ENTRANCE TEST-2024

SCHOOL OF APPLIED SCIENCES AND TECHNOLOGY

ELECTRONICS

Question Booklet Series C

Total Questions : 60

Time Allowed : 70 Minutes

Roll No. :

Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.

2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.

3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.

4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.

5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.

6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.

7. There will be **'Negative Marking'** for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.

8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.

9. Do not make any stray mark on the OMR sheet.

10. Calculators and mobiles shall not be permitted inside the examination hall.

11. Rough work, if any, should be done on the blank sheets provided with the question booklet.

12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.

13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.

14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

SEAL

1. An astable multivibrator has _____.

   (A) two stable states

   (B) one stable state

   (C) no stable state

   (D) one metastable state

2. An SCR can be turned off by :

   (A) forced commutation

   (B) a negative pulse on the gate

   (C) decreasing anode current below holding current

   (D) options (A) and (C)

3. A triac is equivalent to two SCRs _____.

   (A) in parallel

   (B) in series

   (C) in inverse-parallel

   (D) none of the above

4. The intrinsic stand-off ratio (η) of a UJT is given by _____.

   (A) $\dfrac{R_{B1}}{R_{B1}+R_{B2}}$

   (B) $R_{B1}+R_{B2}$

   (C) $\dfrac{R_{B1}+R_{B2}}{R_{B1}}$

   (D) $\dfrac{R_{B1}+R_{B2}}{R_{B2}}$

5. The diode associated with voltage-controlled capacitance is _____.

   (A) LED

   (B) photo-diode

   (C) varactor diode

   (D) Zener diode

6. Using De-Morgan's laws, $\overline{AB+A\overline{B}}$ can be written as :

   (A) $AB+A\overline{B}$

   (B) $\overline{AB}+\overline{A\overline{B}}$

   (C) $\overline{A+B}+\overline{A+\overline{B}}$

   (D) $\overline{AB}.A\overline{B}$

7. BCD representation of 65 is :

   (A) 1000 0101

   (B) 0110 0101

   (C) 1000 0001

   (D) 1001 0101

8. The logic function $A+AB$ is the same as :

   (A) A

   (B) AB

   (C) $\overline{A}+B$

   (D) $A+\overline{B}$

9. The hexadecimal equivalent of the decimal number $(700)_{10}$ is :

   (A) 2BC

   (B) 2AC

   (C) 2AB

   (D) 1AC3

10. The logic family with high speed is :

    (A) TTL

    (B) CMOS

    (C) DTL

    (D) ECL

11. ASCII stands for :

(A) American Standard Code for Information Interchange

(B) American System Code for Information Interchange

(C) American System Code for International Information

(D) American Standard Code for International Interchange

12. An XOR gate is a _____.

(A) basic gate

(B) derived gate

(C) universal gate

(D) equivalent to NOR gate

13. JK FF can be transformed into T FF by :

(A) Tying J and K

(B) Inverting J

(C) Inverting K

(D) None of these

14. The number of FFs required to design Modulo-6 counter is :

(A) 6

(B) 3

(C) 2

(D) 4

15. 1K bytes of memory is equal to :

(A) 1000 bytes

(B) 1024 bytes

(C) 1008 bytes

(D) 1012 bytes

16. If the µp has address bus of 13 bit wide and hence the memory which can be accessed by this address bus is :

(A) 2K bytes

(B) 6K bytes

(C) 8K bytes

(D) 16K bytes

17. In a microprocessor, the address of the next instruction to be executed, is stored in :

(A) Stack pointer

(B) Address latch

(C) Program counter

(D) General purpose register

18. JZ 2034H in 8085 µp is a :

(A) Data transfer instruction

(B) Branching instruction

(C) Control instruction

(D) Machine instruction

19. Which of the following uses immediate addressing mode ?

(A) JMP 3333H

(B) MOV A, B

(C) MVI A, 50

(D) MOV A, 2050H

20. Which one of the following is the non-maskable interrupt in 8085 ?

(A) TRAP

(B) RST 7.5

(C) RST 6.5

(D) INTR

21. The main purpose of accumulator register of 8085 is _____.

(A) selection of peripheral

(B) temporary data storage

(C) storing instructions

(D) that it is used as primary pointer

22. Which of the following flags is set to 1 when there is even number of 1 bits in the result and to 0 when there is odd number of 1 bits in the result ?

(A) Parity Flag

(B) Zero Flag

(C) Trap Flag

(D) Sign Flag

23. At 100% modulation, the power in each sideband is _____ of that of carrier.

(A) 50%

(B) 40%

(C) 60%

(D) 25%

24. The major advantage of FM over AM is _____.

(A) reception is less noisy

(B) higher carrier frequency

(C) smaller bandwidth

(D) small frequency deviation

25. If a radio receiver amplifies all the signal frequencies equally well, it is said to have high _____.

(A) sensitivity

(B) selectivity

(C) distortion

(D) fidelity

26. In FM, modulation index β is equal to (Δf is the frequency deviation and f_m is the modulating signal frequency).

(A) $\Delta f . f_m$

(B) $\dfrac{\Delta f}{f_m}$

(C) $\dfrac{f_m}{\Delta f}$

(D) $\dfrac{1}{\Delta f . f_m}$

27. Analog Modulation scheme with lesser bandwidth requirement is :

(A) AM

(B) DSBSC

(C) SSBSC

(D) VSB

28. In a radio receiver, noise is generally developed at _____.

(A) IF stage

(B) receiving antenna

(C) audio stage

(D) RF stage

29. In TV transmission, picture signal is _____ modulated.

(A) frequency

(B) phase

(C) amplitude

(D) none of the above

30. A signal with highest frequency of 10 kHz can be faithfully recovered from its sampled version if the sampling frequency is _____.

(A) Greater or equal to 20 kHz

(B) Greater than 10 kHz and less than 20 kHz

(C) Greater than 5 kHz and less than 10 kHz

(D) Equal to 10 kHz

31. 1's and 0's are represented by two different frequencies in :

