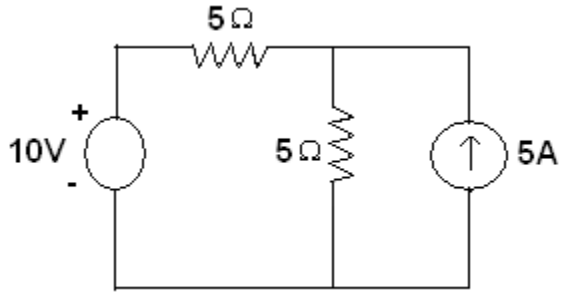
Electronics Engineering

1. In a circuit voltage and current are specified by $v(t)= 10 \sin(\omega t+30^0)$ and $i(t)=10 \sin(\omega t-30^0)$
   (A) 200 watts
   (B) 25watts
   (C) 100watts
   (D) 12.5watts

2. The voltage across 5 A source in the given circuit is
   (A) 20 volt
   (B) 25 volt
   (C) 15 volt
   (D) 17.5 volt



3. An independent voltage source in series with an impedance $Z_s = 3.0 +j4.8$ ohm delivers a maximum average power to a load impedance Z_L when
   (A) $Z_L = 3.0 +j4.8$ ohm
   (B) $Z_L =3.0$ ohm
   (C) $Z_L = 3.0 - j4.8$ ohm
   (D) $Z_L= - j4.8$ ohm

4. A ramp voltage , $x(t) = 50t$ volts is applied to an RC differentiating circuit with $R= 10k\Omega$ and $C= 4\mu F$. The maximum output voltage is
   (A) 2.0 volts
   (B) 0.2 volts
   (C) 10.0 volts
   (D) 20.0 volts

5. A series RLC circuit has a resonance frequency of 1KHz and a quality factor Q=50. If each of R, L, and C is doubled from its original value, the new Q of the circuit is
   (A) 50
   (B) 100
   (C) 25
   (D) 200

6. The short-circuit admittance matrix of a two port network has $y_{12} = y_{21}$, then the network is
   (A) reciprocal and passive
   (B) reciprocal and active
   (C) non-reciprocal and passive
   (D) non-reciprocal and active

7. A series RL circuit with R= 100Ω, L= 50H is supplied by a d.c. source of 100V. The time taken for the current to rise to 70% of its steady state value is
   (A) 70% of time required to reach steady state
   (B) 0.3sec
   (C) 0.6sec
   (D) 1.2sec

8. Voltage across capacitor in RLC series circuit is maximum
   (A) just after resonance
   (B) just before resonance
   (C) much after resonance
   (D) at resonance

9. F(s) = (s+1)(s+3)/s(s+2) represents an
   (A) RC admittance
   (B) RC impedance
   (C) RL admittance
   (D) RC impedance and an RL admittance

10. If the unit step response of a network is $(1-e^{-\alpha t})$, then its unit impulse response will be
   (A) $\alpha\, e^{-\alpha t}$
   (B) $\alpha\, e^{-t/\alpha}$
   (C) $1/\alpha\, e^{-\alpha t}$
   (D) $(1-e^{-\alpha t})\, e^{-\alpha t}$

11. The impurity commonly used for realizing the base region of a silicon n-p-n transistor is
   (A) Phosphorus
   (B) Indium
   (C) Gallium
   (D) Boron

12. Drift current in a semiconductor depends upon
   (A) both the electric field and the carrier concentration
   (B) only the electric field
   (C) only carrier concentration gradient
   (D) neither the electric filed nor the carrier concentration gradient

13. Which one the following devices exhibit negative resistance characteristics
    (A) Photo diode
    (B) MOSFET
    (C) Tunnel diode
    (D) Zener diode

14. A BJT is said to be operating in the saturation region if
    (A) both the junctions are reverse biased
    (B) both the junctions are forward biased
    (C) base-emitter junction is forward biased and base-collector junction reverse biased
    (D) base-emitter junction is reverse biased and base-collector junction forward biased

15. The topology used to get high input and output resistance in feedback amplifier
    (A) voltage shunt
    (B) voltage series
    (C) current shunt
    (D) current series

16. In a multi-stage RC-coupled amplifier the coupling capacitor
    (A) blocks the DC components without effecting the frequency response
    (B) limits the high frequency response
    (C) does not effect the frequency response
    (D) limits the low frequency response

17. AN n-channel JFET has I_{DDS} = 2mA and V_P = -10V. Its maximum transconductance is
    (A) 0.40 msec
    (B) 0.04 msec
    (C) 4.00 msec
    (D) 8.40 msec

