output impedance
   (c) Darlington amplifier provides low current gain
   (d) Darlington amplifier is often used in high gain amplifiers because of its high current gain

43. How many different sets of input conditions of A, B, and C will produce a high output in the circuit shown in Figure (7) ?
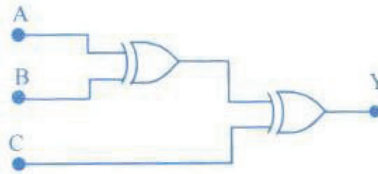   (a) 10
   (b) 8
   (c) 6
   (d) 4

Figure (7)

44. In class-A amplifier when a transistor is driven from the edge of saturation region to cutoff, then for every 1 W output power the power consumed internally is :
   (a) 1 W   (b) 2 W
   (c) 3 W   (d) 4 W

45. The trans-conductance of a MOSFET is :
   (a) independent of the drain current
   (b) directly proportional to the drain current
   (c) directly proportional to square root of the drain current
   (d) inversely proportional to square root of the drain current

46. Unijunction transistor is a :
   (a) variable capacitance device   (b) relaxation oscillator
   (c) current controlled device   (d) voltage controlled device

47. Identify the correct statement from the following. In an RC coupled amplifier :
   (a) the low frequency response is affected by junction capacitances and high frequency response is affected by coupling capacitor
   (b) only high frequency response is affected by coupling and bypass capacitors
   (c) the low frequency response is affected by coupling and bypass capacitors
   (d) the coupling capacitor do not affect the frequency

48. Class-B push-pull amplifiers there exists
   (a) intermodulation distortion
   (b) cross-over distortion
   (c) even harmonic distortion
   (d) neither even harmonic nor odd harmonic distortion

49. The maximum theoretical efficiency of an amplifier in class-B operation is
   (a) 78.5%   (b) 50.5 %
   (c) 40.5 %   (d) 25.5 %

50. If the emitter resistance of a common emitter amplifier is not bypassed by a capacitor the emitter resistance provides a :
   (a) Negative voltage feedback   (b) Current series feedback
   (c) Voltage shunt feedback   (d) Positive current feedback

51. The current I_D in circuit shown in Figure (8) will be equal to :
   (a) 5mA
   (b) 10mA
   (c) 15mA
   (d) 20mA
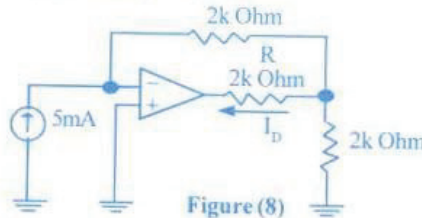

Figure (8)

52. The circuit shown in Figure (9) is a :
   (a) Logarithmic amplifier
   (b) Differentiator
   (c) Antilogarithmic amplifier
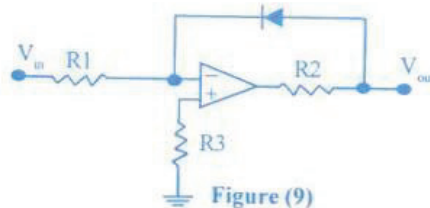   (d) Integrator

Figure (9)

53. If the internal gain of an amplifier is 300 and feedback fraction β is 0.03, the loop gain of the amplifier is :

   (a) 3   (b) 30

   (c) 90   (d) 100

54. If C_{BE} and C_{CB} represent the base-emitter and collector-base capacitances of a transistor respectively. If the transistor is employed in common emitter amplifier having voltage gain A, the input capacitance C_{in} of the amplifiers is given by :

   (a) $C_{in} = C_{BE} + AC_{CB}$ (b) $C_{in} = C_{BE} + C_{CB}$

   (c) $C_{in} = C_{BE} + (1 + A)C_{CB}$ (d) $C_{in} = C_{CB} + (1 + A)C_{BE}$

55. Which of the following pin pairs in 741 Op Amp IC are for power supply connections ?

   (a) 2 and 3   (b) 6 and 8

   (c) 1 and 5   (d) 7 and 4

56. Identify the false statement. The ideal Op Amp would exhibit :

   (a) Infinite voltage gain

   (b) Infinite input resistance

   (c) Zero output voltage when input voltage is zero

   (d) Infinite output resistance

57. The minimum quantity that an instrument can measure is known as :

   (a) Precision   (b) Resolution

   (c) Accuracy   (d) Sensitivity

58. The relative limiting error of product of two terms is equal to the :

   (a) sum of the of the relative error of the terms

   (b) difference of the relative error of the terms

   (c) division of the relative error of the terms

   (d) product of the relative error of the terms

59. In a differential amplifier the difference mode gain $A_{VD} = 1000$ and CMMR=100. If the inputs V_1 and V_2 of the amplifier are 1.0mV and 0.9mV respectively, the output voltage of the amplifier will be :

   (a) 10.95 mV   (b) 20.95 mV

   (c) 109.5 mV   (d) 1095 mV

60. A moving coil galvanometer is converted into a DC ammeter by connecting :

   (a)   a capacitor of appropriate capacitance across the galvanometer

   (b)   a resistor of appropriate resistance across the galvanometer

   (c)   a resistor of appropriate resistance in series with galvanometer

   (d)   an inductor of appropriate inductance across the galvanometer

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(ROUGH WORK)