    (A) ASK

    (B) PSK

    (C) FSK

    (D) DPSK

32. The error in PCM can be reduced by :

    (A) decreasing the number of quantization levels

    (B) increasing the number of quantization levels

    (C) increasing the sampling frequency

    (D) decreasing sampling frequency

33. The evolution of cell phone standards are from 1G to 5G, what this G indicates ?

    (A) Gross

    (B) Generation

    (C) General

    (D) Gap

34. Which system allows the entire bandwidth to be available to each user at the same time ?

    (A) CSMA

    (B) GSM

    (C) CDMA

    (D) FDMA

35. The main objective of a cell in a cellular mobile system is :

    (A) Handoff

    (B) Simple modulation technique

    (C) Frequency reuse

    (D) Higher bandwidth

36. The spring material used in a spring control device should have the following property :

    (A) Should be non-magnetic

    (B) Must be of low temperature co-efficient

    (C) Should have low specific resistance

    (D) All of the above

37. In an Anderson Bridge, the unknown inductance is measured in terms of :

    (A) known inductance and resistance

    (B) known capacitance and resistance

    (C) known resistance

    (D) known inductance

38. For measurement of inductance having high value, we should use :

    (A) Hay's bridge

    (B) Maxwell's bridge

    (C) Maxwell Wien bridge

    (D) None of the above

39. The horizontal plates of a CRO are supplied with _____ to observe the waveform of a signal.

    (A) sinusoidal wave

    (B) cosine wave

    (C) sawtooth wave

    (D) square wave

40. Function generators generally give _____.

    (A) sinusoidal wave

    (B) triangular wave

    (C) square wave

    (D) all of the above

41. The energy band in which holes exist is the :

   (A) First band

   (B) Second band

   (C) Conduction band

   (D) Valence band

42. Electron hole pairs are produced by :

   (A) Thermal Excitation

   (B) Optical Excitation

   (C) Excitation by Ionizing Radiation

   (D) All of the above

43. The average value of half-wave rectified voltage with a peak value of 290V is :

   (A) 92.32V

   (B) 46.15V

   (C) 145V

   (D) 205V

44. A certain regulator has a no-load voltage of 6V and a full-load output of 5.82V. What is the load regulation ?

   (A) 3.09 %

   (B) 2.87 %

   (C) 5.72 %

   (D) 9.03 %

45. The lowest stability factor is for :

   (A) base resistor transistor biasing method

   (B) collector feedback transistor biasing method

   (C) voltage divider transistor biasing method

   (D) emitter bias method of transistor biasing

46. Emitter follower is used for _____.

   (A) current gain

   (B) impedance matching

   (C) voltage gain

   (D) none of the above

47. When drain voltage equals the pinch-off voltage, then drain current _____ with the increase in drain voltage.

   (A) decreases

   (B) increases

   (C) remains constant

   (D) first increases then decreases

48. A MOSFET has _____ terminals.

   (A) Three

   (B) Two

   (C) Four

   (D) Five

49. Efficiency at maximum power transfer is _____.

   (A) 75%

   (B) 25%

   (C) 90%

   (D) 50%

50. A resonant circuit contains _____ elements.

   (A) R and L

   (B) R and C

   (C) only R

   (D) L and C

51. Which of the following filters has maximum gain at center /cut-off frequency ?

(A) A lowpass filter

(B) A highpass filter

(C) A bandpass filter

(D) A bandstop filter

52. The quality factor of a coil _____.

(A) decreases with the increase in input frequency

(B) increases with the increase in inductance of coil

(C) increases with the increase in the resistance of coil

(D) remains constant with the increase in the resistance of coil

53. The maximum efficiency of transformer coupled class A power amplifier is _____.

(A) 30%

(B) 50%

(C) 80%

(D) 45%

54. Crossover distortion is a problem for :

(A) Class A amplifiers

(B) Class AB amplifiers

(C) Class B amplifiers

(D) All of these amplifiers

55. In a phase shift oscillator, the frequency determining elements are _____.

(A) L and C

(B) R, L and C

(C) R and C

(D) R and L

56. In a certain oscillator, $A_v = 50$. The attenuation of the feedback circuit must be _____.

(A) 1

(B) 0.02

(C) 0.01

(D) 10

57. If $A_{DM} = 200000$ and $A_{CM} = 0.2$, the CMRR is :

(A) 2,00,000

(B) 10,00,000

(C) 120 dB

(D) Options (B) and (C)

58. A non-inverting amplifier with feedback resistor $R_f = 99$ kΩ and series resistor $R_1 = 1$ kΩ has gain of _____.

(A) 99

(B) 100

(C) 1

(D) 98

59. If the input of the integrator is a square wave signal, the output will be _____.

(A) a square wave signal

(B) a sinusoidal wave signal

(C) series of positive and negative spikes

(D) a triangular wave

60. An Op-amp has _____.

(A) high input impedance

(B) low CMRR

(C) high noise at the output

(D) large input current

ENTRANCE TEST-2023

SCHOOL OF APPLIED SCIENCES AND TECHNOLOGY

ELECTRONICS

Total Questions : 60

Time Allowed : 70 Minutes

Question Booklet Series **A**

Roll No. :

Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.

2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.

3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.

4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.

5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.

6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.

7. There will be **'Negative Marking'** for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.

8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.

9. Do not make any stray mark on the OMR sheet.

10. Calculators and mobiles shall not be permitted inside the examination hall.

11. Rough work, if any, should be done on the blank sheets provided with the question booklet.

12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.

13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.

14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

1. A coil of inductance L=5.00 μ H and a capacitor of capacitance C=200 pF is connected in series. Suppose the frequency is f = 4.00 MHz. What is the net reactance?

   (A)   -j 73

   (B)   j 73

   (C)   -j 199

   (D)   -j 126

2. The complex admittance of a certain parallel circuit is 0.010 - j0.0050. What is the complex impedance of this same circuit, assuming the frequency does not change?

   (A)   80 + j 20

   (B)   80 + j 40

   (C)   40 + j 40

   (D)   80 - j 40

3. Which of the following is not a characteristic of an independent voltage source?

   (A)   voltage independent of magnitude of current drawn

   (B)   voltage dependent on magnitude of current drawn

   (C)   independent of direction of current flow

   (D)   can supply or receive uninterrupted energy at constant voltage

4. A practical voltage source can be represented by

   (A)   an ideal voltage source with its internal resistance connected in series

   (B)   an ideal voltage source with its internal resistance connected across its terminals

   (C)   by neglecting the internal resistance

   (D)   none of these

5. When R = 0 in a series RLC circuit, but the net reactance is not zero, the impedance vector

   (A)   always points straight up.

   (B)   always points straight down.

   (C)   always points straight toward the right.

   (D)   None of the above is correct.

6. A Zener diode would most likely be found in

   (A)   the mixer in a super heterodyne receiver.

   (B)   the PLL in a circuit for detecting FM.

   (C)   the product detector in a receiver for SSB.

   (D)   the voltage regulator in a power supply.

7. A diode can be used as a frequency multiplier because of its

   (A)   junction capacitance.

   (B)   nonlinearity.

   (C)   avalanche voltage.

   (D)   forward break over.

8. Correct answer from these points:

   a.   tunnel diode used for high frequency switching operations.

   b.   tunnel diode uses a high doping level to provide a narrow junction.

   (A)   True, False

   (B)   False, False

   (C)   True, True

   (D)   False, True

9. The following is a negative differential resistance diode:

   (A)   PN Junction diode

   (B)   Zener diode

   (C)   Tunnel diode

   (D)   Schottky diode

☑

10. Which of the following substances is sometimes used as the semiconductor material in junction field-effect transistors (JFETs) ?
   (A) Gallium arsenide
   (B) Mica
   (C) Glass
   (D) Polystyrene

11. A common-collector transistor circuit is often used :
   (A) to provide high gain and sensitivity over a wide range of frequencies.
   (B) to match a high impedance to a low impedance.
   (C) as a high-fidelity audio power amplifier.
   (D) as an oscillator at microwave frequencies.

12. Suppose a bipolar-transistor amplifier has a dc collector input of 115 W and an ac power output of 65.0 W. What is the efficiency in percent ?
   (A) 50 %
   (B) 5.6 %
   (C) 5 %
   (D) 56.5 %

13. A twin T oscillator is commonly used for generating
   (A) AF signals.
   (B) High-frequency RF signals.
   (C) Microwave RF signals.
   (D) Powerful bursts of RF energy.

14. A circuit has a rms ac input voltage of 24.2 V and a rms ac output voltage of 19.9 V. What is the gain in decibels?
   (A) 1.7 dB
   (B) -1.7 dB
   (C) 0.0849 dB
   (D) 20 dB

15. The frequency at which a quartz crystal oscillator produces energy is largely dependent on :
   (A) the load impedance.
   (B) the physical thickness of the quartz wafer.
   (C) the amount of resistance through the crystal.
   (D) the power-supply voltage.

16. An FET amplifier is 60 percent efficient. If the power output is 3.5 W, what is the dc drain power input ?
   (A) 5.8 W
   (B) 4.0 W
   (C) 8.8 W
   (D) 7.0 W

17. What is the binary equivalent of decimal 29 ?
   (A) 10101
   (B) 11101
   (C) 10111
   (D) 11011

18. The time period of a monostable 555 multivibrator :
   (A) RC
   (B) 3RC
   (C) 1.1RC
   (D) 0.33 RC

19. An audio amplifier is an example of ....
   (A) Digital IC
   (B) Linear IC
   (C) Both digital and linear IC
   (D) None of the above

20. In voltage follower circuit the input and output voltages are :
   (A) V_{in} =2V and V_{out} = 3V
   (B) V_{in} =10V and V_{out} = 11V
   (C) V_{in} =9V and V_{out} = 9V
   (D) V_{in} =4V and V_{out} = 7V

21. CMRR value of an ideal instrumentation amplifier :
   (A) 1
   (B) 0
   (C) Infinity
   (D) 0.5

22. Inverters are placed in series with both inputs of an AND gate. Under what conditions is the output of the resulting black box high ?

 (A) If and only if both inverter inputs are high

 (B) If and only if both inverter inputs are low

 (C) If and only if one inverter input is high and the other is low

 (D) Under no conditions (the output is always low)

23. What is the octal equivalent of binary 1010 ?

 (A) 4

 (B) 10

 (C) 12

 (D) There is no way to tell without more information.

24. What is the largest possible radix 10 number that can be represented as a six-digit binary number ?

 (A) Decimal 256

 (B) Decimal 128

 (C) Decimal 64

 (D) Decimal 63

25. Frequency deviation in FM is :

 (A) Change in carrier frequency to the frequency above and below the centre frequency

 (B) Formation of side bands

 (C) The variation of the instantaneous carrier frequency in proportion to the modulating signal

 (D) All of the above

26. DeMorgan's Theorem states that, for all logical statements X and Y, where _____ is complement.

 (A) $-(X*Y) = X+Y$

 (B) $X*Y = -(X+Y)$

 (C) $(-X)+(-Y) = X*Y$

 (D) $(-X)+(-Y) = -(X*Y)$

27. If you see a number represented by FF in the documentation for an electronic circuit or system, you can be certain that the number is

 (A) radix 16.

 (B) radix 10.

 (C) radix 8.

 (D) radix 2.

28. A binary digital black box with two inputs, called X and Y and an output Z. If X = 0 and Y = 1, then Z = 0. In all other instances, Z = 1. Which of the following logical expressions represents the contents of the black box ?

 (A) $X + (-Y)$

 (B) $X * (-Y)$

 (C) $X - (*Y)$

 (D) $X = (-Y)$

29. Suppose a logic circuit has four inputs W, X, Y, and Z. How many possible input combinations are there ?

 (A) 4

 (B) 8

 (C) 16

 (D) 32

30. What can be done to minimize the capacitance of the P-N junction in a semiconductor diode, thereby making the component effective as a high-speed RF switch ?

