ELECTRONICS

1. In case of amplitude modulation if three sine waves simultaneously modulate the carrier with individual modulation indices m_1, m_2 and m_3, then total modulation index is given by :

(A) $\sqrt{m_1^2 + m_2^2 + m_3^2}$

(B) $m_1 + m_2 + m_3$

(C) $\sqrt[3]{m_1 m_2 m_3}$

(D) $(m_1 + m_2 + m_3)/2$

2. Identify the false statement with regard to advantages and disadvantages of FM :

(A) FM is, or can be made, relatively immune to the effects of noise

(B) A much smaller channel is required by FM, up to 1/10 times as small as that needed by AM

(C) FM transmitting and receiving equipments tend to be more complex

(D) The amplitude of the FM wave is constant. It is thus independent of modulation index

3. The absorption of radio waves by the atmosphere depends on :

(A) the distance from the transmitter

(B) the polarization of the wave

(C) the frequency of the wave

(D) both the distance and the polarization of the wave

4. The most suitable method out of the following in measurement of the resistance of expected value less than 1 Ω is :

(A) Limit bridge method

(B) Wheatstone's bridge method

(C) Loss of charge method

(D) Kelvin's bridge method

5. The diffusion current density is :

(A) directly proportional to the concentration gradient of charge carriers

(B) inversely proportional to the concentration gradient of charge carriers

(C) independent of the concentration gradient of charge carriers

(D) directly proportional to concentration of charge carriers

6. With increase in temperature :

(A) the resistivity of a conductor decreases while that of a semiconductor increases

(B) the resistivity of both conductor and semicodnuctor increases

(C) the resistivity of both conductor and semiconductor decreases

(D) the resistivity of a conductor increases and that of semiconductor decreases

7. The ratio of electron and hole concentrations in case of an intrinsic semiconductor is :

(A) greater than one

(B) less than one

(C) equal to one

(D) equal to square of the intrinsic carrier concentration

8. In case of a centre-tap full-wave rectifier if V_{max} is the peak voltage across the secondary of the transformer, the voltage appearing across the non-conducting diode is :

(A) V_{max}

(B) $2\ V_{max}$

(C) $\sqrt{2}V_{max}$

(D) $V_{max}/\sqrt{2}$

9. In common base configuration if I_E is the emitter current and α is the current gain, the part of the emitter current which forms the collector current is :

(A) αI_E

(B) $(1 - \alpha)I_E$

(C) $(1 - \alpha)I_E + \alpha$

(D) $(1 + \alpha)I_E$

10. The configuration having the highest input resistance, lowest output resistance and voltage gain less than unity is :

(A) CE

(B) CC

(C) CB

(D) Both CE and CB

11. The graph plotted between the drain current I_D and gate-source voltage V_{GS} for a given drain source voltage V_{DS} of a MOSFET is called its :

(A) output characteristics

(B) input characteristics

(C) transfer characteristics

(D) load line

12. The process used in growing thin layers of the material on the semiconductor surface in fabrication of the semiconductor devices is known as :

(A) Lithography

(B) Metallization

(C) Diffusion

(D) Epitaxy

13. The operation of N-channel JFET involves flow of :

(A) electrons

(B) holes

(C) both electrons and holes

(D) doping impurity ions

14. The principle of superposition is a fundamental consequence of :

(A) non-linearity

(B) linearity

(C) reciprocity

(D) both non-linearity and reciprocity

15. The branch relationship of a two terminal resistive element is linear if it is :

(A) homogeneous

(B) additive

(C) homogeneous and additive

(D) none of the above

16. In model analysis of networks the choice of a reference node :

(A) alters the currents flowing through its branches

(B) effects the operation of the network

(C) alters the voltage across the elements

(D) affects the voltage of various nodes

17. The drain-source voltage at which the channel opening of a JFET reduces to zero is known as :

(A) cut-in voltage

(B) punch-through voltage

(C) pinch-off voltage

(D) breakdown voltage

18. The quality factor of any circuit is given by :

(A) 2π times the energy dissipated per cycle divided by the energy stored per cycle

(B) 2π times the energy stored per cycle divided by the energy dissipated per cycle

