Electronics Eingineering

1. The output of a two-input gate is 0 if and only if its inputs are unequal. It is true for
(A) XOR gate
(B) NAND gate
(C) NOR gate
(D) XNOR gate

2. In K-map simplification, a group of eight adjacent 1's leads to a term with
(A) one literal less than the total number of variables
(B) two literals less than the total number of variables
(C) three literals less than the total number of variables
(D) four literals less than the total number of variables

3. The octal equivalent of the binary number 11010111 is
(A) 656
(B) 327
(C) 653
(D) D7

4. If each successive code differs from its preceding code by a single bit only, then this code is called
(A) BCD code
(B) Gray code
(C) weighted code
(D) binary code

5. Which of the following logic families dissipates minimum power?
(A) DTL
(B) TTL
(C) ECL
(D) CMOS

6. In a T flip-flop the output frequency is
(A) same as the input frequency
(B) one-half its input frequency
(C) double the input frequency
(D) none of the above

7. For a sinusoidal input, the output from a Schmitt trigger is
(A) sinusoidal
(B) saw tooth wave
(C) square wave
(D) triangular wave

8. A 555 timer can be used as
(A) an astable multivibrator
(B) a monostable multivibrator
(C) a frequency divider
(D) any of the above

9. Shifting binary data to the left by one bit position using shift registers amounts to
(A) division by 2
(B) subtraction of 2
(C) addition of 2
(D) multiplication by 2

10. A PLA can be used
(A) to realize combinational logic
(B) to realize sequential logic
(C) as a dynamic memory
(D) as a microprocessor

11. The intrinsic carrier concentration of silicon sample at 300 K is 1.5×10^{16} /m^3. If after doping, the majority carrier concentration is 2×10^{20} /m^3, the minority carrier concentration is
(A) 6.666×10^4 /m^3
(B) 9×10^{11} /m^3
(C) 1.125×10^{12} /m^3
(D) 6×10^5 /m^3

12. If the common mode rejection ratio and the common mode voltage gain of a differential amplifier are 36 dB and 4 dB respectively, then differential voltage gain is
(A) 32 dB
(B) 16 dB
(C) 40 dB
(D) 20 dB

13. If mobility of electrons in a specific sample of semiconductor at a given temperature increases then the diffusion constant of the electrons will

(A) increase
(B) decrease
(C) remain same
(D) none of the above

14. The direction of electric field within the depletion region of an unbiased p-n junction diode is from

(A) p-side to n-side
(B) n-side to p-side
(C) there exists no electric field
(D) none of the above

15. The action of JFET in its equivalent circuit can best be represented as a

(A) current controlled current source
(B) current controlled voltage source
(C) voltage controlled voltage source
(D) voltage controlled current source

16. Voltage series feedback results in

(A) increase in both input and output impedances
(B) decrease in both input and output impedances
(C) increase in input impedance and decrease in output impedance
(D) decrease in input impedance and increase in output impedance

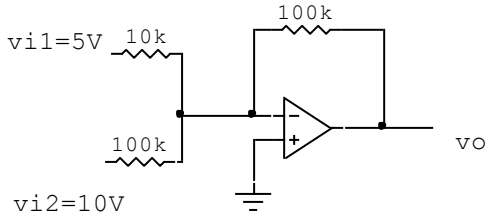
17. Fermi energy level of a p-type semiconductor lies

(A) close to conduction band edge
(B) close to valance band edge
(C) at the middle of the conduction band and valance band edges
(D) within the conduction band

18. The frequency of oscillation of a Wien bridge oscillator is given by

(A) $\frac{1}{2\pi\sqrt{6\,RC}}$
(B) $\frac{1}{2\pi\sqrt{RC}}$
(C) $\frac{RC}{2\pi\sqrt{6}}$
(D) $\frac{1}{2\pi RC}$

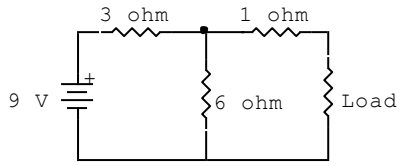
19. For the circuit given below vo equals to



(A) -50 V
(B) -10 V
(C) -60 V
(D) 60 V

20. If a BJT is operated in forward active mode then
(A) emitter-base junction is reverse biased and collector-base junction is forward biased
(B) emitter-base junction is forward biased and collector-base junction is forward biased
(C) emitter-base junction is reverse biased and collector-base junction is reverse biased
(D) emitter-base junction is forward biased and collector-base junction is reverse biased

21. The maximum power that can be transferred to the load of the circuit shown is



(A) 3 watt
(B) 6 watt
(C) 6.75 watt
(D) 13.5 watt

22. Three equal resistors of 5 Ω are connected in delta, the resistance in one of the arm of the equivalent star circuit is
(A) 5 Ω
(B) 1.33 Ω
(C) 1.67 Ω
(D) 10 Ω