 (A) The surface area of the P-N junction can be maximized.

 (B) A layer of intrinsic semiconductor can be placed between the P- and N-type materials.

 (C) The frequency of the applied signal can be made as high as possible.

 (D) The diode can be forward- biased with a high voltage.

31. Notch filter is a :
    (A) Band pass filter
    (B) Band stop filter
    (C) Low pass filter
    (D) High pass filter

32. What is the wavelength if the frequency is 4MHz ?
    (A) 75 meters
    (B) 75 km
    (C) 75 cm
    (D) 75 mm

33. Signal attenuation, or degradation, exists in all media of wireless transmission. It is proportional to the :
    (A) the distance between the transmitter and receiver
    (B) difference of the distance between the transmitter and receiver
    (C) square of the distance between the transmitter and receiver
    (D) summation of the distance between the transmitter and receiver

34. TCP stands for :
    (A) Transmission Control Protocol
    (B) Transmission Capture Protocol
    (C) Transmission Control Procedure
    (D) Transistor Capacitor Power

35. A receiver that responds to a desired signal, but not to another signal very close by in frequency, has good
    (A) Sensitivity.
    (B) Noise figure.
    (C) Dynamic range.
    (D) Selectivity.

36. The domain name system (DNS) is chiefly used to translate hostnames into :
    (A) Alphabetical address
    (B) Numeric IP addresses
    (C) Analog address
    (D) All of the above

37. A continuously variable signal can be recovered from a signal having only a few discrete levels or states by means of :
    (A) a ratio detector.
    (B) a D/A converter.
    (C) a product detector.
    (D) an envelope detector.

38. An AM super heterodyne receiver with IF of 455 kHz is tuned to the carrier frequency of 1000 kHz. The image frequency is :
    (A) 545 kHz
    (B) 1 MHz
    (C) 1455 kHz
    (D) 1910 kHz

39. In FM signal with a modulation index mf is passed through a frequency Tripler. The wave in the output of the Tripler will have a modulation index of :
    (A) mf
    (B) 3mf
    (C) mf/3
    (D) mf/9

40. The maximum power efficiency of an AM modulator is :
    (A) 25%
    (B) 33%
    (C) 50%
    (D) 100%

41. Which of the following modes is used to send image data over telephone lines ?
    (A) On/off keying
    (B) Fax
    (C) AM
    (D) Product detection

42. READY signal used in an intel 8085 microprocessor is :
    (A) To indicate to user that the microprocessor is working and is ready for use.
    (B) To provide proper WAIT states when the microprocessor is communicating with a slow peripheral device.
    (C) To slow down a fast peripheral device so as to communicate at the microprocessor's device.
    (D) None of the above.

43. The 8085 has six general-purpose registers to store 8-bit data; these are identified as :
    (A) A, C, D, E, H, and L
    (B) B, C, D, E, H, and I
    (C) B, C, D, E, H, and L
    (D) B, C, D, E, F, and L

44. The ALU includes five flip- flops, which are set or reset after an operation according to data conditions of the result in the accumulator and other registers. These flags are :
    (A) Z, CY, S, P and AC
    (B) A, CY, S, P and AC
    (C) F, CY, S, P and C
    (D) W, CY, S, P and A

45. Immediate addressing in 8085 example is :
    (A) MVI data, R
    (B) MVI R, data
    (C) MOV R, data
    (D) MOVE R, data

46. Trap interrupt is a non-maskable restart interrupt; it has the priority of any interrupt.
    (A) Lowest
    (B) Medium
    (C) Less
    (D) Highest

47. Which one is not correct in 8085 microprocessors ?
    (A) RAC Rotate the accumulator to Carry. Bit 0 goes to bit 7 AND the Carry flag
    (B) RAR Rotate the accumulator right through the carry. Bit 0 goes to the Carry and carry goes to bit 7.
    (C) RLC Rotate the accumulator left. Bit 7 goes to bit 0 and the carry flag.
    (D) RAL Rotate the accumulator left through the carry. Bit 7 goes to the carry and carry goes to bit 0.

48. The 8085 has 16 address lines. So, it can address a total of memory locations :
    (A) 65K
    (B) 64K
    (C) 128K
    (D) 16K

49. The 8051 is an :
    (A) 8-bit microcontroller with 8-bit data bus and 16-bit address bus.
    (B) 16-bit microcontroller with 16-bit data bus and 16-bit address bus.
    (C) 16-bit microcontroller with 8-bit data bus and 8-bit address bus.
    (D) 8-bit microcontroller with 8-bit data bus and 8-bit address bus.

50. The 8051 has :
    (A) 3 internal interrupts, 3 external interrupts.
    (B) 4 internal interrupts, 2 external interrupts.
    (C) 2 internal interrupts, 2 external interrupts.
    (D) 3 internal interrupts, 2 external interrupts.

51. The interrupt has highest priority in 8051 microcontrollers :

(A) IE0

(B) TF0

(C) IE1

(D) TF1

52. In addressing of 8051 The storage of addresses that can be directly accessed is :

(A) external data RAM

(B) internal data ROM

(C) internal data RAM and SFRS

(D) external data ROM and SFRS

53. For measuring a very high resistance we should use :

(A) Kelvin's double bridge

(B) Wheatstone bridge

(C) Meggar

(D) None of the above

54. An ammeter shunt is useful because :

(A) It increases meter sensitivity.

(B) It makes a meter more physically rugged.

(C) It allows for measurement of a wide range of currents.

(D) It prevents overheating of the meter.

55. The main advantage of a FETVM over a conventional voltmeter is the fact that the FETVM :

(A) Can measure lower voltages.

(B) Draws less current from the circuit under test.

(C) Can withstand higher voltages safely.

(D) Is sensitive to AC as well as to DC.

56. Integrating instruments among the following is :

(A) Ammeters

(B) Voltmeters

(C) Wattmeter

(D) Watt-hour meters

57. In an enhancement-mode MOSFET,

(A) the channel conducts fully with zero gate bias.

(B) the channel conducts partially with zero gate bias.

(C) the channel conducts ac but not dc.

(D) the channel does not conduct with zero gate bias.

58. The high input impedance of a MOSFET makes this type of device ideal for use in

(A) weak-signal amplifiers.

(B) high-power oscillators.

(C) high-current rectifiers.

(D) antenna tuning networks.

59. A significant difference between MOSFETs and JFETs is the fact that :

(A) MOSFETs can handle a wider range of gate bias voltages.

(B) MOSFETs can deliver greater output power.

(C) MOSFETs are more rugged.

(D) MOSFETs last longer.

60. An optocoupler consists of :

(A) two Zener diodes back-to-back.

(B) an LED and a photodiode.

(C) two NPN transistors in series.

(D) an NPN transistor followed by a PNP transistor.

ROUGH WORK

ENTRANCE TEST-2020

SCHOOL OF APPLIED SCIENCES AND TECHNOLOGY

ELECTRONICS

Question Booklet Series | C |

Total Questions : 60
Time Allowed : 70 Minutes

Roll No. :

Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.

2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.

3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.

4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.

5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.

6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.

7. There will be **'Negative Marking'** for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.

8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.

9. Do not make any stray mark on the OMR sheet.

10. Calculators and mobiles shall not be permitted inside the examination hall.

11. Rough work, if any, should be done on the blank sheets provided with the question booklet.

12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.

13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/ herself.

14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

1. A 4-bit parallel full adder without any initial carry requires :

(A) 8 half adders and 4 OR gates

(B) 8 half adders and 3 OR gates

(C) 7 half adders and 4 OR gates

(D) 7 half adders and 3 OR gates

2. Each cell of a Random Access Memory contains :

(A) 6 MOS transistors

(B) 4 MOS transistors and 2 capacitors

(C) Two 2-input NOR and one X-NOR gates

(D) XOR gates and shift registers

3. The total number of operation codes and instructions in the 8085 microprocessor instruction set are _____ and _____ respectively.

(A) 74, 244

(B) 72, 244

(C) 74, 246

(D) 72, 246

4. The following program is run on an 8085 microprocessor.

Memory Address in Hex	Instructions
2000	LXI SP, 1000
2003	PUSH H
2004	PUSH D
2005	CALL 2050
2008	POP 2050
2009	HALT

At the completion of execution of program the program counter contains _____ and the stack pointer contains _____ .

(A) 1025, 0CCF

(B) 1025, 0FFC

(C) 2050, 0CCF

(D) 2050, 0FFC

5. A memory system has a total of 8 memory chips, each with 12 address lines and 4 data lines. The total size of the memory system is :

(A) 32 Kbytes

(B) 48 Kbytes

(C) 128 Kbytes

(D) 384 Kbytes

6. In 8085 the number of output ports in the peripheral mapped I/O is restricted to :

(A) 128

(B) 256

(C) 512

(D) None of the above

7. Different ways of making operands available in 8085 are called :

(A) Instruction Fetch

(B) Addressing Modes

(C) Memory Fetch

(D) Data Fetch

8. Which of the following techniques is preferable for transferring large amount of data to and from the memory in a short time ?

