ELECTRONICS

1. A differential amplifier has common-mode gain of 0.02 db and differential-mode gain of 200 db. Its CMMR in db is :

   (A) 0.02 db

   (B) 4.80 db

   (C) 80.0 db

   (D) 200.0 db

2. If the cut-in voltage for silicon diodes D_1 and D_2 used in the circuit shown in Fig.(1) is 0.6 V, the output voltage V_o for V_1 = 5 V and V_2 = 5 V is :

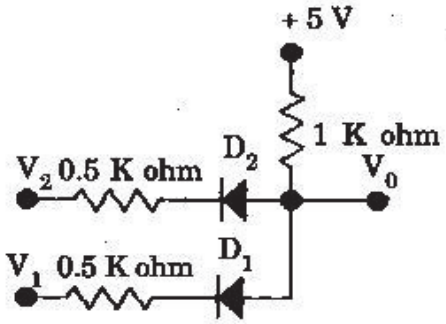

Fig. (1)

   (A) 0 V

   (B) 5 V

   (C) 10 V

   (D) 15 V

3. Identify the *true* statement. An emitter follower has :

   (A) low input impedance and high voltage gain

   (B) high output impedance and unity current gain

   (C) low input impedance and unity current gain

   (D) high input impedance and unity voltage gain

4. Bridge rectifiers are preferred because :

(A) ripple factor of the bridge rectifier is less than that of centre-tap full-wave rectifier

(B) PIV in case of bridge rectifier is half that of a centre-tap full-wave rectifier

(C) the regulation in case of bridge rectifiers is higher than that in case of centre-tap full-wave rectifier

(D) the rectification efficiency is larger than that in case of centre-tap full-wave rectifier

5. In a *p-n* junction the Zener breakdown is caused by :

(A) field ionization

(B) impact ionization

(C) thermal runaway

(D) punchthrough mechanism

6. Identify the *true* statement. In case of avalanche breakdown of a *p-n* junction :

(A) direct band rupture occurs due to high electric field

(B) the charge carriers acquire high energies sufficient to produce electron-hole pairs by impact ionization

(C) electron-hole pairs are generated because of the increase in junction temperature

(D) negligible current flows across the junction

7. A transistor is said to be in saturation region when :

(A) emitter-base junction is forward biased and collector-base junction is reverse biased

(B) both emitter-base junction and collector-base junction are reverse biased

(C) both emitter-base junction and collector-base junction are forward biased

(D) emitter base-junction is reverse biased and collector-base junction is forward biased

8. Semiconductors having Fermi level within the allowed bands are known as :

(A) degenerate semiconductors

(B) non-degenerate semiconductors

(C) compensated semiconductors

(D) intrinsic semiconductors

9. In case of a MOSFET the drain-source voltage at which the drain current becomes nearly constant is called :

(A) punchthrough voltage

(B) cut-in voltage

(C) early voltage

(D) pinch-off voltage

10. The use of a bypass capacitor across emitter resistor in transistor circuits is to :

(A) avoid shift in the Q-point

(B) stabilize the circuit against temperature variations

(C) avoid loss of signal gain

(D) stabilize the circuit against the variation in β

11. For a *p-n-p* transistor if $\alpha = 0.98$ and $I_{CBO} = 5\ \mu A$, then for a base current of 100 μA the collector current I_C is :

(A) 1.50 mA

(B) 2.50 mA

(C) 3.15 mA

(D) 5.15 mA

12. The voltage gain of a source follower employing FET is usually :

(A) slightly less than unity but positive.

(B) equal to unity but negative.

(C) never less than +200.