23. RMS value of $f(t) = 10(1 + \sin \omega t)$ is

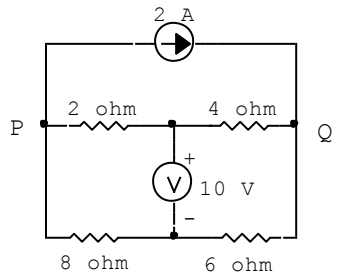
(A) 10

(B) $\frac{10}{\sqrt{2}}$

(C) $\sqrt{150}$

(D) $\frac{20}{\sqrt{2}}$

24. The potential difference between the points P and Q in the circuit shown below is



(A) 14V

(B) 7V

(C) -6V

(D) -7V

25. The final value of function F(s) = $\frac{2s+1}{s^4 + 8s^3 + 16s^2 + s}$ is

(A) 2

(B) infinite

(C) zero

(D) 1

26. The impulse response of a system with transfer function H(s) = $\frac{1}{(s+1)(s+2)}$ is

(A) $0.5\, e^{-t} - e^{-2t}$

(B) $e^{-t} - 0.5\, e^{-2t}$

(C) $e^{-t} - e^{-2t}$

(D) $e^{-2t} - e^{-t}$

27. The highest priority interrupt in 8085 microprocessor is

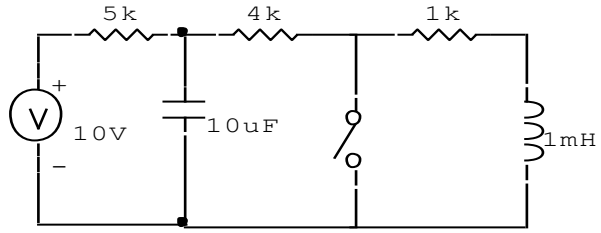
(A) INTR

(B) TRAP

(C) RST 6.5

(D) RST 5.5

28. In the figure shown, the ideal switch has been opened for a long time. If it is closed at t = 0, then the magnitude of the current through the 4 kΩ resistor at t = 0+ is



(A) 2 mA
(B) 1.5 mA
(C) 1.2 mA
(D) 1 mA

29. A higher value of Q (quality factor) is characterized by
(A) wide band of frequency
(B) narrow band of frequency and sharp response
(C) poor selectivity
(D) none of the above

30. The relation AD-BC = 1, where A, B, C, and D are the elements of a transmission matrix, is valid for
(A) any type of network
(B) passive but not reciprocal network
(C) passive and reciprocal network
(D) both active and passive network

31. The root locus diagram of a system exhibits
(A) the frequency response of the system
(B) the bandwidth of the system
(C) the poles of the transfer function for a set of parameter values
(D) the response of the system to a step input

32. A tacho-generator can be used to measure
(A) displacement
(B) speed
(C) acceleration
(D) speed and acceleration

33. In case of type-1 system, steady state acceleration is

(A) unity
(B) 10
(C) zero
(D) infinity

34. In closed loop control system, with positive value of feedback gain, the overall gain of the system will

(A) decrease
(B) increase
(C) be unaffected
(D) any of the above

35. A system with gain margin close to unity or phase margin close to zero is

(A) relatively stable
(B) highly stable
(C) highly oscillatory
(D) none of the above

36. Addition of zeros in a transfer function causes

(A) lead compensation
(B) lag compensation
(C) lead-lag compensation
(D) none of the above

37. If the gain of a critically damped system is increased, it will behave as

(A) underdamped
(B) critically damped
(C) overdamped
(D) none of the above

38. First column elements of a Routh's tabulation are 3, 5, -3/4, 1/2, 2; it means that there

(A) is one root in the left half **s**-plane
(B) is one root in the right half **s**-plane
(C) are two roots in the left half **s**-plane
(D) are two roots in the right half **s**-plane

39. In Bode diagram, the factor $1/j\omega$ in the transfer function gives a line having slope

(A) -20 dB per octave
(B) -10 dB per octave
(C) -6 dB per octave
(D) -2 dB per octave

40. A second order system exhibits 100% overshoot. The damping ratio is

(A) 0
(B) 1
(C) <1
(D) >1

41. The Fourier transform of a signal $x(t) = e^{2t}.u(-t)$ is given by

(A) $1/(2-j\omega)$
(B) $2/(1-j\omega)$
(C) $1/(j2-\omega)$
(D) $2/(j2-\omega)$

42. The convolution of a rectangular pulse is

(A) another rectangular pulse
(B) square pulse
(C) triangular pulse
(D) sinc pulse