(A) Programmed I/O

(B) Interrupt driven I/O

(C) DMA

(D) None of these

9. How are the bits of the register PSW affected if we select Bank2 of 8051 ?

(A) PSW.5=0 and PSW.4=1

(B) PSW.2=0 and PSW.3=1

(C) PSW.3=1 and PSW.4=1

(D) PSW.3=0 and PSW.4=1

10. Number of I/O ports in the 8051 microcontroller are :

(A) 3 ports

(B) 4 ports

(C) 5 ports

(D) 4 ports with last port having 5 pins

11. A 1.0 KHz square wave signal is passed through an ideal filter having cut-off at 4500 Hz. It is used to amplitude modulate a carrier of 10 KHz. The spectral width of modulated signal is :

(A) 8.0 KHz

(B) 9.0 KHz

(C) 4.5 KHz

(D) 10 KHz

12. The Carlson bandwidth of an FM system is 170 kHz when the frequency deviation is 75 kHz. The modulation index β is :

(A) 15

(B) 2.29

(C) 7.5

(D) None of the above

13. Envelope detection is used for :

(A) SSB/SC

(B) DSB-AM

(C) SSB-Pilot carrier

(D) DSB/SC

14. A signal $x(t) = A \sin \omega t$ is affected by noise $n(t)$. N represents the noise power. The SNR of a system is :

(A) A^2/N

(B) $2A^2/N$

(C) $A^2/(2N)$

(D) None of above

15. A signal x(t), having peak to peak signal swing 2.048V, is sampled. The sampling rate is 8000 samples/sec. Each sample is coded as an 11 bit linear PCM code. The step size is :

(A) 4 mV

(B) 2 mV

(C) 0.5 mV

(D) 1 mV

16. To separate channels in a TDM receiver, it is necessary to use :

(A) AND gates

(B) Band pass filters

(C) Differentiation

(D) Integration

17. Source encoding in a data communication system is done in order to :

(A) Enhance the information transmission rate

(B) Reduce the transmission errors

(C) Conserve the transmitted power

(D) Facilitate clock recovery in the receiver

18. Which of the following requires a synchronizing signal ?

(A) Single channel PPM system

(B) PAM

(C) DM

(D) All of the mentioned

19. Quantization noise occurs in :

(A) DSB-SC systems

(B) FSK systems

(C) Pulse width modulation

(D) Pulse code modulation

20. A signal can be recovered from its sample by using :

(A) Low pass filter

(B) High pass filter

(C) Band pass filter

(D) Band stop filter

21. A cordless telephone using separate frequencies for transmission in base and portable units is known as :

(A) Duplex arrangement

(B) Half duplex arrangement

(C) Either (A) or (B)

(D) Neither (A) nor (B)

22. Which of the following memory devices stores information such as subscriber's identification number in GSM ?

(A) Register

(B) Flip flop

(C) SIM

(D) SMS

23. _____ manages the switching function in GSM.

(A) BSS

(B) NSS

(C) OSS

(D) MSC

24. What is frequency reuse ?

(A) Process of selecting and allocating channels

(B) Process of selection of mobile users

(C) Process of selecting frequency of mobile equipment

(D) Process of selection of number of cells

25. _____ gets propagated through networks and technologies like SMS, Bluetooth, wireless medium, USB's and infrared to affect mobile phones.

(A) Worms

(B) Antivirus

(C) Malware

(D) Multimedia files

26. In majority of instruments, damping is provided by :

(A) Fluid friction

(B) Spring

(C) Eddy currents

(D) All of the above

27. A universal RLC bridge uses :

(A) Maxwell bridge configuration for measurement of inductance and De Santy's bridge for measurement of capacitance

(B) Maxwell Wein bridge configuration for measurement of inductance and De Santy's bridge for measurement of capacitance

(C) Maxwell Wein bridge configuration for measurement of inductance and Wein bridge for measurement of capacitance

(D) None of the above

28. Capacitance sensor can measure very small displacement. It can be formed by varying :

(A) Separation

(B) Area

(C) Permittivity

(D) Either (A) or (B) or (C)

29. If the quantity to be measured remains constant during the process of taking the repeated measurements then the random errors can be eliminated by :
   (A) Calculating the mean of the number of repeated measurements
   (B) Calculating the median of the number of repeated measurements
   (C) Calculating the sum of the numbers of repeated measurements
   (D) Either (A) or (B)

30. LVDT which is an instrument for the measurement of displacement, works on the principle of :
   (A) Linear inductance
   (B) Non-linear inductance
   (C) Mutual inductance
   (D) Linear capacitance

31. Q factor of a series resonance circuit can be increased by using :
   (A) A coil of large inductance, and small Ohmic resistance
   (B) A coil of large inductance and large Ohmic resistance
   (C) A coil of small inductance and large Ohmic resistance
   (D) A coil of small inductance, and small Ohmic resistance

32. Superposition theorem is applicable to :
   (A) Power only
   (B) Current only
   (C) Voltage only
   (D) Current and Voltage both

33. At t = 0+ with zero initial condition, which of the following act as an open circuit ?
   (A) Inductor
   (B) Capacitor
   (C) Resistor
   (D) All of the above

34. The current through a branch in a linear network is 2A when the input source voltage is 10 V. If the voltage is reduced to 1V and the polarity is reversed, the current through the branch is :
   (A) − 2.0
   (B) − 0.2
   (C) + 0.2
   (D) + 2.0

35. dBm is a :
   (A) Unit of Power
   (B) Unit of Voltage
   (C) Ratio of Power
   (D) None of the above

36. Mobility of holes in intrinsic Si is :
   (A) 0.048 m²/Vs
   (B) 0.135 m²/Vs
   (C) 1350 m²/Vs
   (D) 480 m²/Vs

37. The reverse saturation current I_{co} of Si diode varies as :
   (A) T^2
   (B) T^3
   (C) $T^{1/2}$
   (D) $T^{3/2}$

38. The tunnel diode :
   (A) Has a tiny hole through its centre to facilitate tunneling
   (B) Is a point contact diode with a very high value of reverse resistance
   (C) Uses a high doping level to provide a narrow junction
   (D) None of the above

39. For a BJT, D_E, D_B, and D_C are doping concentrations for emitter, base, and collector respectively then :
    (A) $D_C > D_E > D_B$
    (B) $D_E > D_C > D_B$
    (C) $D_E > D_B > D_C$
    (D) $D_C > D_B > D_E$

40. The voltage divider bias is used to make the Q-point :
    (A) Independent of β
    (B) Independent of V_{BE}
    (C) Dependent of β
    (D) None of the above

41. The *h*- parameters of a BJT are :
    (A) Dependent on R_L
    (B) Dependent on I_{CQ}
    (C) Independent of I_{CQ}
    (D) Constant

42. The transition cut-off frequency f_T at which the magnitude of short circuit current gain of transistor in CE configuration is :
    (A) Half of the mid-band gain
    (B) One-tenth of the mid-band gain
    (C) Unity
    (D) 100

43. Dynamic transfer curve of an amplifier is a plot of :
    (A) Output voltage *vs.* input current
    (B) Output current or voltage *vs.* input excitation
    (C) Output current *vs.* input current
    (D) None of the above

44. Low frequency response of amplifiers is mainly limited by :
    (A) Coupling capacitors
    (B) Bypass capacitors
    (C) Biasing circuit
    (D) Input and Output capacitors

45. A Darlington amplifier is characterized by :
    (A) Very high voltage and current gains
    (B) Very high input resistance and current gains
    (C) Very low resistance and current gain
    (D) None of the above

46. Cross-over distortion in Class-B push-pull amplifiers can be overcome by :
    (A) Operating it as Class-C
    (B) Operating it as Class-AB
    (C) Using a low leakage transformer
    (D) None of the above

47. Why are R-C oscillators unsuitable for radio frequency applications ?
    (A) At higher radio frequencies capacitors required have non-practical values
    (B) Resistors and capacitors get heated up at higher frequencies
    (C) Resistors cause tremendous power loss at higher frequencies
    (D) None of the above

48. The frequency at which the differential gain in Op Amps is zero dB is called :
    (A) Unity gain cross-over frequency
    (B) Cross over frequency
    (C) Zero-dB frequency
    (D) Cut-off frequency

49. In cascade tuned amplifier, the impedance transformation is achieved through :
    (A) Tapping of inductor of the tank circuit
    (B) Tapping of capacitor of the tank circuit
    (C) Tapping both of the above (A and B)
    (D) None of the above

50. A differentiator is rarely used in analog computers because :

(A) It reduces the gain

(B) It decreases the output of the amplifier

(C) It amplifies noise, drift, and other unwanted disturbances

(D) None of the above

51. For an Op-amp with negative feedback, the output is :

(A) Equal to the input

(B) Increased

(C) Fed back to the inverting input

(D) Fed back to the non-inverting input

52. For operating a p-channel MOSFET, the gate is applied a :

(A) Positive potential (for enhancement mode)

(B) Negative potential (for depletion mode)

(C) Negative potential (for enhancement mode)

(D) None of the above

53. An SCR may be turned off by :

(A) By reducing its anode to cathode voltage

(B) By removing the gate voltage pulse

(C) By reducing the current below the holding value

(D) None of the above

54. In case a reverse biased photodiode is kept in dark condition, the current flowing through the device corresponds to :

(A) Maximum value of current which can flow through the device

(B) Value of reverse saturation current

(C) Normal value of current

(D) Zero

55. The efficiency of an LED for generating light is directly proportional to the :

(A) Temperature

(B) Voltage applied

(C) Level of doping used

(D) Current injected

56. Which of the following is a unique property of laser ?

(A) Directional

(B) Speed

(C) Coherence

(D) Wavelength

57. The output of a 2-input logic gate is 1 when all its inputs are at logic 0. The gate is :

(A) A NAND or an EX-OR gate

(B) A NOR or an EX-OR gate

(C) An AND or an EX-NOR gate

(D) None of the above

58. When signed numbers are used in binary arithmetic, then which of the following notations would have unique representation for zero ?

