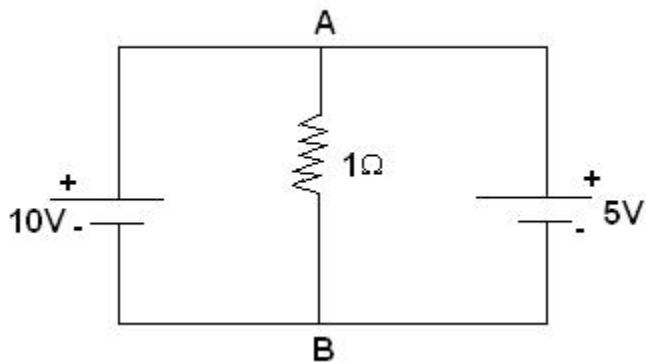1. If b is the number of branches and n the number of nodes in a connected graph, the number of links corresponding to any tree of the graph
   (A) b-n-1
   (B) b-n+1
   (C) n-b-1
   (D) n+1-b

2. KCL is a consequence law of conservation of
   (A) flux
   (B) energy
   (C) current
   (D) charge

3. The current in the 1 Ω resistor is
   (A) 15 A
   (B) 10 A
   (C) 5 A
   (D) zero

4. The voltage across 5A source in the given circuit is
   (A) 17.5 volt
   (B) 25 volt
   (C) 15 volt
   (D) 20 volt
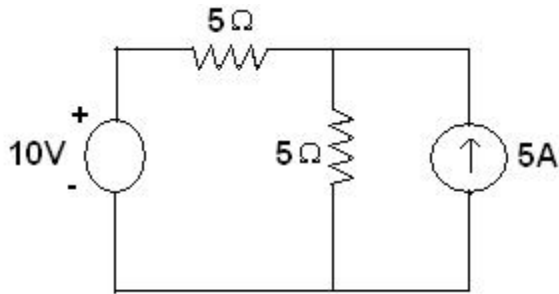
5. The impulse response of the first order system described by the differential equation
   (A) 4 (t)
   (B) e^{-4t}
   (C) $e^{-2t}u(t)$
   (D) e^{4t}

6. The voltage transfer ratio of two-port networks connected in cascade may be conveniently obtained from
   (A) sum of the Z-matrices of the two networks
   (B) sum of the h-matrices of the two networks
   (C) product of the individual ABCD matrices of the two networks
   (D) product of voltage transfer ratio of the two individual networks

7. The Laplace transform of a unit ramp function starting at t=a, is
   (A) $1/(s+a)^2$
   (B) $e^{-as}/(s+a)^2$
   (C) a/s^2
   (D) e^{-as}/s^2

8. In a pn junction diode, if the junction current is zero, this means that
   (A) there is no carriers crossing the junction
   (A) the number of majority carriers crossing the junction equals the number of minority carriers crossing the junction.
   (C) the number of holes diffusing from the p-region equals the number of electrons diffusing from the n-region
   (D)The potential barrier has disappeared

9. In a semiconductor, rate of diffusion of charge carriers
   (A) depends on the concentration gradient and the mobility
   (B) is independent of concentration gradient and the mobility
   (C) depends on the mobility alone
   (D) depends on the concentration alone

10. Avalanche breakdown in a semi-conductor diode occurs when
    (A) the potential barrier is reduced to zero
    (B) forward current exceeds a certain value
    (C) forward bias exceeds a certain value
    (D) reverse bias exceeds a certain value

11. A Schotty diode clamp is used along with switching BJT for
    (A) reducing the base current
    (B) increasing the value of
    (C) reducing the switching time
    (D) reducing the power dissipation

12. The output V - I characteristics of an enhancement type MOSFET has
    (A) an ohmic region at low voltage value followed by a saturation at high voltages
    (B) only an ohmic region
    (C) only a saturation region
    (D) an ohmic region at large voltage values preceded by a saturation region at lower voltages

13. Diffused resistors for integrated circuits
    (A) do not need isolation
    (B) can be accurately reproduced in absolute value
    (C) can be made with values above 1M
    (D) can be produced with accurate ratio between values

