1. A first order high pass filter has a cut-off frequency of 1 KHz. An input of 100 Hz is applied with an amplitude of 1V. What will be the output of the filter?

   (a) 0.1 V
   (b) 0 V
   (c) 2.5 V
   (d) 1 V

2. If an input is activated by a single transition, it is called …

   (a) level triggered
   (b) clock triggered
   (c) pulse triggered
   (d) edge triggered

3. In a 8085 microprocessor, which element stores the results of the Arithmetic and Logic Unit (ALU)?

   (a) Temporary register
   (b) Accumulator
   (c) Program counter
   (d) Address buffer

4. (A+B)' is same as

   (a) A . B
   (b) A' . B'
   (c) A' + B'
   (d) A + B

5. In a BJT, the base current is $2\mu A$. $\beta = 100$. What is the collector current and emitter current respectively?

    (a) $200\mu A, 198\mu A$
    (b) $100\mu A, 102\mu A$
    (c) $201\mu A, 200\mu A$
    (d) $200\mu A, 202\mu A$

6. In which region of the RF spectrum is satellite communication done?

    (a) Terahertz bands (> 100 GHz)
    (b) Low frequency bands (30 KHz - 300 KHz)
    (c) High Frequency bands (3 - 30 MHz)
    (d) Microwave bands (1 - 100 GHz)

7. A down-converter mixer

    (a) Converts RF to RF
    (b) Converts RF to IF
    (c) Converts IF to IF
    (d) Converts IF to RF

8. What is the full form of VCO and PLL?

    (a) Voltage Controlled Oscillator and Phase Locked Loop
    (b) Voltage Constant Oscillator and Phase Loss Loop
    (c) Voltage Controlled Oscillator and Phase Loss Loop
    (d) Voltage Constant Oscillator and Phase Locked Loop

9. If a keyboard with 80 keys needs to be interfaced with a microcontroller, how many bits need to be used to represent all the keys?

    (a) 7 bits
    (b) 8 bits
    (c) 6 bits
    (d) 5 bits

10. A super-heterodyne receiver is designed to receive a 1 GHz signal. The local oscillator frequency is 900 MHz. What is the image frequency that should be rejected?

   (a) 900 MHz
   (b) 1.1 GHz
   (c) 800 MHz
   (d) 2 GHz

11. If 3 amps flows through a 1 ohm resistor, what is the voltage dropped?

   (a) 1/3 V
   (b) 1/9 V
   (c) 3 V
   (d) 9 V

12. How many bits input does a K-map for full adder have?

   (a) 3
   (b) 4
   (c) 2
   (d) 8

13. A 300 V voltmeter has 2% full scale error. If the voltmeter reads 200 V, the actual voltage lies between …

   (a) exactly 200 V
   (b) 196 V - 204 V
   (c) 194 V - 206 V
   (d) 198 V to 202 V

14. Convert 1001 1000 1011 1010 1100 0101 into hexa-decimal number.

   (a) 98BAC5
   (b) 88BAC5
   (c) A8BAC5
   (d) 98CAB5

15. A circuit consists of a comparator, where one of the input terminals is connected to a rail-to-rail triangle wave and the other is connected to the input signal. What type of modulation do you get at the output of the comparator?

    (a) Pulse Position Modulation
    (b) Pulse Code Modulation
    (c) Delta Modulation
    (d) Pulse Width Modulation

16. Choose the most accurate voltmeter.

    (a) 100 V, 0.2 A
    (b) 100 V, 20 mA
    (c) 100 V, 10 mA
    (d) 100 V, 0.1 A

17. What is the element used in spike buster?

    (a) Varactor
    (b) Resistor
    (c) Inductor
    (d) Varistor

18. If an inductive load is fed from a square wave voltage, which of the following is true?

    (a) The fundamental component is in phase with respect to the applied voltage.
    (b) The fifth harmonic current amplitude is 1/25th of the fundamental current amplitude.
    (c) The current through the inductor is sinusoidal.
    (d) The current through the inductor is a square wave.