(C) 2π times the energy stored per cycle

(D) 2π times the energy dissipated per cycle

19. The normal binary code of Gray 11011 is :

(A) 11111

(B) 11110

(C) 11010

(D) 10010

20. At resonance frequency ω, the Q of a series LCR circuit is given by :

(A) $\omega L/R$

(B) $\omega C/R$

(C) $R/\omega L$

(D) ω/RL

21. A device said to be active if its I-V characteristic lies in the :

(A) 1st quadrant

(B) 2nd and 4th quadrants

(C) 1st and 3rd quadrants

(D) 3rd quadrant

22. The threshold voltage of *p*-channel enhancement MOSFET is :

(A) zero

(B) positive

(C) negative

(D) independent of device geometry

23. $\frac{b}{s^2 + as + b}$ is a second order filter gain function that realizes the characteristics of a :

(A) band pass filter

(B) band reject filter

(C) high pass filter

(D) low pass filter

24. Identify the false statement from the following. The RC filters offer :

(A) increased circuit reliability because for all the processing steps can be automated

(B) improvement in performance because high quality components can be realized

(C) an increase in parasitic

(D) simpler design process

25. The frequency response curve of a first order filter rolls-off at a rate of :

(A) 10 db/decade

(B) 20 db/decade

(C) 10 db/octave

(D) 20 db/octave

26. The total number of sets of input conditions that will produce a high output from a three-input OR gate is :

(A) 7

(B) 8

(C) 15

(D) 16

27. The logic expression $\overline{\bar{A} + B} + \overline{\bar{A} + \bar{B}}$ on simplification reduces to :

(A) A + B

(B) A

(C) AB

(D) B

28. A NAND gate with all inputs connected together will function as :

(A) OR gate

(B) AND gate

(C) NOT gate

(D) NOR gate

29. According to De Morgan's theorem :

(A) the complement of the product of two or more variables is equal to the sum of the variables

(B) the complement of the product of two or more variables is equal to the product of the variables

(C) the complement of the product of two or more variables is equal to the product of the complements of the variables

(D) the complement of the product of two or more variables is equal to the sum of the complements of the variables

30. When 2's complement of a binary number is taken twice, the result will be :

(A) square of the original number

(B) double of the original number

(C) original number

(D) half of the original number

31. When binary number 1110101 is divided by the number 1001, the result is :

(A) 1001

(B) 1101

(C) 1010

(D) 0101

32. In Schottky TTL families a Schottky diode clamping between base and collector of the transistor is used to :

(A) prevent transistor saturation

(B) prevent transistor breakdown

(C) prevent short circuit failure

(D) increase the fan-in

33. Identify the false statement. Excess-3 code :

(A) is an unweighted code

(B) is used in representing a alphanumeric data

(C) is a self-complementing code

(D) uses only 10 of the 16 possible 4-bit code groups

34. In logic circuits the positive logic is one in which :

(A) logic 0 and logic 1 are represented by negative and positive voltages respectively

(B) logic 0 and logic 1 are represented by zero and positive voltages respectively

(C) the voltage corresponding to logic 0 is lower than that corresponding to logic 1

(D) the voltage corresponding to logic 0 is higher than that corresponding to logic 1

35. With a NAND RS-latch a low R and low S produces :

(A) high output

(B) low output

(C) no change

(D) race condition

36. A multivibrator which continuously switches between two quasi-stable states without external excitation is known as :

(A) bistable multivibrator

(B) monostable multivibrator

(C) astable multivibrator

(D) flip-flop

37. The logical value of the logical function A + A is :

(A) 0

(B) 1

(C) A

(D) $\bar{A}$

38. The minimum number of JK flip-flops required for designing a modulus-10 counter is :

(A) 4

(B) 6

(C) 8

(D) 10

39. Identify the *correct* statement from the following :

(A) Static RAM is volatile while dynamic RAM is non-volatile

(B) Static RAM is non-volatile while dynamic RAM is volatile

(C) Both static and dynamic RAM are volative

(D) Both static and dynamic RAM are non-volatile

40. Dynamic RAM :

(A) uses bipolar or MOS flip-flop

(B) uses MOSFET's and capacitors

(C) needs no refreshing of the data

(D) contains less memory cells than a static RAM on the same chip area

41. The 8085 A microprocessor has :

(A) 10 restart instructions

(B) 8 restart instructions

(C) 6 restart instructions

(D) 4 restart instructions

42. The execution of RST2 instruction vectors to location :

(A) 0000_H

(B) 0008_H

(C) 0010_H

(D) 0018_H

43. The hardware restart of 8085A microprocessor which has the highest priority and when active branches the program to location 0024_H is :