14. The g_m of a MOS device can increased by
    (A) decreasing its width
    (B) increasing its width
    (C) independent of width
    (D) decreasing its area

15. In a transistor h_{fe} =50, h_{ie}=830 , h_{oe}=10^{-4} mho. Its output resistance when used in CB
    configuration is about
    (A) 2M
    (B) 2.5M
    (C) 500K
    (D) 500

16. The h parameter equivalent circuit of a BJT is valid for
    (A) low frequency, large signal operation
    (B) low frequency, small signal operation
    (C) high frequency, small signal operation
    (D) high frequency, large signal operation

17. The potential divider bias is used in amplifier to
    (A) make the operating point almost independent of
    (B) reduce the cost of the circuit
    (C) limit the input ac signal going to the base
    (D) reduce the base current

18. Emitter follower is used in electronic instruments because
    (A) its voltage gain is very high
    (B) its output impedance is low and input impedance is high
    (C) its voltage gain is less than unity
    (D) its output impedance is high and input impedance is low

19. The circuit shown in the figure can be used as a
    (A) full wave rectifier
    (B) voltage to frequency converter
    (C) frequency to voltage converter
    (D) logarithmic amplifier
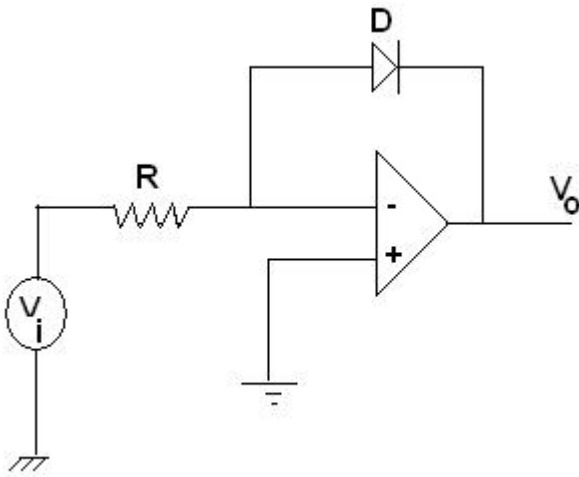

20. Tuned voltage amplifiers are not used
    (A) in radio receivers
    (B) where a band of frequencies is to be selected and amplified
    (C) in a public-address systems
    (D) in television receivers

21. In a multi-stage RC coupled amplifier, the coupling capacitor
    (A) limits the low frequency response
    (B) does not affect the frequency response

(C) limits the high frequency response

(D) blocks the d.c. component without affecting the frequency response

22. Which type of gate is shown in figure
   (A) NOR
   (B) EX-OR
   (C) OR
   (D) NAND
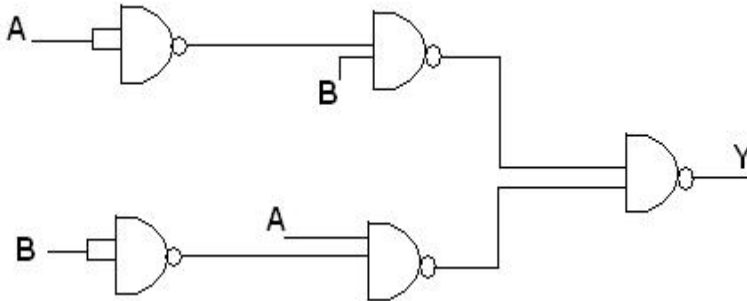
23. Which of the following is not a characteristic of a flip-flop?
   (A) the flip-flop has two inputs
   (B) the flip-flop has two outputs
   (C) the outputs are complement of each other
   (D) the flip-flop is a bistable device with only two stable states

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

25. A bit synchronous counter uses flip-flops with propagation delay time of 15ns each. The maximum possible time required for change of state will be
   (A) 30ns
   (B) 45ns
   (C) 15ns
   (D) 60ns

26. Flash ADC is
   (A) a parallel ADC
   (B) partly serial and partly parallel ADC
   (C) a serial ADC
   (D) successive approximation ADC

27. The function of accumulator in 8085 microprocessor is
    (A) to store 8-bit data
    (B) to store 16-bit data
    (C) to store 32-bit data
    (D) to store 4-bit data

