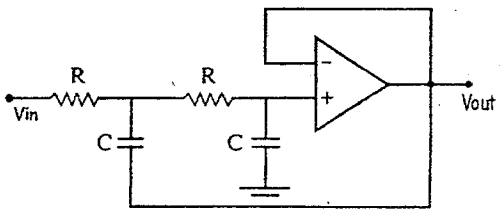
1. The circuit shown in figure is a



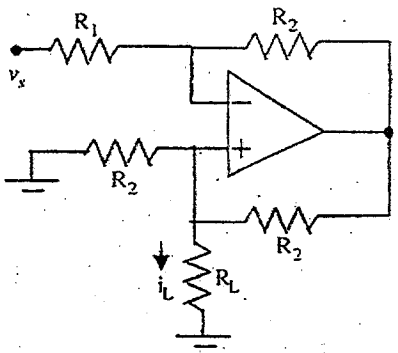
(a) Low-pass filter

(b) High-pass filter

(c) Band-pass filter

(d) Band-reject filter

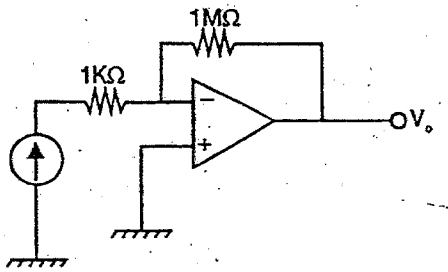
2. In the op-amp circuit given in figure, the load current i_L is



(a) $-\frac{v_s}{R_2}$ (b) $\frac{v_s}{R_2}$

(c) $-\frac{v_s}{R_L}$ (d) $\frac{v_s}{R_1}$

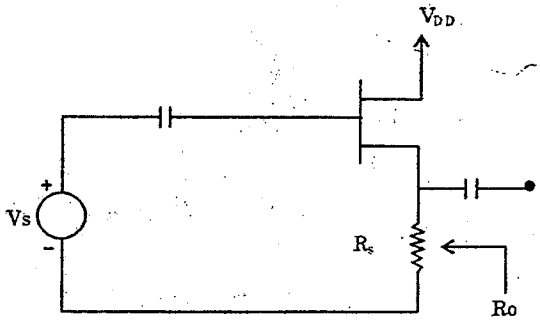
3. An op-amp has an offset voltage of 1 mV and is ideal in all other respects. If this op-amp is used in the circuit shown in figure, the output voltage will be



(a) 1mV (b) 1V

(c) ±1V (d) 0V

4. For the circuit shown above if $g_m = 3\times10^{-3}$ and $R_S = 3000\Omega$, then the approximate value of R_o is



(a) 3000 Ω (b) 1000/3 Ω

(c) 300 Ω (d) 100 Ω

5. **Where does the operating point of a class-B power amplifier lie?**

(a) At the middle of $a.c$ load line
(b) Approximately at collector cut-off on both the $d.c$ and $a.c$ load lines
(c) Inside the collector cut-off region on $a.c$ load line
(d) At the middle point of $d.c$ load line

6. **The Laplace transform of e^{-2t} is**

(a) $\frac{1}{2s}$ (b) $\frac{2}{s}$ (c) $\frac{2}{s+1}$ (d) $\frac{1}{s+2}$

7. **The system with characteristic equation $s^4 + 3s^3 + 6s^2 + 9s + 12 = 0$**

(a) Stable (b) Unstable (c) Marginally stable (d) Marginally unstable

8. **Compared to field effect photo transistors, bipolar photo transistors are**

(a) More sensitive and faster
(b) Less sensitive and slower
(c) More sensitive and slower
(d) Less sensitive and faster

9. **The output V-I characteristics of an enhancement type MOSFET has**

(a) Only an ohmic region
(b) Only a saturation region
(c) An ohmic region at low voltage value followed by a saturation region at higher voltages
(d) An ohmic region at large voltage values preceded by a saturation region at lower voltages

10. **Which of the following relation is valid?**
Where $MTBF$ = Mean Time Between Failures
$MTTF$ = Mean Time To Failures
$MTTR$ = Mean Time To Repair

(a) $MTBF = MTTF + MTTR$
(b) $MTTR + MTTF + MTBF = 1$
(c) $\frac{1}{MTTR} + \frac{1}{MTTF} = \frac{1}{MTBF}$
(d) $MTBF.MTTF.MTTR = 1$