19. Which of the following memories does not get erased when powered off?

    (a) Cache
    (b) DRAM
    (c) SRAM
    (d) ROM

20. A receiver consists of an envelope detector and comparator. What type of digital modulation can it handle?

   (a) ASK/OOK
   (b) FSK
   (c) PSK
   (d) None of the above

21. A ground station transmits 500W power. The loss is measured to be 120 dB. What is the received power at the satellite?

   (a) 500 pW
   (b) 500 μW
   (c) 500 fW
   (d) 500 nW

22. What is the output voltage of following circuit?
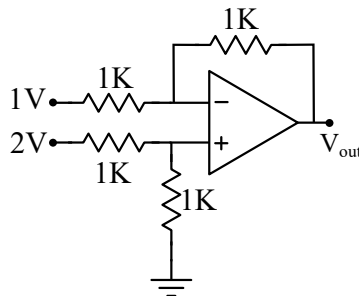

   (a) 3 V
   (b) 2 V
   (c) 0.5 V
   (d) 1 V

23. In which layer of the TCP/IP protocol is the IP addresses handled?

   (a) Host-to-Host/Transport layer
   (b) Network access/Link layer
   (c) Internet layer
   (d) Process/Application layer

24. One unit of electrical energy is equivalent to …

    (a) 1 KJ
    (b) 1 kWh
    (c) 1 hp
    (d) 1 Wh

25. What is the job of a compiler in a microcontroller programming?

    (a) Translates a high-level language program to machine language
    (b) Translates a high-level language program to assembly language
    (c) Translates a assembly language program to machine language
    (d) Translates a machine language program to assembly language

26. Which of the following statements is true regarding 3-phase power measurement by two watt-meter method?

    (a) Measurement can only be made for star connected loads.
    (b) If both the meters read equal and opposite values, the power factor is zero.
    (c) The sum of the values shown is 2/3 of the total power.
    (d) Measurement can only be made for delta connected loads.

27. Which of the following statements is true for an opamp?

    (a) Opamp has low input resistance
    (b) Gain of an opamp is zero
    (c) Opamp has high input resistance
    (d) Opamp has high output resistance

28. What is the output of the following circuit?

$V_{dd} = 15V$

300R

5V

1K

V_{out}

V_{in}

0V
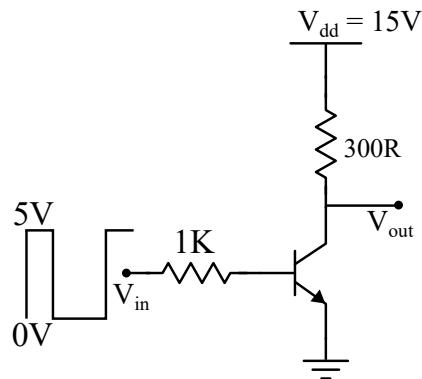
    (a) Toggles between 0V to 15V, inverting
    (b) Toggles between 0V to 5V, non-inverting
    (c) Toggles between 0V to 15V, non-inverting
    (d) Toggles between 0V to 5V, inverting

29. Consider the circuit shown below. The input is a sinewave of 5V amplitude. What will the output be?

R1

In   Out

+2V
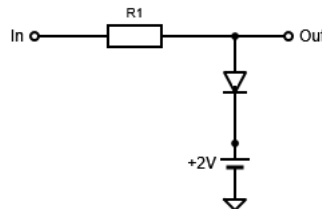
Assume the diode drop to be 0.