(D) slightly greater than unity but negative

13. Under thermal equilibrium the product of the electron and hole carrier concentrations in a semiconductor is :

(A) dependent on the doping concentrations

(B) independent on the doping concentrations

(C) greater than square of the intrinsic concentrations

(D) less than square of the intrinsic concentrations

14. The Schottky diode clamping across the collector-base junction of the transistor in case of Schottky-TTL is used :

(A) to increase the current gain of the transistor

(B) to prevent transistor from junction breakdown

(C) to prevent transistor from saturation

(D) to prevent transistor from thermal runaway

15. According to the De Morgan's theorem :

(A) An n-input NAND gate is equivalent to an n-input bubbled AND gate

(B) An n-input OR gate is equivalent to an n-input bubbled AND gate

(C) OR gate and NOR gate are complement to each other

(D) An n-input NAND gate is equivalent to n-input bubbled OR-gate

16. The output logic Y of the circuit shown in Fig. (2) is :

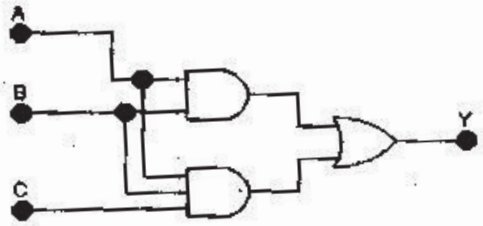

Fig. (2)

(A) ABC

(B) AB

(C) AC

(D) A

17. The number of load gates that a logic device can drive reliably is called the :

(A) fan-out

(B) fan-in

(C) standard load

(D) current sink

18. The potential divider method of biasing in transistor amplifiers is used as it :

(A) increases the voltage gain of the amplifier

(B) makes the operating point stable against the variations of β

(C) reduces the noise of the amplifier

(D) prevents transistor from thermal run away

19. The equivalent resistance between A and B terminals of the circuit shown in Fig. (3) is :

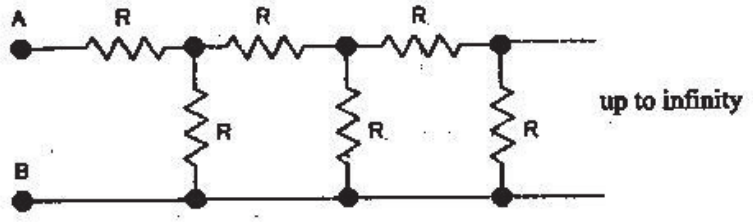

Fig. (3)

(A) R

(B) 2R

(C) $(1 + \sqrt{5})R$

(D) $(1 + \sqrt{10})R$

20. For a step voltage input an integrator produces :

(A) a sine wave

(B) a square wave

(C) a narrow spike

(D) a ramp

21. For the circuit shown in Fig. (4) the output V_{out} will be :

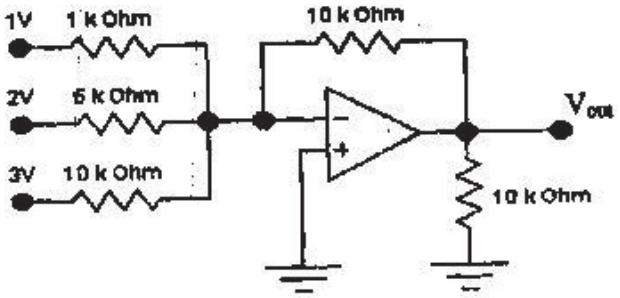

Fig. (4)

(A) –17 V

(B) –15 V

(C) –9.6 V

(D) –6 V

22. The resolution of 4-digit 0-10 V DVM is :

(A) 1 V

(B) 1 mV

(C) 1 μV

(D) 1 pV

23. For an input voltage V_{in} = 10 sin (2000 t) μV the output voltage V_{out} for the circuit shown in Fig. (5) will be :

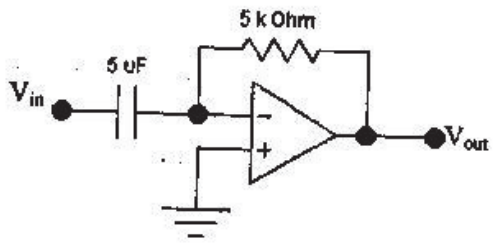

Fig. (5)

(A) –100 cos (2000 t) μV
(B) –100 sin (2000 t) μV
(C) –500 cos (2000 t) μV
(D) –500 sin (2000 t) μV

24. One of the following devices has no negative region in its static I-V characteristics. The device is :
(A) Thyristor
(B) Tunnel diode
(C) Gunn diode
(D) Zener diode