43. The step response for an LTI system with impulse response $h(n) = \delta(n) - \delta(n -2)$ is

(A) $\delta(n-2)$
(B) $\delta(n)$
(C) $u(n) - u(n-2)$
(D) $u(n)$

44. In an amplitude modulated wave obtained by sinusoidal modulation of the carrier, the positive peak amplitude of the R.F is varying between 12 V and 4 V. The modulation index and the unmodulated carrier amplitude are respectively

(A) 1/3, 8 V
(B) 0.5, 8 V
(C) 0.5, 4 V
(D) 1/3, 4 V

45. The modulating frequency in frequency modulation is increased from 10 KHz to 20 KHz. The practical bandwidth is

(A) increased tremendously
(B) increased by 20 KHz
(C) halved
(D) doubled

46. The bit rate of a QPSK system is 34 Mbps. The baud rate of the system is

(A) 17 Mbps
(B) 34 Mbps
(C) 68 Mbps
(D) 85 Mbps

47. Bit error rate of coherent binary FSK is

(A) ½ erfc $\sqrt{(E_b / 2N_0)}$
(B) ½ erfc $\sqrt{(E_b / N_0)}$
(C) ½ erfc $\sqrt{(-E_b / 2N_0)}$
(D) ½ erfc $\sqrt{(-E_b / N_0)}$

48. The PSD of white noise is

(A) $N_o/2$
(B) $2/N_o$
(C) $N_o/4$
(D) N_o

49. The multiplexing technique which transmits digital signals is

(A) FDM
(B) TDM
(C) WDM
(D) none of the above

50. The transfer function of a stable system is $H(z) = 1/(1- 0.5z^{-1}) + 1/(1-2z^{-1})$, its impulse response will be

(A) $(0.5)^n u(n) + 2^n u(n)$
(B) $- (0.5)^n u(-n -1) - 2^n u(n)$
(C) $(0.5)^n u(n) - 2^n u(-n -1)$
(D) $- (0.5)^n u(-n -1) - 2^n u(-n -1)$

51. Which of the following is always zero?
(A) grad div
(B) div grad
(C) div curl
(D) curl curl

52. The outward flux of a vector field $p_s = x^2 + xy$ over the region $0 \le y \le x^2, 0 < x < 1$ will be
(A) $\frac{1}{5}$
(B) $\frac{1}{12}$
(C) $\frac{17}{60}$
(D) $\frac{1}{60}$

53. Two identical coaxial circular coils carry the same current I but in opposite directions. The magnitude of the magnetic field B at a point on the axis midway between the coils is
(A) zero
(B) the same as that produced by one coil
(C) twice that produced by one coil
(D) half that produced by one coil

54. A uniform plane wave in a lossy medium gets its magnitude reduced by 60% for travelling through 2 meter. The skin depth will be
(A) $\frac{2}{\ln(2.5)}$ meter
(B) $2 \times \ln(2.5)$ meter
(C) $\frac{\ln(2.5)}{2}$ meter
(D) $\ln(2.5)$ meter

55. Which of the following statements is not true for waves in general?
(A) It may be a function of time only
(B) It may be sinusoidal or cosinusoidal
(C) It must be a function of time and space
(D) For practical reasons, it must be finite in extent

56. What is the major factor for determining whether a medium is free space, lossless dielectric, lossy dielectric, or good conductor?

(A) Attenuation constant
(B) Constitutive parameters (ε, μ, σ)
(C) Loss tangent
(D) Reflection coefficient

57. A plane wave in free space ($z \leq 0$) is incident normally on a large block of material with ε_r = 12, μ_r = 3, σ = 0 which occupies $z \geq 0$. If the incident electric field is $E = 30\cos(\omega t - z)\vec{a}_y$ V/m then the standing wave ratio will be

(A) 3
(B) 2
(C) 4/3
(D) 3/2

58. Which statement does not characterize a static magnetic field?

(A) It is solenoidal
(B) It is conservative
(C) It has no sinks or sources
(D) Magnetic flux lines are always closed

59. In a homogeneous non-conducting region (μ_r = 1), the electric and magnetic field components are $E = 30\pi\cos(\omega t - \frac{4}{3}y)\vec{a}_z$ V/m and $H = 1.0\cos(\omega t - \frac{4}{3}y)\vec{a}_x$ A/m respectively. The speed of light through this medium will be

(A) $\frac{1}{3}$ times of free space
(B) $\frac{1}{4}$ times of free space
(C) $\frac{1}{8}$ times of free space
(D) $\frac{1}{16}$ times of free space

60. A 30 cm × 40 cm rectangular loop rotates at 150 rad/s in a magnetic field of 0.06 Wb/m^2 normal to the axis of rotation. If the loop has 50 turns, then the induced voltage in the loop will be

(A) -36 V
(B) 0 V
(C) -54 V
(D) -72 V