    (a) Full sinewave of 2V amplitude
    (b) Full sinewave of 5V amplitude
    (c) Sinewave clipped at -2V
    (d) Sinewave clipped at +2V

30. If two resistors of value $100 \, \Omega \pm 1\%$ is connected in series, the total resistance is ...

    (a) $200 \pm 1\%$
    (b) $100 \pm 1\%$
    (c) $100 \pm 2\%$
    (d) $200 \pm 2\%$

31. In a 555 timer, the three 5 $k\Omega$ resistors provide a trigger level of

    (a) $1/2V_{cc}$ and a threshold voltage of $2/3V_{cc}$
    (b) $2/3V_{cc}$ and a threshold voltage of $1/3V_{cc}$
    (c) $1/3V_{cc}$ and a threshold voltage of $1/2V_{cc}$
    (d) $1/3V_{cc}$ and a threshold voltage of $2/3V_{cc}$

32. What is the operation of the following circuit?
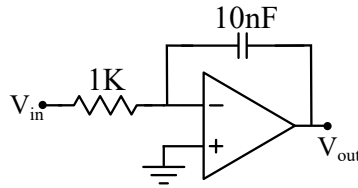
    (a) high pass filter
    (b) integrator
    (c) summer
    (d) differentiator

33. The input-output relationship for an inverting amplifier is …
    R_f is feedback resistor, R_{in} is the input resistor.

    (a) $V_o = -\dfrac{R_f}{R_{in}}V_{in}$

    (b) $V_o = \dfrac{R_{in}}{R_f}V_{in}$

    (c) $V_o = -\dfrac{-R_f}{R_{in}}V_{in}$

    (d) $V_o = -\dfrac{-R_{in}}{R_f}V_{in}$

34. What should be the sequence of elements in a receiver?

    (a) Mixer, low noise amplifier, low pass filter, band pass filter
    (b) Low noise amplifier, low pass filter, mixer, bandpass filter
    (c) Band pass filter, mixer, low noise amplifier, low pass filter
   (d) Band pass filter, low noise amplifier, mixer, Low pass filter

35. In which of the configurations of the BJT, does the gain always remain slightly less than unity?

   (a) Common Collector
   (b) Common Emitter
   (c) Common Base
   (d) None of the above

36. The 8051 microcontroller is used in 16-bit timer mode. If the clock frequency is 100 KHz, and the timer starts from 0x0000, what will be the timer value in decimal, when it reaches 100 millisecond?

   (a) 100000
   (b) 10000
   (c) 1000
   (d) 1000000

37. What is the current through resistor R_L?
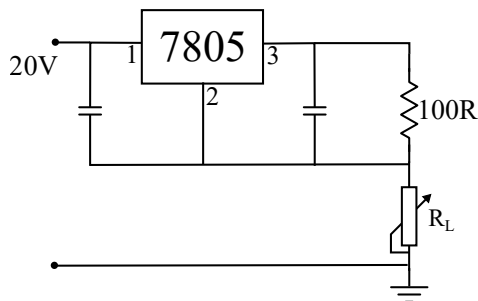
   (a) 50 mA
   (b) 5 mA
   (c) 500 mA
   (d) 1.5 A

38. In a programmable keyboard controller, interfaced to a micrcontroller, which of the following describes the interrupt mode of interface?

    (a) The CPU checks periodically, but it also gets interrupted when a key is pressed.
    (b) The CPU periodically reads an internal flag of the controller to check whether any key is pressed or not.
    (c) The processor is requested service only if any key is pressed, otherwise the CPU will continue with its main task.
    (d) None of the above

39. What are the states in a tristate buffer?

    (a) HIGH and LOW
    (b) HIGH, LOW and low impedance
    (c) HIGH, LOW and high impedance
    (d) HIGH, LOW and short

40. A circuit is required to produce a square wave of time period $500\mu s$. Which of the following circuits should be used?