18. A Darlington pair is used for
    (A) high current gain
    (B) high power gain
    (C) low distortion
    (D) high frequency range

19. In a differential amplifier, CMRR can be improved by using
    (A) source resistance
    (B) emitter resistance
    (C) collector resistance
    (D) power supply voltage

20. The low frequency oscillator is
    (A) Hartly oscillator
    (B) Crystal oscillator

(C) Wein-bridge oscillator
(D) Colpitts oscillator

21. What is dual of X +[Y+(XZ)]+ W
(A) X +[Y(X+Z)] +W
(B) X +[Y(X+Z)]W
(C) X[Y+XZ]W
(D) X[Y(X+Z)]W

22. In which of the following logic gate families of the circuits both direct and complemented outputs are available
(A) CMOS
(B) ECL
(C) TTL
(D) DTL

23. For odd parity, the original 7-bit binary data 000 0000 will be presented as
(A) 1000 0000
(B) 0000 1000
(C) 0000 0000
(D) 1111 1111

24. A flip-flop is
(A) always positive edge-triggered
(B) always negative edge-triggered
(C) either positive edge or negative edge-triggered
(D) neither positive nor negative edge-triggered

25. Finally an n-bit binary counter always its input clock frequency by
(A) 2^n
(B) n
(C) 2
(D) $2^{(2n)}$

26. How many 4-bit binary adders will be necessary to construct a 10-bit parallel binary adder?
(A) two
(B) one
(C) four
(D) three

27. To construct a register to store 32-bit data, we will need a minimum of
(A) 16 flip-flops
(B) 32 flip-flops
(C) 8 flip-flops
(D) 5 flip-flops

28. The resolution of a DAC is approximately 0.4 percentage of its full scale. It is
    (A) a 16-bit converter
    (B) a 10-bit converter
    (C) a 8-bit converter
    (D) a 12-bit converter

29. Choose the sequential circuit from the following
    (A) ROM
    (B) binary serial adder
    (C) binary parallel adder
    (D) digital magnitude comparator

30. In a microprocessor, the address of the next instruction is to be stored in
    (A) program counter
    (B) stack pointer
    (C) general purpose register
    (D) address latch

31. The trigonometric Fourier series of an even function of time does not have
    (A) cosine terms
    (B) sine terms
    (C) the DC term
    (D) odd harmonic terms

32. If a signal x(t) has energy E, the energy of the signal x(2t) is equal to
    (A) E
    (B) 4E
    (C) 2E
    (D) E/2

33. If the Laplace transform of a signal x(t) is X(s) = 1/s(s-1), then its final value is
    (A) -1
    (B) 0
    (C) 1
    (D) unbounded

34. $x(n) = (1/2)^n u(n)$, $y(n)=x^2(n)$, and $Y(e^{j\omega})$ be the Fourier transform of y(n). Then $Y(e^{j0})$ is
    (A) 2
    (B) 4
    (C) 4/3
    (D) 3/4

35.The z-transform X(z) of the function $x(nT) = a^{nT}$ is
(A) $z/(z+a^{T})$
(B) $z/(z-a^{T})$
(C) $z/(z+a^{-T})$
(D) $z/(z-a^{-T})$

36. Convolution of $x(t+5)$ with an impulse function $\delta(t-6)$ is equal to
(A) x(t-1)
(B) x(t-11)
(C) x(t+11)
(D) x(t+1)

37. The impulse response h[n] of a linear time-invariant system is given by h[n]=u[n+3] + u[n-2] - 2u[n-7], where u[n] is the unit step sequence. The system is
(A) stable but not causal
(B) causal but stable
(C) stable and causal
(D) unstable and not causal

38. The minimum sampling frequency for the signal $x(t) = sinc^{2}(100t)\ cos(2\pi \times 10^{6}t)$ is
(A) 100KHz
(B) 100Hz
(C) 200KHz
(D) 200Hz

39.10 MHz carrier is frequency modulated by a sinusoidal signal of 500 Hz, the maximum frequency deviation being 50 KHz. The bandwidth required, as given by the Carson's rule
(A) 101 KHz
(B) 100 KHz
(C) 120 KHz
(D) 56 KHz

40. In a PCM system with uniform quantization, increasing the number of bits from 8 to 9 will reduce the quantization noise power by a factor of
(A) 2
(B) 8
(C) 4
(D) 9

41. When the modulating frequency is doubled, the modulation index is halved, and the modulating voltage remain constant, the modulation system is
(A) phase modulation