11. **Two transistors have the same value of α but different gain bandwidth products. One of them is a germanium transistor and the other is a silicon transistor. Both the transistors have similar geometries and base width. The transistor with lower GB product**

(a) is the germanium
(b) is the silicon
(c) both are same
(d) Cannot be identified unless more information is available

12. **The following transistor configuration has the highest input impedance**

(a) CC (b) CE (c) CB (d) All of the above

13. If t_c, h and t_m specify the cache access time, hit ratio and main memory access time then the average access time is (given t_c = 160ns, t_m =960ns h=0.90)
(a) 160 ns (b) 960 ns (c) 256 ns (d) 960×0.9 ns

14. The advantage of write (copy) back data cache organization over write through organization is
(a) Main memory consistency (b) Write allocate on write miss
(c) Less memory bandwidth requirement (d) Higher capacity

15. E^2PROM storage element is
(a) Cross – coupled latch (b) Isolated gate transistor
(c) Capacitor (d) Flip flop

16. The modulus of $1+\cos\alpha+i\sin\alpha$ is
(a) $2\sin\frac{\alpha}{2}$ (b) $2\cos\frac{\alpha}{2}$ (c) $\sin^2\frac{\alpha}{2}-1$ (d) $\cos^2\frac{\alpha}{2}-1$

17. The 8 bit DAC produces 1.0 V for a digital input of 00110010. What is the largest output it can produce?
(a) 5V (b) -5V (c) 5.5 V (d) 5.10 V

18. The fastest ADC among the following is
(a) Successive approximation type (b) Dual slope type
(c) Sigma – Delta ADC (d) Flash converter

19. The mod number of a Johnson counter will be always equal to ..... the number of flip flops used
(a) same (b) twice
(c) 2^N where N is the number of flip flops (d) None of the these

20. Odd parity generator uses ..... logic
(a) XNOR (b) XOR (c) Sequential (d) OR

21. Which type of memory has fast erase and write times
(a) EPROM (b) EEPROM (c) Flash memory (d) None of these

22. The performance gain that can be obtained by improving some portion of a computer can be calculated using
(a) Moore's law (b) Djikstra's algorithm
(c) Amdahl's law (d) Murphy's law

23. **Microprogramming refers to**

(a) Emulation
(b) Programming at micro level
(c) The use of storage to implement the control unit
(d) Array processing

24. **An array processor is a ..... machine**

(a) SIMD (b) MIMD (c) SISD (d) MISD

25. **---------- machines tend to make use of internal resources of the processor, a rich set of registers and a pipelined organization.**

(a) CISC (b) Parallel processor (c) RISC (d) Array processor

26. **Difference between a switch and Hub**

(a) Both are same
(b) Switch avoids flooding
(c) Hub avoids broadcast
(d) None of the above

27. **100 Base T refers to**

(a) Fibre connectivity (b) BNC connectors (c) SONET (d) Twisted pair

28. **A S-R flip flop with a clock input can be converted to a 'D' flip flop using**

(a) Two inverters
(b) the flip flop outputs (Q& $\overline{Q}$) connected to its inputs (S&R)
(c) One inverter
(d) Not possible

29. **An 8 bit ADC has a full scale input of 2.55 V. If other cumulative errors are 2.55 mV, determine the maximum error**

(a) 10 mV (b) 12.55 mV (c) 7.45 mV (d) 2.55 mV

30. **A counter is designed with six stages of flip flops. Determine the output frequency at the last (sixth) stage, when input frequency is 1 MHz.**

(a) 1 MHz (b) 166 KHz (c) 15.625 KHz (d) zero

31. **The ethernet protocol uses**

(a) CSMA/CA (b) SCPC (c) CSMA/CD (d) Slotted ALOHA

32. **The value of c which makes the angle 45^0 between $\overline{a} = i + cj$ and $\overline{b} = i + j$ is**

(a) 1 (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{-1}{\sqrt{2}}$ (d) 0

33. In a daisy chained connection to the CPU, the peripheral whose interrupt request has the highest priority is the one

(a) With the largest vector address
(b) With highest speed of operation
(c) Electrically nearest to the CPU
(d) Electrically farthest from the CPU

34. RS-232 interface

(a) Uses only positive voltage
(b) Cannot transmit signals over long distance
(c) Uses only negative voltage
(d) A logic high uses positive voltage

35. Assuming ideal conditions, the speed up obtained from a balanced N stage pipeline is

(a) 2N (b) N^2 (c) N (d) N!