    (a) Bistable multivibrator
    (b) Comparator
    (c) Astable multivibrator
    (d) Monostable multivibrator

41. What is the BCD code for the number $(21)_{10}$?

    (a) 10101
    (b) 11001
    (c) 10001
    (d) 10111

42. The function of shunt resistance in an ammeter is …

    (a) to increase sensitivity
    (b) to bypass current
    (c) to decrease range
    (d) to drop voltage

43. If a 10-bit ADC is used to sense voltage between 0 to 3 V, what is the resolution of the ADC?

    (a) 2.92 μV
    (b) 2.92 mV
    (c) 1 bit
    (d) 300 mV

44. If resistance has to be measured by voltmeter-ammeter method, the voltmeter can be connected across the source, or the resistance. If the resistance is low, the voltmeter should be connected ...

    (a) prefereably across source
    (b) across the source
    (c) in any position
    (d) across the resistor

45. What happens inside an optocoupler?

    (a) Optical to electrical conversion followed by electrical to optical conversion
    (b) Optical to magnetic conversion followed by magnetic to optical conversion
    (c) Optical to optical conversion
    (d) Electrical to optical conversion followed by optical to electrical conversion

46. If the SOP form of a look-up-table is given as $\sum$A, B, C(1, 3, 6, 7), the expression is equal to

    (a) (A'C+AB)
    (b) (AC+B'C)
    (c) (CB+B'C')
    (d) (AC+BC')

47. A transmitter consists of an oscillator in which the input signal (message signal) is fed to a varactor. What type of modulation will be produced?

    (a) Amplitude modulation
    (b) Pulse width modulation
    (c) Frequency modulation
    (d) None of the above

48. A network topology in which the nodes are so connected that at least some or all have multiple paths to other nodes is called as

    (a) Star
    (b) Mesh
    (c) Ring
    (d) None of the above

49. The BCD number of 1001 1010 1011 has ...

    (a) no parity
    (b) odd parity
    (c) parity can not be determined
    (d) even parity

50. A full bridge inverter is fed from a DC supply of voltage V_{dc} and is switching in square wave mode. What is the peak fundamental voltage generated at the output?

    (a) $\dfrac{4V_{dc}}{\pi}$
    (b) V_{dc}
    (c) $V_{dc}/2$
    (d) $\dfrac{2V_{dc}}{\pi}$

51. The statement "JC 2055" in a 8085 microprocessor program means

    (a) Jump to address location 2055 unconditionally
    (b) Jump to address location if there is negative number
    (c) Jump to address location 2055 if there is a carry
    (d) Jump to address location 2055 if there is no carry

52. A square wave of amplitude 1, with 50% duty cycle and period 2π can be represented as ...

    (a) $\dfrac{4}{\pi}\sum_{n=1,2,3...}\dfrac{\sin(nt)}{n}$
    (b) $\dfrac{2}{\pi}\sum_{n=1,3,5...}\dfrac{\sin(nt)}{n}$
    (c) $\dfrac{2}{\pi}\sum_{n=1,2,3...}\dfrac{\sin(nt)}{n}$
    (d) $\dfrac{4}{\pi}\sum_{n=1,3,5...}\dfrac{\sin(nt)}{n}$

53. In TTL logic, the typical output voltage range for HIGH logic is

    (a) 2.25 V to 2.75 V
    (b) 4.75 V to 5.25 V
    (c) 3.0 V to 3.6 V
    (d) 1.7 V to 1.9 V

54. A 12-bit clock divider is used to divide a 50 MHz clock. What is the frequency of the synthesized clock?

    (a) 4.16 MHz
    (b) 48.83 kHz
    (c) 12.20 kHz
    (d) 24.41 kHz

55. What is the guaranteed level of output voltage for '0' state?

    (a) V_{OL}
    (b) V_{OH}
    (c) V_{IH}
    (d) V_{IL}

56. What are the anomalies in a power supply line that a voltage stabilizer can correct?

    (a) Voltage fluctuations
    (b) Cycle changes
    (c) Voltage spikes
    (d) Power failures

57. Which of the following converters is an isolated converter?

    (a) Forward converter
    (b) Buck converter
    (c) SEPIC converter
    (d) Cuk converter

58. If a temperature sensor takes 10 seconds to stabilize, how much time would be required to reach half the value between the initial and final reading?

