

Paper: BEL Placement Paper (Technical-Electronics-IIInd)

1. Resistivity of silicon in ohms cm. is approx. equal to
a. 50 b. 1012 c. 230k d. 10^{-6}
2. Resistivity of Germanium in ohms cm. is approx. equal to
a. 50 b. 10^{-12} c. 50k d. 10^{-6}
3. The number of free electrons/cubic cm intrinsic Germanium at room temperature is approx. equal to
a. 1.5×10^{10} b. 2.5×10^{13} c. 1000 d. 5×10^6
4. The number of free electrons/cubic cm of intrinsic silicon at room temperature is approx. equal to
a. 1.5×10^{10} b. 2.5×10^{13} c. 10000 d. 5×10^6
5. The forbidden energy gap for silicon is
a. 1.1eV b. 0.67eV c. 0.97eV d. 1.7eV
6. The forbidden energy gap for Germanium is
a. 1.1eV b. 0.67eV c. 0.97eV d. 1.7eV
7. N type material is formed by the addition of the following (penta valent) atom in n to semiconductor material
a. Antimony
b. Arsenic
c. Phosphorous
d. Any of the above
8. P type material is formed by the addition of the following [Trivalent] atom in p to semiconductor material
a. Boron b. Gallium c. Indium d. Any of the above
9. Impurity atoms that produces N type material by its addition in semiconductor is called

a. Donar b. Acceptor c. Conductor d. Insulator

10. Impurity atoms that produces P type material by its addition in semiconductor is called

a. Donar b. Acceptor c. Conductor d. Insulator

11. Dynamic resistance of a diode R_d is if voltage changes is DV_d and the current change is $D I_d$

a. $D V_d / D I_d$

b. $D I_d / D V_d$

c. $1 / DV_d$

d. $1 / D I_d$

12. Point contact diodes are preferred at very high frequency because of its low junction

a. Capacitance and inductance

b. Inductance

c. Capacitance

13. Identify the circuit given below

a. AND gate

b. OR gate

c. Rectifier

d. NOR gate

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a. AND gate

b. OR gate

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15. DC value of a Half wave rectifier with E_m as the peak value of the input is

- a. $0.318E_m$
- b. $0.418E_m$
- c. $0.518E_m$
- d. $0.618E_m$

16. Change in Zener voltage of 10V at 100°C if temperature co-efficient is $0.072\% / ^\circ\text{C}$ as

- a. 0.54 V b. 0.74 V c. 0.64 V d. 0.14 V

17. If T_c is the % temperature coefficient / $^\circ\text{C}$ and V_z as zener voltage and ΔT as change in temperature then the change in zener voltage is

- a.
- b.
- c. $100 \cdot V_z \cdot T_c \Delta T$
- d. None of these of the above

18. PIV for a full wave rectifier, if E_m is the peak voltage is

- a. E_m b. $1.5E_m$ c. $0.636E_m$ d. $2E_m$

19. Schottky Barrier diodes becomes important at

- a. DC level operation
- b. Low frequency operation
- c. High frequency operation
- d. None of these

20. Clamping network is the one that will clamp the signal to a

- a. Different peak value
- b. Different DC level

- c. Different polarity level
- d. Different RMS level

21. Clipping network is the one that will clip a portion of the

- a. Input signal without distorting the remaining portion
- b. Input signal with distorting the remaining portion
- c. Any of the above
- d. None of these

22. Transition capacitance C_t of a Varicap diode with Knee voltage V_t , reverse voltage V_r and K , the constant based on semiconductor material and the construction technique & N dependent on type of junction is given by

- a. $1 / K (V_t + V_r)^{N/2}$
- b. $1 / K (V_t + V_r)^N$
- c. $K / (V_t + V_r)^N$
- d. $K / (V_t + V_r)^{1/N}$

23. $C_t = K / (V_t + V_r)^N$ where V_t Knee voltage, V_r reverse voltage, K manufacturing dependent constant and N dependent on type of junction, for alloy junction the value of N is

- a. $1/3$ b. $2/3$ c. $1/2$ d. $1/4$

24. $C_t = K / (V_t + V_r)^N$ where V_t Knee voltage, V_r reverse voltage, K manufacturing dependent constant and N dependent on type of junction, for diffused junction the value of N is