36. The number of comparators required in an 8-bit flash-type A/D converter is

(a) 256 (b) 255 (c) 9 (d) 8

37. Minimum number of 2-input NAND gates that will be required to implement the function: Y = AB + CD + EF is

(a) 4 (b) 5 (c) 6 (d) 7

38. In a ripple counter how many changes in state happen when count changes from 7 to 8?

(a) 1 (b) 2 (c) 3 (d) 4

39. A programmable device (PROM) is

(a) programmable OR and fixed AND array
(b) programmable AND and fixed OR array
(c) programmable AND and programmable OR array
(d) none

40. In asynchronous circuits, which of the following best explains a dynamic hazard

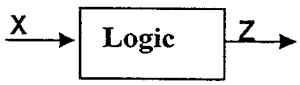
(a) Output changes several times for a single change in an input
(b) Output changes to a different state for a single change in an input
(c) Output changes momentarily when it is supposed to remain constant for a single change in an input
(d) None of the above

41. Digital signal processors use a computer architecture derived from

(a) Harvard Architecture
(b) Von-Neumann Architecture
(c) Cray Architecture
(d) None of the above

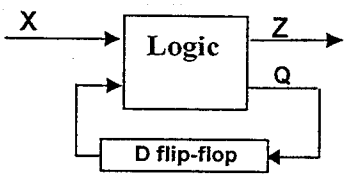
42. Which of the following represents the Moore model for sequential circuits?

(a)

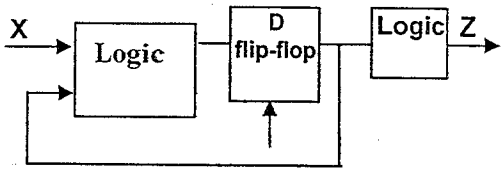


(b)

(c)



(d)



43. An anti-aliasing filter is

(a) An analog filter (b) A digital filter (c) Can be analog or digital (d) None of the above

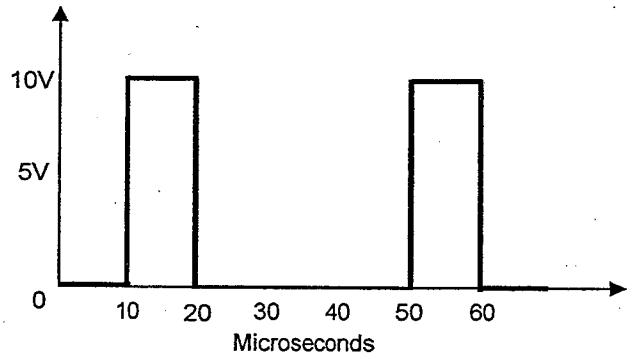
44. Which of the following filter has the fastest roll-off ?

(a) R-C (b) Bessel (c) Butterworth (d) Chebyshev

45. Find the rms value of the signal $x(t) = 5\cos\left(50t + \frac{\pi}{3}\right)$

(a) $\sqrt{5}$ (b) $\sqrt{5 \times 50t}$ (c) $\sqrt{50 + \frac{\pi}{3}}$ (d) $\sqrt{12.5}$

46. Determine the value indicated by a DC voltmeter for the waveform given below



(a) 0 V (b) 2.5 V (c) 10 V (d) 5 V

47. Evaluate the function $\int_0^\infty t^2 \delta(t-3)dt$

(a) e^{-t^2} (b) $\frac{t^3}{3}$ (c) $t^2(t-3)$ (d) 9

48. A husband and wife appear in an interview for two vacancies for same post. The probability of husband getting selected is $\frac{1}{5}$ while the probability of wife getting selected is $\frac{1}{7}$. Then the probability that anyone of them getting selected is

(a) $\frac{11}{35}$ (b) $\frac{12}{35}$ (c) $\frac{1}{35}$ (d) $\frac{34}{35}$

49. The rms value of Complex waveforms are measured using

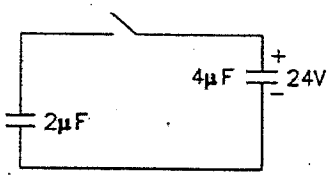
(a) Transistor Voltmeter
(b) Differential Voltmeter
(c) High bandwidth Voltmeter
(d) Voltmeter containing heat sensing elements such as thermocouples