   (a) 5 sec.
   (b) 8 sec.
   (c) 1.38 sec.
   (d) 6.32 sec.

59. A step-down chopper is connected to 125 V supply. If the chopper is operated at 50% duty cycle and the load consumes 100 watts of power, what is the input current? Assume the converter efficiency is 80%

   (a) 1.667 A
   (b) 150 A
   (c) 1 A
   (d) 0.833 A

60. What is the correct order in a instruction cycle?

   (a) Read address from memory - fetch instruction - decode - execute
   (b) Fetch instruction - decode - Read address from memory - execute
   (c) Execute - read address from memory - fetch instruction - decode
   (d) Fetch instruction - Read address from memory - decode - execute

61. Which type of opamp should be used for low current measurements?

   (a) Instrumentation amplifier
   (b) Differential Opamp
   (c) Comparator Opamp
   (d) Electrometer opamp

62. If a semiconductor switch has a conduction loss of 100 mW in a circuit for an average current of 1 A, what would be the conduction loss for an average current of 2 A if the voltage drop across the device is constant irrespective of the switch current?

   (a) 200 mW
   (b) 400 mW
   (c) 50 mW
   (d) 100 mW

63. The 8086 microprocessor has a 20-bit address line. How many memory locations can it access?

    (a) 2097152
    (b) 2048
    (c) 1048576
    (d) 20

64. A signal with a bandwidth of 40 KHz is to be digitized. Of the following sampling rates available, which one should be chosen?

    (a) 40 KHz
    (b) 78 KHz
    (c) 100 KHz
    (d) 50 KHz

65. In a GPS system, which of the following is true?

    (a) It is a two-way communication between satellites and GPS units
    (b) It is a one-way communication from GPS unit to satellites
    (c) It is one-way communication from satellites to GPS unit
    (d) None of the above

66. In a CRO, the output frequency of the time base signal is ...

    (a) a fixed signal
    (b) a random signal
    (c) an adjustable signal
    (d) proportional to sensed voltage

67. The seven-segment display as shown below needs programming in a common-cathode style (Bit to be high for the LED to glow). What is the code to represent 7 without the dot in the order (DP)GFEDCBA?
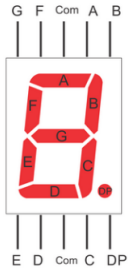
   (a) 0x07
   (b) 0x0D
   (c) 0x0F
   (d) 0x0B

68. How many flip-flops are required to produce a divide-by-128 device?

   (a) 127
   (b) 128
   (c) 7
   (d) 9

69. Which of the following is true about a stored program concept?

   (a) Only the data is stored in the computer memory
   (b) Both instructions and data are stored in the computer memory
   (c) Only the instructions are stored in the computer memory
   (d) Only the results are stored in the computer memory

70. What is the function of "Program Counter" in a 8085 microprocessor?

   (a) Holds the address of the output of the previous execution
   (b) Holds the address of the next instruction to be executed
   (c) Holds the address of the previous instruction executed
   (d) Holds the address of the next data to be processed

71. How should a Zener diode be biased if it has to act as a voltage regulator?

    (a) Short circuited
    (b) Forward biased
    (c) Disconnect one of the terminals
    (d) Reverse biased

72. What is the input-output relationship of a boost converter?

    (a) $V_o = V_{in} \cdot D$
    (b) $V_o = V_{in}/(1 - D)$
    (c) $V_o = V_{in} \cdot D/(1 - D)$
    (d) $V_o = V_{in}/D$

73. Why do we need relays to switch motors or lights?

    (a) The microcontroller cannot switch such high current loads by itself
    (b) To reduce processing time
    (c) To give more flexibility
    (d) To increase the speed of switching