(B) frequency modulation
(C) amplitude modulation
(D) pulse modulation

42. A 1MHz carrier is simultaneously amplitude modulated with 300Hz and 2KHz audio sine waves. Which of the following frequencies will not be present in the output?
(A) 999.7 KHz
(B) 1000.3 KHz
(C) 700 KHz
(D) 998 KHz

43. If carrier modulated by a digital bit stream had one of the possible phases of 0, 90, 180 and 270 degrees
(A) BPSK
(B) QPSK
(C) QAM
(D) BFSK

44. In 8085 microprocessor, the instruction which is one byte length but requiring three machine cycles for its execution is
(A) ADD M
(B) MOV A, B
(C) MOV B, M
(D) INR M

45. The open-loop transfer function of feedback control system is $G(s)H(s)=1/(s+1)^3$. The gain margin of the system is
(A) 8
(B) 4
(C) 2
(D) 16

46. Which one of the following system is under damped
(A) $100/(s^2+100)$
(B) $100/(s^2+5s+6)$
(C) $1/(s^2+2s+1)$
(D) $100/(s^2+10s+100)$

47. The open loop transfer function of a second order unity feed back system has no finite zeros but has finite poles at -2 and -0.1 and a d.c. gain K. The break away point in its root locus plot as K is varied from 0 to infinity is located at
(A) -1
(B) 1.05
(C) -1.05

(D) -0.9

48. The Bode plot of the transfer function C(s)/R(s) = s has
    (A) -20dB/decade slope and a phase shift of 90^0
    (B) zero magnitude and phase shift of 90^0
    (C) 20dB/decade slope and a phase shift of 90^0
    (D) constant magnitude and constant phase shift angle

49. Signal flow graph is used to find
    (A) stability of the system
    (B) transfer function of the system
    (C) poles of the system
    (D) zeros of the system

50. If a unity feedback control system with open-loop transfer function G(s) = K/s(s+1) then the steady state error of the system due to a unit step input is
    (A) zero
    (B) infinite
    (C) K
    (D) 1/K

51. A PID controller is used to compensate a system. Compared to the uncompensated system, the compensated system has
    (A) reduced damping
    (B) larger transient overshoot
    (C) increase the stability
    (D) higher noise amplification

52. The number of roots of $s^3 + 6s^2 + 7s + 3 = 0$ lie in the left half of the s-plane are
    (A) 1
    (B) 2
    (C) 0
    (D) 3

53. The equation $\nabla \times \overline{E} = \frac{\partial B}{\partial t}$ is the generalization of
    (A) Gauss's law
    (B) Ampere's law
    (C) Faraday's law
    (D) Biot-Savart's law

54. Two linearly polarised plane waves A and B travelling in free space in the positive X direction meet at a point. The wave A is polarised in the Y direction and the wave B is polarised in the Z direction. The resulting wave is linearly polarised. Therefore, A and B
    (A) must have equal amplitudes but need not be in time phase
    (B) may have different amplitudes but must be in phase with each other in time
    (C) must have equal amplitudes and must also be in time phase with each other

(D) may have different amplitudes and may also differ in time phase

55. A dispersive medium is one in which phase velocity is a function of
(A) frequency
(B) phase
(C) conductivity
(D) attenuation constant

56. When an electromagnetic wave propagating in free space incident on dielectric substrate of $\varepsilon_r = 3$, not to have any reflection, the angle of incidence is
(A) 40^0
(B) 30^0
(C) 90^0
(D) 60^0

57. In a good conductor, attenuation constant, phase constant, and intrinsic impedance vary directly as $f^{1/2}$, where as the phase velocity varies directly as
(A) f
(B) $f^{1/2}$
(C) $1/f^{1/2}$
(D) 1/f

58. The skin depth of a certain nonmagnetic conducting material is 2μm at 5GHz. The phase velocity in the material is
(A) 6×10^6 m/sec
(B) 3.14×10^4 m/sec
(C) 3×10^6 m/sec
(D) 6.28×10^4 m/sec

59. The type of time variation ($\partial/\partial t$) implied with reference to the field quantities in Maxwell's equations
(A) non-sinusoidal
(B) sinusoidal
(C) both sinusoidal and non-sinusoidal
(D) exponential

60. The electric field of an electromagnetic wave at a point in free space is in the positive Y direction and the magnetic field is in negative X- direction. The direction of power flow will be in the
(A) positive X-direction
(B) negative Z-direction
(C) positive Y-direction
(D) positive Z-direction