50. Find the fundamental period T of the following continuous signal

$x(t) = 20\cos(10\pi t) + \frac{\pi}{6}$

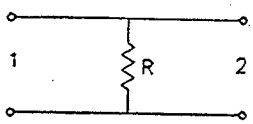
(a) $\frac{\pi}{6}$ sec (b) $\frac{20\times 10\pi}{T}$ sec (c) 5 sec (d) $\frac{1}{5}$ sec

51. In the circuit shown the switch closes at t=0. The voltage across $4\mu F$ capacitor in ideal condition changes to



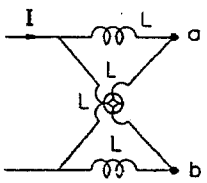
(a) 0 (b) 16 V
(c) 15 V (d) 24 V

52. The 2- part network of Fig A has open circuit impedance parameters given by matrix



(a) $\begin{bmatrix} R & R \\ R & R \end{bmatrix}$ (b) $\begin{bmatrix} R & 0 \\ 0 & R \end{bmatrix}$ (c) $\begin{bmatrix} \infty & R \\ R & \infty \end{bmatrix}$ (d) $\begin{bmatrix} R & \infty \\ \infty & R \end{bmatrix}$

53. The network shown in the figure draw a current I. If the ends a and b are shorted, the current drawn would be

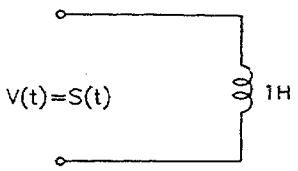


(a) 6 I (b) 4 I
(c) 2 I (d) I

54. As compared to a full-wave rectifier using two diodes, the four diode bridge rectifier has the dominant advantage of

(a) higher current carrying capacity
(b) lower peak inverse voltage
(c) lower ripple factor
(d) higher efficiency

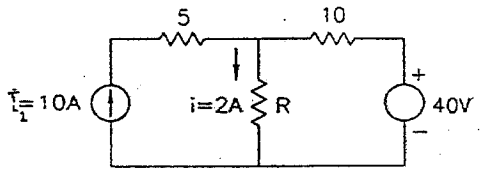
55. When a unit impulse voltage is applied to an inductor of 1 H , the energy supplied by the source is



(a) ∞ (b) $1J$

(c) $\frac{1}{2}J$ (d) 0

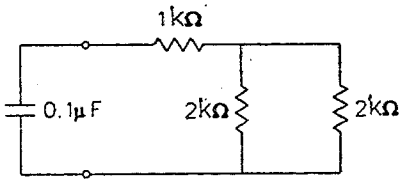
56 The value of R for i = 2A is



(a) 5 (b) 10

(c) 40 (d) 60

57. The time constant for the circuit shown below is



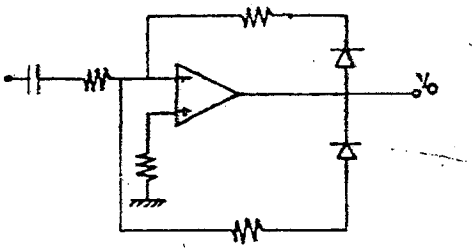
(a) 0.2 microsecond

(b) 0.8 millisecond

(c) 0.4 millisecond

(d) 0.2 millisecond

58. For a sinusoidal input, the circuit shown in the figure will act as a



(a) Pulse generator

(b) Ramp generator

(c) Full-wave rectifier

(d) Voltage doubler

59. A second-order band-pass active filter can be obtained by cascading a low pass second order section having cut off frequency f_{OH} with a high pass second order section having cut-off frequency f_{OL} provided

(a) $f_{OH} > f_{OL}$ (b) $f_{OH} < f_{OL}$ (c) $f_{OH} = f_{OL}$ (d) $f_{OH} \leq \frac{1}{2} f_{OL}$

60. If $\alpha = 0.995$, $I_E = 10$ mA and $I_{CO} = 0.5\ \mu$A, then I_{CEO} will be

(a) 100 μA (b) 10.1 mA (c) 25 μA (d) 10.5 mA

61. **A programme having features such as data abstraction, encapsulation and data hiding, polymorphism inheritance is called**

(a) Structured programme
(b) Object oriented programme
(c) Open source programme
(d) Real time programme

62. **The library function exit ( ) causes as exit from**

(a) the loop in which it occurs
(b) the block is which it occurs
(c) the functions in which it occurs
(d) the programme in which it occurs