(A) Sign-magnitude

(B) 1's complement

(C) 2's complement

(D) 9's complement

59. A 4-bit modulo 16 used JK flip flop. If the progression delay of each flip flop is 50 ms, the maximum clock frequency is equal to :

(A) 800 MHz

(B) 12.5 MHz

(C) 4 MHz

(D) None of the above

60. If a counter having 10 flip flops is initially at 0, what count will it hold after 2060 pulses ?

(A) 0000001100

(B) 0000011100

(C) 0000011000

(D) 0000001110

1. Which parameters are also called short circuit parameters ?
   - (A) z
   - (B) y
   - (C) h
   - (D) None of the above

2. An ideal source consists of 5 V in series with $10 k\Omega$ resistance. The current magnitude of equivalent current source is :
   - (A) 2 mA
   - (B) 3.5 mA
   - (C) 0.5 mA
   - (D) None of the above

3. The voltage 'V' across 3Ω resistor in figure is equal to :
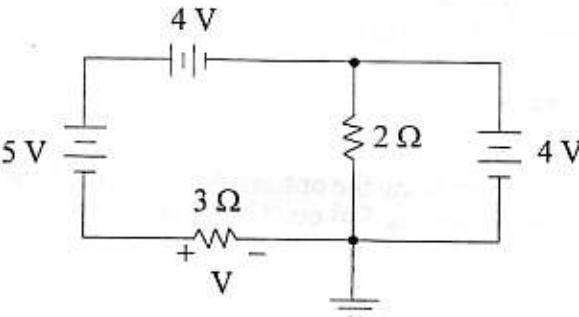
   - (A) 3 V
   - (B) –3 V
   - (C) 5 V
   - (D) 4 V

4. A generator of internal impedance 'Z_i' deliver maximum power to a load impedance, Z_1 only if :
   - (A) $Z_1 < Z_i$
   - (B) $Z_1 > Z_i$
   - (C) $Z_1 = Z_i$
   - (D) $Z_1 = 2Z_i$

5. In the depletion region of a pn junction, there is a shortage of :
   - (A) Acceptor Ions
   - (B) Holes and Electrons
   - (C) Donor Ions
   - (D) None of the above

6. The ripple factor of a half-wave rectifier is :
   - (A) 2
   - (B) 1.21
   - (C) 2.5
   - (D) 0.48

7. The frequency of a full-wave signal is equal to :
   - (A) Twice the line frequency
   - (B) Equal to the line frequency
   - (C) One-half of the line frequency
   - (D) One-fourth of the line frequency

8. Avalanche breakdown in a semiconductor take place :
   - (A) When forward current exceeds a certain valu
   - (B) When potential barrier is reduced to zero
   - (C) When reverse bias exceeds a certain value
   - (D) When forward bias exceeds a certain value

9. The emitter of a transistor is _____ doped.
   - (A) Lightly
   - (B) Heavily
   - (C) Moderately
   - (D) None of the above

10. $I_C = \alpha I_E +$ _____
    - (A) I_B
    - (B) I_{CEO}
    - (C) I_{CBO}
    - (D) βI_B

11. The phase difference between the input and outpu voltages of a transistor connected in commor collector arrangement is :
    - (A) 180°
    - (B) 270°
    - (C) 90°
    - (D) 0°

12. The constant-current region of a JFET lies between :
    - (A) Cut off and saturation
    - (B) Cut off and pinch-off
    - (C) 0 and I_{DSS}
    - (D) Pinch-off and breakdown

55.

13. The decimal equivalent of hex number $(1A53)_{16}$ is :

(A) $(6793)_{10}$

(B) $(6739)_{10}$

(C) $(6973)_{10}$

(D) $(6379)_{10}$

14. A ring counter consisting of five Flip-Flops will have :

(A) 5 states

(B) 10 states

(C) 32 states

(D) Infinite states

15. The 2's complement of the number $(1101101)_2$ is :

(A) $(0101110)_2$

(B) $(0111110)_2$

(C) $(0110010)_2$

(D) $(0010011)_2$

16. When simplified with Boolean Algebra $(x+y)(x+z)$ simplifies to :

(A) x

(B) $x+x(y+z)$

(C) $x(1+yz)$

(D) $x+yz$

17. The code where all successive numbers differ from their preceding number by single bit is :

(A) Binary code

(B) BCD code

(C) Excess-3 code

(D) Gray code

18. Which of the following is the fastest logic ?

(A) TTL

(B) ECL

(C) CMOS

(D) PMOS

19. If the input to T-flip flop is 100 Hz signal, the final output of the three T-flip flops in cascade is :

(A) 800 Hz

(B) 300 Hz

(C) 33.3 Hz

(D) 12.5 Hz

20. The commercially available 8-input multiplexer integrated circuit in the TTL family is :

(A) 7495

(B) 7490

(C) 74151

(D) 74154

21. How many address bits are required to represent 4K memory ?

(A) 5 bits

(B) 12 bits

(C) 8 bits

(D) 10 bits

22. In the a.c. equivalent circuit of a transistor amplifier, the capacitors are considered :

(A) Short

(B) Open

(C) Partially Open

(D) None of the above

23. The purpose of emitter capacitor (i.e. capacitor across R_e) is to :

(A) Avoid voltage gain drop

(B) Forward bias the emitter

(C) Reduce noise in the amplifier

(D) None of the above

24. If a transistor is operated in such a way that output current flows for 160 degrees of the input signal, then it is _____ operation.

(A) Class A

(B) Class C

(C) Class B

(D) Class AB

25. Which coupling has the best frequency response ?

(A) Direct

(B) RC

(C) Transformer

(D) Transistor

26. If gain without feedback and feedback factor are A and β respectively, then gain with negative feedback is given by :

(A) A/(1−Aβ)

(B) (1+Aβ)/A

(C) (1−Aβ)/A

(D) A/(1+Aβ)

27. The frequency of oscillation is _____ L and C in an LC oscillator.

(A) Inversely proportional to square root of

(B) Directly proportional to square root of

(C) Inversely proportional to square of

(D) Directly proportional to square of

28. Given three amplifiers with each having a gain of 10 dB and are connected in cascade. How much is the overall gain in dBs ?

(A) 1000

(B) 100

(C) 30

(D) 20

29. With given full-scale deflection currents, which meter is the most sensitive ?

(A) 10 mA

(B) 1 mA

(C) 1 A

(D) 1 μA

30. An ammeter's ideal resistance should be :

(A) Zero

(B) Unity

(C) Infinite

(D) The same as the circuit's resistance

31. The force in analog instrument which brings the moving system to rest in its final position is :

(A) Damping force

(B) Controlling force

(C) Deflection force

(D) None of the above

32. The resistance of a moving-coil instrument is 10 Ω and gives full-scale deflection at 10 mA. Calculate the resistance of the shunt required to convert the instrument to give full-scale deflection when the circuit current is 5A :

(A) 0.02004 Ω

(B) 0.020004 Ω

(C) 20.4 Ω

(D) 2.04 Ω

33. What is the typical input resistance of the μA741 op-amp when measured under open loop ?

(A) 1.5 MΩ

(B) 3 MΩ

(C) 2 MΩ

(D) 2.5 MΩ

34. What is the most popular IC used in timing circuits ?

(A) 555 timer

(B) 741

(C) LM317

(D) LM340

35. An op-amp circuit that has its output tied directly to the inverting terminal is called a :

(A) Current follower

(B) Inverting amplifier

(C) Non-inverting amplifier

(D) Voltage follower

36. What is the slew rate of a 741 operational amplifier ?

(A) 1 V/ms

(B) 0.5 V/ms

(C) 1 V/μs

(D) 0.5 V/μs

37. What element of a CRT releases electrons when heated indirectly by a filament ?

(A) Cathode

(B) Grid

(C) Anode

(D) Phosphor screen

38. Which part of the following is not a basic part of a CRT ?
   (A) Electron Gun
   (B) Focusing and accelerating elements
   (C) Horizontal and vertical deflecting plates .
   (D) Sawtooth Generator