74. In a doped semiconductor, if the dopant introduces excess electrons, what type is it?

    (a) Intrinsic
    (b) Conductor
    (c) P-type
    (d) N-type

75. Which flip-flop will be synthesized by the following VHDL code?

    ```
    process(clk)
    if(clk'event and clk=1)
    output <= input;
    end if;
    end process;
    ```

    (a) T flip-flop
    (b) SR flip-flop
    (c) D flip-flop
    (d) JK flip-flop

76. A 1 kW linear regulator is used to obtain 12 V from 20 V unregulated supply. Its nominal efficiency at full load and no load operation respectively is …

   (a) 0.6, 0.4
   (b) 0.4, 0.6
   (c) 0.6, 0.6
   (d) 0.4, 0.4

77. A full bridge inverter is fed from a 325 V DC supply. If the modulation index of the inverter is 0.5, and if sine triangle modulation technique is used, what is the RMS value of the fundamental component of the output voltage?

   (a) 325×2
   (b) $\dfrac{325 \times 0.5}{\sqrt{2}}$
   (c) $325\sqrt{2}$
   (d) $\dfrac{325 \times 0.5}{2\sqrt{2}}$

78. The difference between a CALL statement and JMP statement is

   (a) None of the above
   (b) CALL pushes the address of the instruction that would have come next into the stack before branching.
   (c) There is no difference between the two
   (d) JMP pushes the address of the instruction that would have come next into the stack before branching.

79. What is the output voltage of the following circuit?
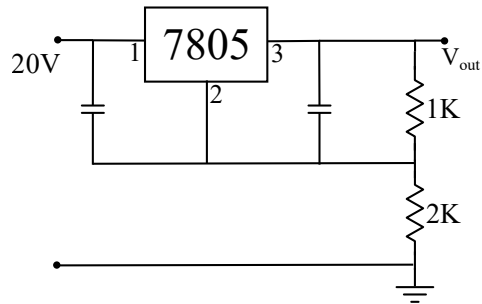
(a) 10 V
(b) 15 V
(c) 20 V
(d) 5 V

80. Which of the following is the normal way to turn on a SCR?

(a) Increasing voltage beyond blocking voltage
(b) Injecting anode current
(c) Injecting gate current
(d) Injecting cathode current

81. In the instruction MOV AL, 34h, which is the opcode?

(a) AL
(b) MOV
(c) 34h
(d) None of the above

82. What are the application of a PIN diode?

(a) Variable resistor
(b) RF switches
(c) High voltage rectifier
(d) All the above

83. When communication happens in only one direction all the time, then it is in

   (a) Half duplex mode
   (b) Full duplex mode
   (c) Simplex mode
   (d) None of the above

84. AM modulation is performed on a 5 MHz carrier. The message signal has a bandwidth of 2 KHz. What is the bandwidth of the modulated signal?

   (a) 4 KHz
   (b) 2 KHz
   (c) 5 MHz
   (d) 5.2 MHz

85. A meter has a square law scale. For 2 A current, the deflection is 90°. What would be the current if deflection is 45°?

   (a) 1.414 A
   (b) 1.0 A
   (c) 1.5 A
   (d) 0.707 A

86. Which of the following memories is the slowest in a computer?

   (a) Hard disk
   (b) RAM
   (c) EEPROM
   (d) Cache

87. In free space propagation, as distance 'd' from the transmitter increases, the received power reduces by ...

   (a) a factor of d^3
   (b) a factor of d
   (c) a factor of $d^{0.5}$
   (d) a factor of d^2

88. How does a queue work?

    (a) First in - first out
    (b) Last in - first out
    (c) First in - last out
    (d) None of the above

89. Which circuit is the best way to convert 3.3V logic into a 5V logic?

    (a) Buffer
    (b) Non-inverting voltage amplifier
    (c) Comparator with pull-up resistor
    (d) Inverting voltage amplifier

90. A 10mW signal is fed to an attenuator of 6 dB. What is the output power?

    (a) 5 mW
    (b) 1.25 mW
    (c) 2.5 mW
    (d) 7.5mW