(A) RST 7.5

(B) RST 6.5

(C) RST 5.5

(D) Trap

44. The decrease in gain of an RC coupled amplifier at low frequency is mainly due to :

(A) junction capacitances of the transistor

(B) emitter resistance

(C) coupling capacitor

(D) voltage divider resistances used for self-biasing of the amplifier

45. If R_i and R_o are the input and output resistances of an amplifier, its power gain in decibels equals its voltage gain in decibels when :

(A) $R_i = 2R_o$

(B) $R_i = R_o$

(C) $R_i = R_o/2$

(D) $R_i = 5R_o$

46. A phasor is :

(A) a vector representing the magnitude and phase of an alternating quantity

(B) graph representing the frequecny and phase of an amplifier

(C) an instrument used for determination phase difference between two time varying quantities

(D) a colour tag for distinguishing between different phases of 3-phase supply

47. When the output flows for less than one-half cycle of the input signal, the amplifier is said to operate in :

(A) Class-A mode

(B) Class-AB mode

(C) Class-B mode

(D) Class-C mode

48. If an amplifier has an overall current gain of 200 and input resistance of 20 kΩ with a load resistance of 10 kΩ. The overall voltage gain of the amplifier is :

(A) 20 dB

(B) 40 dB

(C) 60 dB

(D) 80 dB

49. Two amplifiers having mid band voltage gains 20 dB and 40 dB are connected in cascade. The overall voltage gain of the cascade configuration will be :

(A) 800 dB

(B) 60 dB

(C) 30 dB

(D) 2 dB

50. A class-B push-pull amplifier suffers from :

(A) intermodulation distortion

(B) excess harmonic distortion

(C) cross-over distortion

(D) none of the above

51. An amplifier with a voltage gain of 1000 uses 1/100th of its output in negative feedback, the gain with feedback is :

(A) 90.9

(B) 80.9

(C) 20.9

(D) 10.9

52. A program that accepts a high-level language program as input and generates a corresponding machine language program as output is called :

(A) Linker

(B) Loader

(C) Compiler

(D) Editor

53. Out of the following bridges which one is used for determination the capacitance :

(A) Schering bridge

(B) Wheatstone bridge

(C) Kelvin bridge

(D) Hay bridge

54. Which one of the following operators does *not* belong to unary operator group ?

(A) ++

(B) <=

(C) --

(D) size of

55. Identify the *false* statement from the following :

(A) an integer quantity cannot be added to or subtracted from a pointer variable

(B) a pointer variable can be assigned the address of an ordinary variable

(C) a pointer variable can be assigned the value of another pointer variable

(D) a pointer variable can be assigned a null (zero) value

56. If $i = 1$, then on execution of $++ i$ statement the value of i will be :
    (A) 1
    (B) 2
    (C) 3
    (D) 4

57. Identify *false* statement. In C programming :
    (A) a process directive may appear at any place in a source file
    (B) only one processor directive can occur in a line
    (C) a processor directive is terminated by a semicolon
    (D) all processor directives begin with the sharp sign (#)

58. In C programming when working with stream-oriented data file, one has to establish first a buffer area. This is accomplished by :
    (A) fwrite
    (B) fopen
    (C) fclose
    (D) FILE

59. Which of the following operators enjoys the highest precedence in C programming ?
    (A) Unary operators
    (B) Logical operators
    (C) Relational operators
    (D) Arithmetic operators

60. Idetnify the *false* statement from the following :
    (A) A Union contains members whose individual data types may differ from one another
    (B) The members that compose a union each are assigned its unique storage area within the computer's memory
    (C) The members that compose a union all share the same storage area within the computer's memory
    (D) A union can be member of a structure and a structure can be a member of a union.