- a. $1/3$ b. $2/3$ c. $1/2$ d. $1/4$

25. In JFET, the drain current I_d is given by (I_{dss} drain \rightarrow source saturation current V_{gs} \rightarrow Gate \rightarrow source voltage, V_p the pinch off voltage)

- a. $I_{dss}[1 - V_p/V_{gs}]$
- b. $I_{dss}(1 - V_{gs}/V_p)^2$
- c. $I_{dss}[1 - V_{gs}/V_p]$

d. $I_{dss}(1 - V_{gs}/V_p)^{3/2}$

26. The shadow mask in colour tube is used to

- a. Reduce X-Ray emission
- b. Ensure each beam hits its own dots
- c. Increase screen brightness
- d. Provide degaussing for the screen

27. Indicate which of the following signal is not transmitted in colour TV

- a. Y b. Q c. R d. I

28. Another name for horizontal retrace in TV receiver is the

- a. Ringing b. Burst c. Damper d. Fly back

29. Another name for the colour sync in the colour TV system

- a. Ringing b. Burst c. Damper d. Fly back

30. The HV anode supply for a picture tube of a TV receiver is generated in the

- a. Mains transformer
- b. Vertical output stage
- c. Horizontal output stage
- d. Horizontal oscillator

31. The output of vertical amplifier is

- a. Direct current
- b. Amplified vertical sync pulse
- c. A saw tooth voltage
- d. A saw tooth current

32. In a transistor if $\alpha = 0.98$, current gain is equal to

a. 29 b. 59 c. 69 d. 49

33. The active region in the common emitter configuration means

- a. Both collector and emitter junction is reverse biased
- b. The collector junction is forward biased and emitter junction
- c. The collector junction is reverse biased and emitter junction is forward biased
- d. Both collector & emitter junction are forward biased

34. The saturation region in the common emitter configuration means that

- a. Both collector & emitter junction are reverse biased
- b. The collector junction is forward biased and emitter junction
- c. The collector junction is reverse biased and emitter junction is forward biased
- d. Both collector & emitter junction are forward biased

35. The % of Red, Green & Blue in 100% White Y is given by

- a. 30%, 59%, 11%
- b. 50%, 30%, 11%
- c. 30%, 11%, 50%
- d. 33.3%, 33.5%, 38.3%

36. Equalizing pulse width, if H is the Horizontal sync rate

- a. 0.64 H b. 0.07 H c. 0.04 H d. 0.16 H

37. In a simple RC network the bandwidth is equal to

- a. $1/2 \pi RC$
- b. $RC / 2$
- c. $2 C / \pi R$
- d. $2 \pi / RC$

38. The time constant of a RC network is given by

- a. RC b. C/R c. R/C d. None of these

39. First zero crossing of pulse frequency spectrum occurs at if d is the pulse width, T is the pulse repetition rate

- a. $1/d$ b. d/T c. T/d d. T

40. The distortion less output characteristic of a network means

- a. Constant amplitude and linear phase shift over frequency
b. Linear phase shift and amplitude need not be constant
c. Any amplitude and phase
d. None of these

41. Single sideband means suppressed

- a. Carrier
b. Carrier and one side band
c. One side band
d. None of these

42. In an amplitude modulated signal, lower side band frequency is equal to (if the carrier frequency is f_c and modulation frequency is f_m)

- a. $f_m + f_c$ b. $f_c - f_m$ c. $f_m + f_c$ d. f_c / f_m

43. Modulation index of the frequency modulation depends on

- a. Amplitude & frequency of the modulation signal
b. Frequency and amplitude of carrier signal
c. Carrier frequency
d. None of these

44. The BW of the narrow band FM if modulating frequency is f_m

a. 3 r fm b. 2 r fm c. 2.5 r fm d. 10 r fm

45. Reactance tube modulator is known for

a. FM b. AM c. PPM d. PAM

46. Bandwidth and rise time product is

a. 0.35 b. 0.45 c. 0.30 d. 0.49

47. Energy gap, E_g , for Germanium at room temp [300o K] is

a. 0.72eV b. 1.1eV c. 1.53eV d. 0.2eV

48. Volt equivalent of temperature V_T , at 116o K is

a. 0.11V b. 0.01V c. 1.16V d. 0.1V

49. Reverse saturation current of a Ge.diode is in the range of

a. mA b. uA c. nA d. pA

50. Cut-in voltage V for silicon is approximately

a. 0.2V b. 0.6V c. 0.9V d. 1.1V

51. Every 10o C rise in temp. the reverse saturation current

a. Doubles

b. Halves

c. Triples

d. No change

52. Hall effect with reference to Metal or Semiconductor carrying a current I is placed in a transverse magnetic field B , an electric field E is induced in