25. If the data stored at memory locations 0800 and 0801 is $2C_H$ and 51_H respectively, then on execution of the program :

```
LDA 0800
MOV B,A
LDA 0801
ADD B
STA 0802
```

the contents of the memory location 0802 will be :
(A) $7D_H$
(B) $7E_H$
(C) 20_H
(D) 51_H

26. LDA is a.....byte instruction and belongs to.....addressing mode group.

(A) one, direct

(B) two, register

(C) three, direct

(D) two, intermediate

27. Early voltage is usually determined from the :

(A) input characteristics of CE transistor

(B) input characteristics of CB transistor

(C) output characteristics of CB transistor

(D) output characteristics of CE transistor

28. If the current gain α of a transistor is 0.99, the current gain β of the transistor will be :

(A) 49.0

(B) 50.0

(C) 69.0

(D) 99.0

29. The maximum frequency of oscillation of a Wien bridge oscillator employing an Op-Amp is limited by the :

(A) slew rate of the operational amplifier

(B) output offset voltage of the operational amplifier

(C) output offset current of the operational amplifier

(D) gain of the amplifier

30. In case of a phase shift oscillator, each RC circuit produces a phase shift of :

(A) 30°

(B) 60°

(C) 90°

(D) 180°

31. In every practical oscillator the loop gain is kept :

(A) exactly equal to the unity

(B) slightly less than unity

(C) slightly greater than unity

(D) not less than 10

32. Identify the true statement from the following :

(A) The input resistance in a voltage series feedback amplifier decreases while that in a voltage-shunt feedback amplifier increases

(B) The input resistance both in a voltage-series feedback amplifier and voltage-shunt feedback amplifier decreases

(C) The input resistance both in a voltage-series feedback amplifier and voltage-shunt feedback amplifier increases

(D) The input resistance in a voltage-series feedback amplifier increases while that in a voltage-shunt feedback amplifier decreases

33. The temperature coefficient of resistance in case of semiconductors is :

(A) zero

(B) infinity

(C) positive

(D) negative

34. The Fermi energy level in case of intrinsic semiconductors lies :

(A) halfway between the conduction and valance bands

(B) within the valance band

(C) within the conduction band

(D) close to the bottom of the conduction band

35. When a sinusoidal voltage of frequency 60 Hz is applied across the primary terminals of the transformer in case of full-wave rectifier, the lowest frequency alternating component across the load will have the frequency :

(A) 30 Hz

(B) 60 Hz

(C) 90 Hz

(D) 120 Hz

36. The reverse leakage current I_{CBO} :

(A) increases with increase in I_E

(B) decreases with increase in temperature

(C) increases with increase in temperature

(D) decrease with increase in V_{CB}

37. In case of RC coupled amplifier the main component which results in decrease in its gain in low frequency range :

(A) is coupling capacitor

(B) are the junction capacitances

(C) is the emitter resistance

(D) is emitter resistance bypass-capacitor

38. In case of class-A operation of an amplifier the output current flows for :

(A) full cycle

(B) less than full cycle but more than half cycle

(C) half cycle

(D) less than half cycle

39. The maximum efficiency of class-B operation will not exceed :

(A) 25%

(B) 50%

(C) 60.5%

(D) 78.5%

40. The circuit shown in Fig. (6) is :

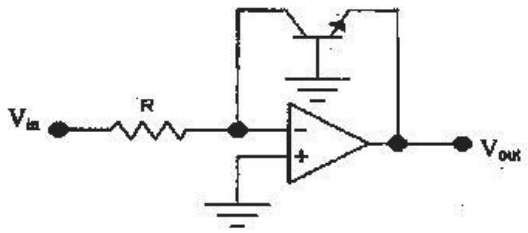

Fig. (6)

(A) an integrator

(B) a logarithmic amplifier

(C) a differentiator

(D) an adder

41. The Boolean expression for a two input A and B exclusive-OR gate is given by :

(A) $f(A, B) = A + B$

(B) $f(A, B) = AB$

(C) $f(A, B) = \bar{A}B + A\bar{B}$

(D) $f(A, B) = \bar{A} + B$

42. The Boolean expression $A + \bar{A}$ will always have logic value :

(A) 0

(B) A

(C) $\bar{A}$

(D) 1

43. The Boolean expression $A + \bar{A}B$ is equal to :

(A) AB

(B) $A + B$

(C) $\bar{A}B + A\bar{B}$

(D) A

44. The output Y in the circuit shown in Fig. (7) is given by :

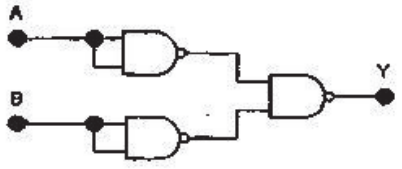

Fig. (7)