39. The bridge used to measure high-Q inductances $(Q > 10)$ is :
   (A) Wheatstone bridge
   (B) Wien bridge
   (C) Hay bridge
   (D) Schering bridge

40. Kelvin double bridge is used to measure :
   (A) Capacitance
   (B) Low-value resistance
   (C) Low-Q inductance
   (D) High value resistance

41. The first microprocessor built by the Intel Corporation was called :
   (A) 8008
   (B) 8080
   (C) 4004
   (D) 8800

42. The number of output pins of a 8085 microprocessor are :
   (A) 40
   (B) 19
   (C) 21
   (D) 27

43. Which signals of 8085 microprocessor is used to insert wait states ?
   (A) READY
   (B) ALE
   (C) HOLD
   (D) INTR

44. Which of the following flag conditions is not available in 8085 microprocessor ?
   (A) Zero Flag
   (B) Parity Flag
   (C) Overflow Flag
   (D) Auxiliary Carry Flag

45. Some of the pins of an 8085 CPU and their functions are listed below. Identify the correct answer that matches the pins to their respective functions :

   P. RST 7.5   1. Selects IO or memory
   Q. Hold   2. Demultiplexes the address
   R. IO/$\overline{M}$ and data bus
   S. ALE   3. Is a vectored interrupt
                    4. Facilitates direct memory
                        access

   (A) P-3, Q-2, R-1, S-4
   (B) P-4, Q-1, R-2, S-3
   (C) P-3, Q-4, R-1, S-2
   (D) P-2, Q-3, R-4, S-1

46. How many instructions does microprocessor 8085 have ?
   (A) 255
   (B) 256
   (C) 246
   (D) 250

47. What is the vectored address of interrupt RST 5.5 ?
   (A) 0034 H
   (B) 0024 H
   (C) 0036 H
   (D) 002C H

48. If the status of the control lines S_1 and S_0 is low, then 8085 microprocessor is performing :
   (A) Reset operation
   (B) Hold operation
   (C) Halt operation
   (D) Interrupt acknowledge

49. Modulation is done in :
   (A) Transmitter
   (B) Radio receiver
   (C) Between transmitter and radio receiver
   (D) None of the above

50. In an AM wave, useful power is carried by :
   (A) Carrier
   (B) Sidebands
   (C) Both sidebands and carrier
   (D) None of the above

51. Consider the following Amplitude Modulated (AM) signal,

$X_{AM}(t) = 10(1 + 0.5 \sin 2\pi f_m t) \cos 2\pi f_c t$, where $f_m < B$

The average side-band power for the AM signal given above is :

(A) 25 W

(B) 12.5 W

(C) 6.25 W

(D) 3.125 W

52. Which block is not present in Superheterodyne receiver ?

(A) IF Amplifier and Filter

(B) RF Amplifier and Filter

(C) Mixer

(D) Schmitt Trigger

53. The IF is 455 kHz. If the radio receiver is tuned to 855 kHz, the local oscillator frequency is :

(A) 455 kHz

(B) 1310 kHz

(C) 1500 kHz

(D) 1520 kHz

54. A 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 is :

(A) 205 kHz

(B) 300 kHz

(C) 305 kHz

(D) 101 kHz

55. In TV transmission, sound signal is _____ modulated.

(A) Amplitude

(B) Frequency

(C) Phase

(D) None of the above

56. A carrier $A_c.\cos(\omega_c t)$ is frequency modulated by a singla $E_m.\cos(\omega_m t)$. The modulation index is m_f. The expression for the resulting FM signal is :

(A) $A_c.\cos[\omega_c t + m_f.\sin(\omega_m t)]$

(B) $A_c.\cos[\omega_c t + m_f.\cos(\omega_m t)]$

(C) $A_c.\cos[\omega_c t + 2\pi.m_f.\sin(\omega_m t)]$

(D) $A_c.\cos[\omega_c t + 2\pi.m_f E_m.\omega_m.\cos(\omega_m t)]$

57. Figure given below shows Fourier spectra of signal x(t) :
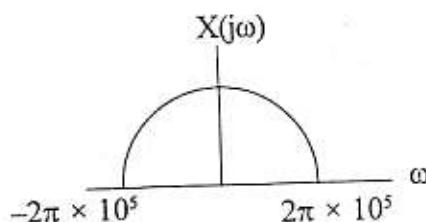
The Nyquist sampling rate for x(t) is :

(A) 100 kHz

(B) 200 kHz

(C) 300 kHz

(D) 50 kHz

58. The PAM signal can be detected by :

(A) Bandpass filter

(B) Bandstop filter

(C) Highpass filter

(D) Lowpass filter

59. The main disadvantage of PCM is :

(A) Large bandwidth

(B) Large power

(C) Complex circuitry

(D) Quantization noise

60. In PWM signal reception, the Schmitt trigger circuit is used :

(A) To remove noise

(B) To produce ramp signal

(C) For synchronization

(D) None of the above

1. The five flags in 8085 are designated as :

   (A) Z, CY, S, P, AC

   (B) D, Z, S, P, AC

   (C) Z, C, S, P, AC

   (D) D, CY, S, P, AC

2. In 8085, pins for SID and SOD are :

   (A) 4 and 5 respectively

   (B) 5 and 4 respectively

   (C) 3 and 4 respectively

   (D) 4 and 3 respectively

3. In 8085 microprocessor :

   (A) P flag is set when the result has even parity

   (B) P flag is set when the result has odd parity

   (C) P flag is reset when the result has even parity

   (D) None of the above

4. In 8085 microprocessor, HL register pair is used for storing :

   (A) Address of memory

   (B) Data

   (C) Address of next instruction

   (D) Address of current instruction

5. What is the vectored address of interrupt RST5 ?

   (A) 0040 H

   (B) 0028 H

   (C) 0005 H

   (D) 0008 H

6. **P :** Program counter is the register, which stores the address of the next instruction to be executed.

   Q : Stack pointer stores the address of the top of the stack.

   Out of these two statements, which statement(s) is (are) true ?

   (A) Only P

   (B) Only Q

   (C) Both P and Q

   (D) None of them

7. A stack is :

   (A) An 8-bit register in the 8085 microprocessor

   (B) A 16-bit register in the 8085 microprocessor

   (C) A set of memory locations in R/W memory reserved for storing information temporarily during the execution of a program

   (D) A 16-bit memory address stored in the program counter

8. Consider the table given below

IO/$\overline{\text{M}}$	S_1	S_0	Machine cycle
0	1	1	X
1	0	1	Y
1	1	1	Z

Here S_0 and S_1 are status signals.

X, Y, Z are respectively :

(A) Interrupt Acknowledgment, I/O read, Opcode Fetch

(B) Interrupt Acknowledgment, I/O write, Opcode Fetch

(C) Opcode Fetch, I/O read, Interrupt Acknowledgment

(D) Opcode Fetch, I/O write, Interrupt Acknowledgment

9. At 100 % amplitude modulation, the power in each sideband is _____ of that of carrier.

(A) 50 %

(B) 40 %

(C) 60 %

(D) 25 %

10. Consider the amplitude modulated (AM) signal $A_c \cos\omega_c t + 2\cos\omega_m t \cos\omega_c t$. For demodulating the signal using envelope detector, the minimum value of A_c should be :

(A) 2

(B) 1

(C) 0.5

(D) 0

11. In amplitude modulation, bandwidth is _____ the highest frequency of audio signal.

(A) Thrice

(B) Four times

(C) Twice

(D) None of the above

12. Superheterodyne principle refers to :

(A) Using a large number of amplifier stages

(B) Using a push-pull circuit

(C) Obtaining lower fixed intermediate frequency

(D) Obtaining higher fixed intermediate frequency

13. The signal $\cos\omega_c t + 0.5\cos\omega_m t . \sin\omega_c t$ is :

(A) FM only

(B) AM only

(C) Both AM and FM

(D) Neither AM nor FM

14. Consider the frequency modulated signal $10\cos[2\pi.10^5 t + 5\sin(2\pi.1500t) + 7.5\sin(2\pi.1000t)]$ with carrier frequency of 10^5 Hz. The modulation index is :

(A) 12.5

(B) 10

(C) 7.5

(D) 5

15. The modulation frequency of an FM is doubled. How does the modulation index change?

   (A) Gets halved

   (B) Gets doubled

   (C) Gets increased by 50 percent

   (D) Remains unchanged

16. The major advantage of FM over AM is:

   (A) Reception is less noisy

   (B) Higher carrier frequency

   (C) Smaller bandwidth

   (D) Small frequency deviation

17. A signal of maximum frequency of 10 kHz is sampled at Nyquist rate. The time interval between two successive samples is:

   (A) 50 µs

   (B) 100 µs

   (C) 1000 µs

   (D) 5 µs

18. Drawback of using PAM method is:

   (A) Bandwidth is very large as compared to modulating signal

   (B) Varying amplitude of carrier varies the peak power required for transmission

   (C) Due to varying amplitude of carrier, it is difficult to remove noise at receiver

   (D) All of the above

19. Pulse Time Modulation (PTM) includes:

   (A) Pulse width modulation

   (B) Pulse position modulation

   (C) Pulse amplitude modulation

   (D) Both (A) and (B)

20. In Pulse Code Modulation System:

   (A) Quantising noise can be overcome by companding

   (B) Large bandwidth is required

   (C) Quantising noise can be reduced by decreasing the number of standard levels

   (D) Suffers from the disadvantage of its incompatibility with Time Division Multiplexing (TDM)

21. Thevenin's theorem replaces a complicated circuit facing a load by an:

   (A) Ideal voltage source and parallel resistor

   (B) Ideal current source and parallel resistor

   (C) Ideal current source and series resistor

   (D) Ideal voltage source and series resistor

22. The output voltage of an ideal voltage source is:

   (A) Zero

   (B) Constant

   (C) Dependent on load resistance

   (D) Dependent on internal resistance

23. The total reactance of a series RLC circuit at resonance is :

(A) Zero

(B) Equal to the resistance

(C) Infinity

(D) Capacitive

24. If the value of resonant frequency is 50 kHz in a series RLC circuit along with the bandwidth of about 1 kHz, then what would be the value of quality factor ?

(A) 50

(B) 5

(C) 100

(D) 500

25. Semiconductors have _____ temperature coefficient of resistance.

(A) Positive

(B) Zero

(C) Negative

(D) None of the above

26. The leakage current across a pn junction is due to :

(A) Minority carriers

(B) Majority carriers

(C) Junction capacitance

(D) None of the above

27. Zener diodes are used primarily as :

(A) Amplifiers

(B) Voltage regulators

(C) Rectifiers

(D) Oscillators

28. The average value of half-wave rectified voltage with a peak value of 200V is :

(A) 63.7 V

(B) 127.3 V

(C) 141 V

(D) 0 V

29. In a transistor if $\beta = 100$ and collector current is 10 mA, then emitter current I_E is :

(A) 100 mA

(B) 10.1 mA

(C) 110 mA

(D) None of the above

30. Which one of the following is not an NPN transistor ?

(A) BC548

(B) BC557B

(C) 2N2222

(D) BC547B

31. In voltage divider bias, $V_{CC} = 25$ V ; $R_1 = 10$ kΩ (Upper resistor in the divider); $R_2 = 2.2$ kΩ (Lower resistor in the divider); $R_C = 3.6$ kΩ and $R_E = 1$kΩ. Assuming Silicon transistor, what is the emitter voltage ?

   (A) 6.7 V

   (B) 5.3 V

   (C) 4.9 V

   (D) 3.8 V

32. In a JFET, I_{DSS} is known as :

   (A) Drain to source current with source open

   (B) Drain to source current with gate shorted to ground

   (C) Drain to source current with gate open

   (D) Drain to source current with source shorted to ground

33. The logic function $f = \overline{(x.\overline{y}) + (\overline{x}.y)}$ is the same as :

   (A) $f = (x + y)(\overline{x} + \overline{y})$

   (B) $f = (\overline{x} + y)(x + \overline{y})$

   (C) $f = (x.y).(\overline{x}\,\overline{y})$

   (D) None of the above

34. How many data select lines are required for selecting eight inputs ?

   (A) 1

   (B) 2

   (C) 3

   (D) 4

35. The octal equivalent of $(B2F)_{16}$ is :

   (A) $(5547)_8$

   (B) $(5457)_8$

   (C) $(7547)_8$

   (D) $(11010)_8$

36. While assigning the bit(s) to the cells, Karnaugh Map follows :

   (A) Excess-3 codes

   (B) Gray code

   (C) Straight binary code

   (D) BCD code

37. A square wave with a period of 10 μs drives a T flip-flop (with T at high level). The period of the output signal will be :

   (A) 100 μs

   (B) 20 μs

   (C) 10 μs

   (D) 5 μs

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

   (A) 1

   (B) 4

   (C) 6

   (D) 7

39. In this type of counter, the output of the last stage is connected to the D input of the first stage :

   (A) Ring Counter

   (B) Johnson Counter

   (C) Up-Down Counter

   (D) All of the above

40. There are _____ basic types of shift registers.
    (A) Six
    (B) Four
    (C) One
    (D) Many

41. _____ coupling has the best frequency response.
    (A) RC
    (B) Transformer
    (C) Direct
    (D) None of the above

42. In an RC coupling scheme, the coupling capacitor C_C must be large enough :
    (A) To pass d.c. between the stages
    (B) Not to attenuate the low frequencies
    (C) Not to attenuate the high frequencies
    (D) To dissipate high power

43. Class _____ power amplifier has the highest collector efficiency.
    (A) C
    (B) A
    (C) B
    (D) AB

44. If a transistor amplifier feeds a load of low resistance (e.g. speaker), then voltage gain will be :
    (A) High
    (B) Very high
    (C) Moderate
    (D) Low

45. When negative voltage feedback is applied to an amplifier, its bandwidth :
    (A) Increases
    (B) Decreases
    (C) Remains the same
    (D) Becomes infinite

46. In a certain oscillator, $A_v = 50$. The attenuation of the feedback circuit must be :
    (A) 1
    (B) 0.01
    (C) 10
    (D) 0.02

47. The resonant angular frequency of an RC oscillator is :
    (A) $\dfrac{1}{RC}$
    (B) $\dfrac{1}{2\pi RC}$
    (C) $\dfrac{1}{2\pi\sqrt{LC}}$
    (D) $\dfrac{1}{2\pi LC}$

48. _____ is a fixed frequency oscillator.
    (A) Phase-shift oscillator
    (B) Hartley oscillator
    (C) Colpitt's oscillator
    (D) Crystal oscillator

49. In the op-amp circuit shown below, the voltage V_O is :
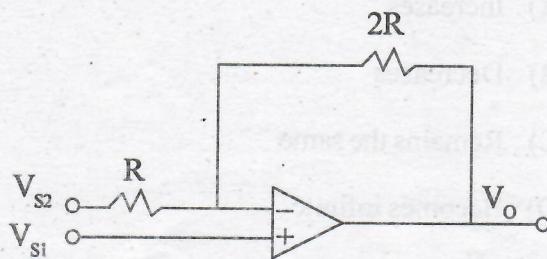
(A) $3V_{s1} - 6V_{S2}$

(B) $2V_{s1} - 3V_{S2}$

(C) $2V_{s1} - 2V_{S2}$

(D) $3V_{s1} - 2V_{S2}$

50. CMRR for an OP-AMP is :

(A) $20\log_{10}\left(\dfrac{A_{com}}{A_{diff}}\right)$

(B) $20\log_{10}\left(\dfrac{A_{diff}}{A_{com}}\right)$

(C) $20\log_{20}\left(\dfrac{A_{com}}{A_{diff}}\right)$

(D) $10\log_{10}\left(\dfrac{A_{diff}}{A_{com}}\right)$

51. Op-amp integrator uses :

(A) Capacitor as feedback element

(B) Resistor as feedback element

(C) Inductor as feedback element

(D) A simple wire as feedback element

52. 555 timer is a :

(A) 8-pin DIP IC

(B) 8-pin TOP IC

(C) 14-pin DIP IC

(D) 8-pin flat package IC

53. A galvanometer in series with a high resistance is called :

(A) An ammeter

(B) A voltmeter

(C) A wattmeter

(D) Ohmmeter

54. Two multimeters A and B have sensitivities of $10\ k\Omega/V$ and $30\ k\Omega/V$ respectively. Then :

(A) Multimeter A is more sensitive

(B) Multimeter B is more sensitive

(C) Both are equally sensitive

(D) None of the above

55. The value of multiplier resistor required to design a voltmeter of 10V range with a PMMC of internal resistance of $1\ K\Omega$ and $I_{fsd} = 100\ \mu A$ is :

(A) $1\ K\Omega$

(B) $9\ K\Omega$

(C) $10\ K\Omega$

(D) $99\ K\Omega$

56. The value of external resistance at half scale deflection in case of series type ohmmeter is equal to :

(A) Half the internal resistance of the meter

(B) The internal resistance of the meter

(C) $\frac{1}{4}^{th}$ of the internal resistance of the meter

(D) None of the above

57. Schering bridge is used to :

(A) Measure the insulating properties of electrical cables and equipment

(B) Determine the inductance

(C) Measure mutual inductance

(D) Measure low resistance

58. AQUADAG is a :

(A) Non-conductive coating on the screen of a CRT to collect the high velocity electrons

(B) Non-conductive coating on the screen of a CRT to collect the secondary-emission electrons

(C) Conductive coating on the screen of a CRT to collect the secondary-emission electrons

(D) None of these

59. The colour of the spot on the screen of a CRO is a characteristic of :

(A) Electron gun in a CRT

(B) The type of the waveform being observed

(C) The coating material on the screen

(D) The velocity of the electrons striking the screen

60. Self generating type transducers are _____ transducers.

(A) Active

(B) Passive

(C) Secondary

(D) Inverse

ENTRANCE TEST-2017

SCHOOL OF APPLIED SCIENCES & TECHNOLOGY

ELECTRONICS

Question Booklet Series **B**

Total Questions	:	60	
Time Allowed	:	70 Minutes	

Roll No. :

Instructions for Candidates :

1. Write your Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.

2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.