28. The figure of merit of logic family is given by
    (A) (noise margin)*(power dissipation)
    (B) (propagation delay time)*(power dissipation)
    (C) gain bandwidth product
    (D) (fan-out)*(power dissipation)

29. The convolution of a function x(t) with the unit impulse function $u(t)$ is
    (A) $x(t)u(t)$
    (B) $u(t)$
    (C) $x(t)$
    (D) $x(\ddagger)u(t)$

30. A linear discrete time system has the characteristic equation, $z^3-0.81z=0$. The system
    (A) is stable
    (B) is unstable
    (C) is marginally stable
    (D) stability cannot be assessed from the given information

31. A transfer function having right-half plane zeros is
    (A) a minimum phase function
    (B) an unstable function
    (C) a constant phase function
    (D) a non-minimum phase function

32. An RC driving point function has zeros at s=-2 and s = -5. The admissible poles for the
    function
    (A) s= 0, s= -6
    (B) s= -3, s= -4
    (C) s=-1, s=-4
    (D) s= 0, s= -1

33. Which one of the following is the region of convergence (ROC) for the sequence
$x[n] = b^n u(n) + b^{-n} u(-n-1); \; |b| < 1$?

(A) annular strip in the region $b > |z| > \dfrac{1}{b}$

(B) region $|z| > 1$

(C) region $|z| < 1$

(D) annular strip in the region $b < |z| < \dfrac{1}{b}$

34. The minimum sampling frequency for the signal $x(t) = sinc^2(100t)cos(2000000 \; t)$ is
   (A) 100Hz
   (B) 200Hz
   (C) 200KHz
   (D) 100KHz

35. A unity feedback control system has a forward path transfer function equal to
   $$\frac{42.25}{s(s+6.5)}$$
   The unit step response of this system starting from rest, will have its maximum value at a time equal to
   (A) ∞
   (B) 0 sec
   (C) 0.56 sec
   (D) 0.65 sec

36. A system has 12poles and 2 zeros. Its high frequency asymptote in its magnitude plot has a slope of
   (A) 200dB/decade
   (B) -240dB/decade
   (C) -280dB/decade
   (D) -200dB/decade

37. When all roots of the characteristic equation are found in the left half of s-plane , the system response due to initial condition will
   (A) decreases to zero as time approaches infinity
   (B) increase to infinity as time approaches infinity
   (C) be oscillating
   (D) remain constant for all time

38. A second order system exhibits 100% overshoot.   Its damping coefficient is
    (A) greater than one
    (B) less than one
    (C) equal to zero
    (D) equal to one

39. The open-loop transfer function of a unity feedback control system is $G(S)=1/(S+2)^2$.
    The closed -loop transfer function will have poles at
    (A) -2, -2
    (B) -2, -1
    (C) -2$\pm$j
    (D) -2, 2

40. In the root-locus for open loop transfer function $G(s)H(s) =K(s+6)/(s+3)(s+5)$, the break
    away and break in points are located respectively at
    (A) -2.47 and -3.77
    (B) 2.47 and 3.77
    (C) -2, and -1
    (D) -2.47 and 3.77

41. Which one of the following is an example of open-loop system?
    (A) Aqualung
    (B) a windscreen
    (C) a system for controlling anti rocket missiles
    (D) respiratory system of an animal

42. A 1000 KHz carrier is simultaneously modulated with 300 Hz and 2 KHz audio sine waves.
    Which of the following frequencies will not be present in the output?
    (A) 998 KHz
    (B) 1000.3 KHz
    (C) 999.7 KHz
    (D) 700 KHz

43. In the spectrum of a frequency-modulated signal
    (A) the carrier frequency cannot disappear
    (B) the total number of sidebands depends on the modulation index
    (C)) the amplitude of any sidebands depends on the modulation index
    (D) the carrier frequency disappears when the modulation index is very large

44. In a radio receiver with simple AGC
    (A) an increase in signal strength produces more AGC
    (B) the faster the AGC time constant, the more accurate the output
    (C) the highest AGC voltage is produced between stations
    (D) the audio stage gain is normally controlled by the AGC