a. Parallel to B

b. Perpendicular to I

c. Perpendicular to both B & I

d. Perpendicular to B

53. 1 eV (electron volt) is equal to:

a. 1.9×10^{-20} J

b. 1.6×10^{-19} J

c. 1.6×10^{-20} J

d. 1.16×10^{-19} J

54. Donor impurity is having a valency of:

a. 2 b. 3 c. 4 d. 5

55. Acceptor impurity is having a valency of

a. 2 b. 3 c. 4 d. 5

56. Electron volt arises from the fact that if any electron falls through a potential of 1 volt, its kinetic energy will

a. Decrease, & potential energy will increase

b. Increase & potential energy decrease

c. Be unaltered & potential energy decreases

d. Increase & potential energy increase

57. Hole is created in a semiconductor material if one of following impurities are added

a. Antimony

b. Arsenic

c. Indium

d. Phosphorus

58. Excess electron is created by

a. Boron

b. Gallium

c. Indium

d. Arsenic

59. A snubber circuit is used across the SCR to protect against

a. The di/dt of the anode current

b. The dv/dt turn on

c. $L.di/dt$ of load inductance

d. None of these

60. Germanium has the valency of

a. 2 b. 3 c. 4 d. 5

61. Silicon has the valency of

a. 2 b. 3 c. 4 d. 5

62. Hole acts as a free charge carrier of polarity

a. Negative

b. Positive

c. Neutral

d. None of these

63. Burst signal in NTSC system is 8 cycles of the frequency of

a. Colour sub carrier

b. Picture carrier

c. Sound carrier

d. None of these

64. Colour sub carrier reference burst is superimposed on the

a. Back porch of the each horizontal sync pulse

b. Front porch of the each horizontal sync pulse

c. Front porch of the each vertical sync pulse

d. Back porch of the each vertical sync pulse

65. The law of mass action with reference to semiconductor technology states that the product of free negative & positive concentration is a constant and

a. Independent of amount of donor and acceptor doping

b. Dependent on amount of donor and independent of the amount acceptor impurity doping

c. Depend on amount of both donor & acceptor impurity doping

d. None of these

66. The snubber circuit used across SCR is a simple

a. R-L network

b. RLC network

c. LC network

d. RC network

67. To limit the rate of rise of SCR anode current a small

a. Inductor is inserted in cathode circuit

b. Inductor is inserted in anode circuit

c. Capacitor is inserted in anode circuit

d. Capacitor is inserted in cathode circuit

68. Torque developed by a DC servo motor is proportional to the

a. Product of power and time

b. Product of armature current and back emf

c. Armature voltage and armature current

d. Field voltage and field current

69. Proportional Integral control

- a. Reduces steady state error but reduces the forward gain
- b. Increases the forward gain and reduces the steady state error
- c. Increases the steady state error and increases the forward gain
- d. None of these

70. Increasing the servo bandwidth:

- a. Improves signal to noise ratio
- b. Improves speed response and lowers signal to noise ratio
- c. Improves power output
- d. None of these

71. Notch filter is

- a. Low pass filter
- b. High pass filter
- c. Narrow stop band filter
- d. Narrow pass band filter

72. In TV Receivers the Electron beam deflection method used is

- a. Electro static
- b. Electro magnetic
- c. Magnetic
- d. All the above

73. In a line of sight communication the maximum range R in miles between the receiver antenna and transmitter antenna of height H in feet is approximately

- a. $R = 1.93 \text{ \AA-H}$
- b. $R = 1.23 \text{ \AA-H}$
- c. $R = 1.53 \text{ \AA-H}$
- d. $R = 2.03 \text{ \AA-H}$

74. In wavelength of the 60 MHz carrier frequency is

- a. 10 metres
- b. 15 metres
- c. 5 metres
- d. 2.5 metres

75. In standard TV receiving antenna the dipole element is

- a. 0.5 of the wave length
- b. 0.25 of the wave length
- c. 1.5 of the wave length
- d. 1.0 of the wave length