63. **The "go to statement" causes control to go to**

(a) An operator (b) A label (c) A variable (d) A function

64. **The differential equation satisfying** $y = A e^{3x} + B e^{2x}$ **is**

(a) $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} - 6y = 0$
(b) $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$
(c) $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = 0$
(d) $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} - 6y = 0$

65. **For an energy signal g(t) and its time-shifted version *f* (t-T),the**

(a) amplitude spectra are identical and their phase spectra are also identical
(b) amplitude spectra are identical but their phase spectra are different
(c) amplitude spectra are different but their phase spectra are identical
(d) amplitude spectra and their phase spectra are different

66. **As the modulation index of an FM signal with sinusoidal modulation is increased from zero to two, the power in the carrier component will**

(a) Decrease continuously
(b) Increase continuously
(c) First increase, becomes zero and then decrease
(d) First decrease, become zero and then increase

67. **For a short wave radio link between two stations via the ionosphere, the ratio of the maximum usable frequency to the critical frequency**

(a) is always less than 1
(b) May be ≤ 1 depending on the distance between the two stations
(c) is always greater than 1
(d) Does not depend on the distance between the two stations

68. **A carrier voltage is simultaneously modulated by two sine waves causing modulation indices of 0.4 and 0.3. The overall modulation index is**

(a) 0.35
(b) 0.7
(c) 0.5
(d) Can not be calculated unless the phase relations are known

69. **If each stage has a gain of 10 dB, and noise figure of 10dB, then the overall noise figure of a two-stage cascade amplifier will be**

(a) 10 (b) 1.09 (c) 1.0 (d) 10.9

70. **De- emphasis circuit is used**

(a) To attenuate high frequencies
(b) To attenuate low frequencies
(c) To attenuate midband frequencies
(d) None of the above

71. **An amplifier has an input power of 2 microwatts. The power gain of the amplifier is 60 dB. The output power will be**

(a) 6 microwatts (b) 120 microwatts (c) 2 milliwatts (d) 2 watts

72. **A transmission line has a VSWR of 2, the reflection coefficient is**

(a) $\frac{1}{3}$ (b) 0 (c) $\frac{1}{4}$ (d) $\frac{1}{2}$

73. **Which vacuum based device is widely used as a power amplifier in satellite communication systems?**

(a) Amplitron (b) Klystron (c) Magnetron (d) TWT

74. **Maxwell's equations establish the relationship between $\overline{E}, \overline{D}, \overline{H}$ and $\overline{B}$ at any point in a continuous medium. When we move from one medium to another, then which of the following statement is correct**

(a) At the boundary separating the two media, the tangential components of $\overline{E}$ and $\overline{H}$ are continuous
(b) At the boundary separating the two media the tangential components of only $\overline{E}$ are continuous
(c) If there are surface charges present on the boundary then normal component of $\overline{D}$ is continuous
(d) If there are no surface charges then normal component of $\overline{D}$ is discontinous

75. **The input impedance of short circuited lossless line of length less than a quarter wavelenth is**

(a) Purely resistive (b) Purely inductive (c) Purely capacitive (d) Complex

76. The intrinsic impedance of free space is 377 Ω. The approximate intrinsic impedance of a medium with relative premittivity and permeability of 4 and 1 respectively will be

(a) 75 Ω (b) 94 Ω (c) 188 Ω (d) 377 Ω

77. A 8 kHz communication channel has an SNR of 30 dB. If the channel bandwidth is doubled, keeping the signal power constant, the SNR for the modified channel will be

(a) 27 dB (b) 30 dB (c) 33 dB (d) 60 dB

78. Two orthogonal signals $s_1(t)$ *and* $s_2(t)$ satisfy the following relation

(a) $\int_0^T s_1(t)s_2(t)dt = 0$ (b) $\int_0^T s_1(t)s_2(t)dt = 1$

(c) $\int_0^T s_1(t)s_2(t)dt = \infty$ (d) $\int_0^T s_1(t)s_2(t)dt = \pi$

79. In which modulation system, when modulating frequency is doubled, the modulation index also becomes double.

(a) AM (b) FM (c) PM (d) None of the above

80. The matrix $A = \begin{bmatrix} -4 & -3 & -3 \\ 1 & 0 & 1 \\ 4 & 4 & x \end{bmatrix}$ is its own adjoint. The value of x will be

(a) 5 (b) 3 (c) -3 (d) -5