45. To prevent overloading of the last I.F. amplifier in a receiver, one should use
    (A) double conversion
    (B) variable selectivity
    (C) variable sensitivity
    (D) squelch

46. A certain low pass signal x(t) is sampled and the spectrum of the sampled version has guard band from 1500 Hz to 1900 Hz. The sampling frequency used is
    (A) 3400 samples/sec
    (B) 1700 samples/sec
    (C) 1500 samples/sec
    (D) 1900 samples/sec

47. In a PCM the amplitude levels are transmitted in a 7 unit code. The sampling is done at the rate of 10Hz. The bandwidth should be
    (A) 5MHz
    (B) 35KHz
    (C) 35MHz
    (D) 5KHz

48. Of error among the following is
    (A) non- For a specified average transmitted power, the system that gives the lowest
        probability coherent FSK system
    (B) coherent ASK
    (C) coherent FSK system
    (D) PSK system

49. Which multiplexing technique transmits analog signal
    (A) FDM
    (B) TDM
    (C) WDM
    (D) CDMA

50. The equation $\nabla \times \bar{E} = \dfrac{\partial B}{\partial t}$ is the generalization of

    (A) Gauss's law

    (B) Ampere's law

    (C) Faraday's law

    (D) Biot-Savart's law

51. 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) must have equal amplitudes and must also be in time phase with each other

    (C) may have different amplitudes but must be in phase with each other in time

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

52. Characteristic impedance of line is

    (A) $Z_0 = \sqrt{\dfrac{G + j\check{S}C}{R + j\check{S}L}}$

    (B) $Z_0 = \sqrt{(R + j\check{S}L)(G + j\check{S}L)}$

    (C) $Z_0 = \dfrac{1}{\sqrt{(R + j\check{S}L)(G + j\check{S}C)}}$

    (D) $Z_0 = \sqrt{\dfrac{R + j\check{S}L}{G + j\check{S}C}}$

53. The dominant mode in a waveguide is characterized by

    (A) zero attenuation

    (B) longest cutoff wavelength

    (C) infinite attenuation

    (D) shortest cutoff wavelength

54. One of the following consists of non-resonant antennas

    (A) the rhombic antenna

    (B) the broadside array

    (C) the folded dipole

    (D) the end-fire array

COLLEGEDUNIA

55. Fibres have numerical aperture in the region of 0.15 to 0.4. Fibres with higher numerical aperture values exhibit
    (A) high bandwidth
    (B) reduced losses
    (C) reduced losses and low bandwidth
    (D) greater losses and low bandwidth

56. The input impedance of a CRO is nearly
    (A) around 10
    (B) around 1M
    (C) zero ohm
    (D) around 100

57. A signal of 12mV at 20MHz is to be measured. Which of the following instrument can be used?
    (A) VTVM
    (B) digital multimeter
    (C) cathode ray oscilloscope
    (D) moving iron voltmeter

58. The output of a piezoelectric effect crystal has
    (A) low amplitude and low impedance
    (B) high amplitude and high impedance
    (C) high amplitude and low impedance
    (D) low amplitude and high impedance

59. The most serious source of error in ac bridge measurement is
    (A) eddy currents
    (B) stray fields
    (C) leakage currents
    (D) residual imperfectness

60. Capacitive transducer is superior to inductive type for the measurement of displacement because
    (A) high frequency response
    (B) high accuracy
    (C) absence of non-linearity
    (D) small size

COLLEGEDUNIA

K E Y

1	2	3	4	5	6	7	8	9	10
B	D	D	A	A	C	D	B	A	D

11	12	13	14	15	16	17	18	19	20
C	A	D	B	C	B	A	B	D	C

21	22	23	24	25	26	27	28	29	30
A	B	A	D	C	A	A	B	C	A

31	32	33	34	35	36	37	38	39	40
D	A	C	B	A	D	B	C	C	A

41	42	43	44	45	46	47	48	49	50
B	D	C	A	C	A	B	C	A	C

51	52	53	54	55	56	57	58	59	60
C	D	B	A	D	B	C	D	B	A