76. The characteristics of FET are similar to:

- a. Triode
- b. Tertode
- c. Pentode
- d. Diode

77. Charge coupled device is an array of capacitors whose structure is similar to:

- a. Shift register
- b. Flip-flop
- c. NAND gate

d. Amplifier

78. Operational amplifier characteristics are which of the following:

- a. Infinite gain
- b. Infinite input impedance
- c. Output impedance is zero
- d. All of the above

79. The typical value of the open loop gain in dB of an amplifier at DC with no feedback is:

- a. 90 to 100
- b. 80 to 90
- c. 0 to 50
- d. 50 to 70

80. The 3 dB band width means the frequency at which

- a. The open loop voltage gain reduced to 0.707
- b. The open loop gain reduced to unity
- c. Maximum voltage of a signal is without distortion
- d. It is a medium wave band width of radio receiver

81. Rise time of an amplifier is defined as time required

- a. To change from 0 to 100 % of its final value
- b. To change from 0 to 50 % of its final value
- c. To change from 10 to 90 % of its final value
- d. To change from 10 to 100 % of its final value

82. High speed amplifier design emphasized on

- a. Extremely small bandwidth

- b. Very slow response
- c. Unity gain bandwidth after 10 MHz
- d. None of these

83. Tuned amplifier having the frequency range between

- a. 150 KHz $\hat{=}$ 50 MHz
- b. 100 Hz $\hat{=}$ 100 KHz
- c. 100 KHz $\hat{=}$ 120 KHz
- d. 50 MHz $\hat{=}$ 100 MHz

84. The resonance frequency of a tuned circuit made up of R, L, C is given by

- a. $1/2 \pi \sqrt{LC}$
- b. $2 \pi \sqrt{LC}$
- c. $2 \pi / \sqrt{LC}$
- d. $\sqrt{LC} / 2$

85. The voltage follower can be obtained using operational amplifier

- a. Without any feedback
- b. Series parallel feedback of unity
- c. Parallel feedback
- d. Series feedback

86. Fidelity of the amplifier is when

- a. It is a linear amplifier
- b. It does not add or subtract any spectral components
- c. It amplifier each component by the same amount
- d. All of the above

87. What would be the output when two input sine waves of frequency 50 KHz and 100 KHz passed through an amplifier in the medium signal

- a. 50 KHz and 100 KHz
- b. 100 KHz and 200 KHz
- c. 50 KHz and 150 KHz
- d. All of the above

88. The important application of Schmitt trigger is

- a. To convert slowly varying input voltage to abrupt voltage change
- b. To convert abruptly varying input voltage into slowly varying output
- c. To change the frequency of the input
- d. None of these

89. Meaning of decoding is

- a. Binary addition
- b. Data transmission
- c. Demultiplexing
- d. Storage of binary information

90. Approximately how many number of gates are incorporated in SSL chip

- a. 12
- b. 100
- c. Excess of 100
- d. Excess of 1000

91. The circuit diagram represents which one of the following

- a. Half adder

b. Full adder

c. Exor gate

d. AND gate

92. Flip flop cannot be called as

a. Bistable multivibrator

b. 1 Bit memory unit

c. latch

d. combinational circuit

93. The important use of low pass filter in power supply is

a. To get the regulation in the output voltage

b. To filter out the ripple frequency

c. To increase the current rating

d. To convert AC into DC

94. Binary equivalent of the decimal number 145 is

a. 10010001

b. 1001011

c. 1010001

d. 1100010

95. In which of the following gate the output will be high when all the maintained at high level

a. NOR

b. AND

c. NAND

d. EXOR

96. Which of the following definition is true in the De Morgan's theorem

- a. Multiplication symbols are replaced by addition symbol
- b. Addition symbols are replaced by Multiplication symbol
- c. Each of the terms are expressed in the complementary form
- d. All of the above

97. 8421/BCD code for a decimal number 149 is

- a. 0001 0100 1001
- b. 10010101
- c. 10101001
- d. None of these

98. Combinational circuit are mainly characterized by

- a. Output depends upon the previous state & presents state
- b. Output depends upon the input at that particular instant
- c. Output depends upon the present state & the clock state
- d. Output does not depends upon the input at all

99. A flip flop is defined as

- a. A bistable device with two complementary outputs
- b. It is memory element
- c. It will respond to input and it is a basic memory element
- d. All of the above

100. Four bit code is called

- a. Nibble b. Byte c Word d. Register