(A) $A + B$

(B) AB

(C) $\bar{A}B + A\bar{B}$

(D) $(A + \bar{B})(\bar{A} + B)$

45. For 50 μA meter movement with a coil resistance of 200 Ω. What shunt resistance is required to extend the range to 250 μA ?

(A) 200 Ω

(B) 150 Ω

(C) 100 Ω

(D) 50 Ω

46. If m is the modulation index the ratio between the total power in the amplitude modulated wave to the unmodulated carrier power is given by :

(A) $m^2/2$

(B) $1 + m^2/2$

(C) $1 + m^2$

(D) $(1 + m^2)/2$

47. A carrier wave is simultaneously modulated by two sine waves with modulation indices of 0.3 and 0.4, the total modulation index is :

(A) 1.7

(B) 0.7

(C) 0.5

(D) 0.34

48. Identify the *true* statement from the following. In a superheterodyne receiver :

(A) a constant frequency difference is maintained between the local oscillator and the RF circuit

(B) no local oscillator is used

(C) a frequency difference equal to twice the intermediate frequency is maintained between local oscillator and RF circuit

(D) local oscillator frequency is normally double the IF

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

(A) FM has an infinite number of side bands.

(B) In FM the total transmitted power always remains constant with depth of modulation

(C) In FM the amplitude of the carrier component does not remain constant

(D) In FM with increased depth of modulation the required bandwidth is decreased

50. The image frequency of a superheterodyne receiver :

(A) is not rejected by the IF tuned circuit

(B) is produced within the receiver

(C) is independent of the frequency to which the receiver is tuned

(D) is due to the insufficient adjustment of channel receiver

51. The carrier wave $V_c = 80 \sin (2 \times 10^6 t)$ is amplitude modulated by a modulating signal $V_m = 4 \sin (200t)$, the modulation index is :

(A) 0.01

(B) 0.05

(C) 0.25

(D) 0.50

52. If δ and f_m represent the frequency deviation and modulating frequency the modulation index of FM is given by :

(A) f_m/δ

(B) δ/f_m

(C) δf_m

(D) $\delta f_m/2$

53. In case of frequency modulation :

(A) the total number of side bands depend on the modulation index

(B) the carrier frequency cannot disappear

(C) the amplitude of any side band does not depend on the modulation index

(D) the amplitude of any side band depends on the modulation index

54. In C-programming the **while (expression) statement** is used to carry out looping operation. The included statements will executed repeatedly as long as the value of the expression is :

(A) zero

(B) one only

(C) negative

(D) not zero.

55. In C-programming the expression **++k** is equivalent to :

(A) **k=k+1+1**

(B) **k=k-1**

(C) **k=k+1**

(D) **k=k+k**

56. In C-programming the global variables are the variables defined :

(A) inside the function program

(B) outside the main program

(C) inside the main program

(D) in function declaration statement

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

(A) A pointer is a variable which holds the memory address of another variable.

(B) A pointer allows to return structured variables from a function

(C) A pointer allows to pass variables, arrays, functions, strings and structures to a function arguments

(D) A pointer does not support dynamic allocation and deallocation of memory segments

58. Identify the *false* statement. In C-programming :

(A) all processor directives begin with the sharp sign #

(B) the processor directive is terminated by a semicolon

(C) only one processor directive can occur in a line

(D) the processor directive may appear at any place in source file

59. The electromagnetic wave when travelling through the free space will suffer only one of the following :

(A) Reflection

(B) Refraction

(C) Attenuation

(D) Absorption

60. The highest frequency that will return to earth by a given atmospheric layer after being beamed straight up at it is known its :

(A) critical frequency

(B) maximum useable frequency

(C) window

(D) resonant frequency