3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.

4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.

5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.

6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.

7. There will be 'Negative Marking' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.

8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.

9. Do not make any stray mark on the OMR sheet.

10. Calculators and mobiles shall not be permitted inside the examination hall.

11. Rough work, if any, should be done on the blank sheets provided with the question booklet.

12. OMR Answer sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.

13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.

14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

1. An 8085 assembly language program is given below. Assume that the carry flag is initially unset. The content of the accumulator after the execution of the program is

    MVI A, 07H
    RLC
    MOV B,A
    RLC
    RLC
    ADD B
    RRC

    (A)   8CH
    (B)   64H
    (C)   23H
    (D)   15H

2. For 8085 microprocessor, the following program is executed

    MVI A, 05H;
    MVI B, 05H;
    PTR: ADD B;
    DCR B;
    JNZ PTR;
    ADI 03H;
    HLT;

    At the end of program, accumulator contains

    (A)   17 H
    (B)   20 H
    (C)   23 H
    (D)   05 H

3. For the 8085 assembly language program given below, the content of the accumulator after the execution of the program is

    3000 MVI A, 45H
    3002 MOV B, A
    3003 STC
    3004 CMC
    3005 RAR
    3006 XRA B

    (A)   00H
    (B)   45H
    (C)   67H
    (D)   E7H

4. An 8085 microprocessor executes "STA 1234H" with starting address location 1FFEH (STA copies the contents of the accumulator to the 16 bit address location). While the instruction is fetched and executed, the sequence of values written at the address pins A15–A8 is:

    (A)   1FH, 1FH, 20H, 12H
    (B)   1FH, FEH, 1FH, FFH
    (C)   1FH, 1FH, 12H, 12H
    (D)   1FH, 1FH, 12H, 20H

5. If the carrier of a 100% modulated AM wave is suppressed, the percentage power saving will be

    (A)   50
    (B)   150
    (C)   100
    (D)   66.66

6. Consider the signal $s(s)=m(t)\cos 2\pi f_c t+\hat{m}(t)\sin 2\pi f_c t$ where $\hat{m}(t)$ denotes the Hilbert transform of $m(t)$ and the bandwidth of $m(t)$ is very small compared to f_c. The signal $s(t)$ is a

    (A)   high-pass signal
    (B)   low-pass signal
    (C)   band-pass signal
    (D)   double sideband suppressed carrier signal

7. A message signal $m(t) = \cos 200pt + 4\cos pt$ modulates the carrier $c(t) = \cos 2p\, f_c t$ where $f_c = 1$ MHz to produce an AM signal. For demodulating the generated AM signal using an envelope detector, the time constant RC of the detector circuit should satisfy

    (A)   0.5 ms < RC < 1ms
    (B)   1 μs << RC < 0.5 ms
    (C)   RC << 1 μs
    (D)   RC >> 0.5 ms

8. Consider sinusoidal modulation in an AM system. Assuming no over modulation, the modulation index(μ) when the maximum and minimum values of the envelope respectively, are 3 V and 1 V, is _____.

   (A)   0.5

   (B)   1

   (C)   0.8

   (D)   0.6

9. An FM signal with a modulation index m_f is passed through a frequency Tripler. The wave in the output of the Tripler will have a modulation index of

   (A) $m_f/3$

   (B) $3m_f$

   (C) m_f

   (D) $9m_f$

10. Consider an angle modulated signal x(t)=6cos[2πx106t+2sin(8000πt) +4cos(8000pt)] V. The average power of x(t) is

   (A)   10 W

   (B)   18 W

   (C)   20 W

   (D)   28 W

11. An FM radio receiver which is tuned to a 91.6 MHz broadcast station may receive an image frequency of

   (A)   102.3 MHz

   (B)   113 MHz

   (C)   70.2 MHz

   (D)   80.9 MHz

12. Commercial frequency deviation of FM is

   (A)   70 kHz

   (B)   75 kHz

   (C)   80 kHz

   (D)   65 kHz

13. One of the disadvantages of PCM is

   (A)   It requires large bandwidth

   (B)   Very high noise

   (C)   Cannot be decoded easily

   (D)   All of the above

14. An analog signal is band-limited to 4 kHz, sampled at the Nyquist rate and the samples are quantized into 4 levels. The quantized levels are assumed to be independent and equally probable. If we transmit two quantized samples per second, the information rate is _____ bits / second.

   (A)   1

   (B)   2

   (C)   3

   (D)   4

15. A band-limited signal with a maximum frequency of 5 kHz is to be sampled. According to the sampling theorem, the sampling frequency which is not valid is

   (A)   5 kHz

   (B)   12 kHz

   (C)   15 kHz

   (D)   20 kHz

16. Which one of the following is used to generate PWM?

   (A)   Free running multivibrator

   (B)   Mono-stable multivibrator

   (C)   JK flip flop

   (D)   Schmitt trigger

17. Generation of FM signal from PM signal requires

   (A)   Differentiator

   (B)   Integrator

   (C)   Band pass filter

   (D)   Oscillator

18. Assertion (A): Thermistors are commonly used to measure hot spot temperatures in electric machines.

    Reason (R): Thermistor has the advantages of high temperature coefficient, small size and high speed of response.

    (A) Both (A) and (R) are true and (R) is correct explanation of (A)

    (B) Both (A) and (R) are true but (R) is not correct explanation of (A)

    (C) (A) is true (R) is false

    (D) (A) is false (R) is true

19. Consider the following statements regarding phase sensitive detector –

    1. The detector reads zero when phases of input signal and reference signal are different

    2. The detector acts as a linear rectifier

    3. The detector can be used as vector voltmeter

    Of the above statements which are correct?

    (A) 1, 2, 3   (B) 1 and 2

    (C) 2 and 3   (D) 1 and 3

20. Companding is used

    (A) to overcome quantizing noise in PCM

    (B) in PCM transmitters, to allow amplitude limited in the receivers

    (C) to protect small signals in PCM from quantizing distortion

    (D) in PCM receivers, to overcome impulse noise.

21. For parallel RLC circuit, which one of the following statements is NOT correct?

    (A) The bandwidth of the circuit decreases if R is increased

    (B) The bandwidth of the circuit remains same if L is increased

    (C) At resonance, input impedance is a real quantity

    (D) At resonance, the magnitude of input impedance attains its minimum value.

22. The current I_s in Amps in the voltage source, and voltage V_s in Volts across the current source respectively, are

    (A) 13, −20   (B) 8, −10

    (C) −8, 20   (D) −13, 20

23. In the circuit shown below, the Norton equivalent current in amperes with respect to the terminals P and Q is
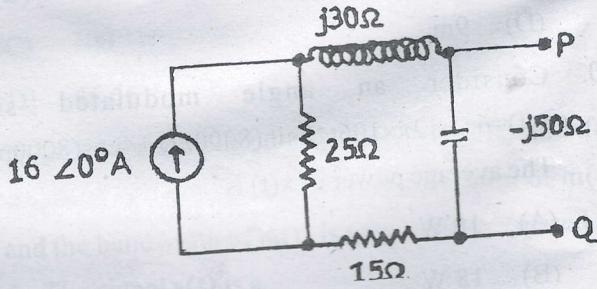
    (A) 6.4−j4.8   (B) 6.56−J7.87

    (C) 10+j0   (D) 16+j0

24. In the circuit shown below, the current I is equal to

    (A) 14 A   (B) 2.0 A

    (C) 2.8 A   (D) 3.2 A
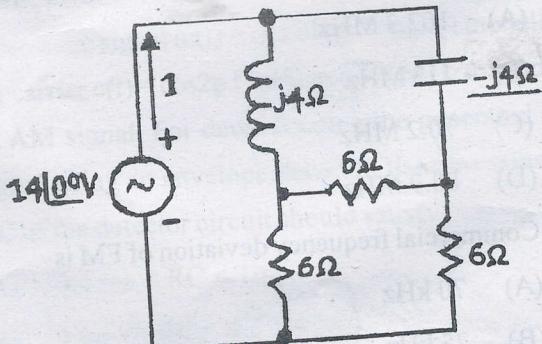
25. Consider the following statement:

If an electric field is applied to an n type semiconductor bar, the electrons and holes move in opposite directions due to their opposite charges. The net current is -

1. both due to electrons and holes with electrons as majority carriers

2. sum of hole and electron currents

3. difference between electron and hole currents.

Which of above statements are correct?

(A)   1 only

(B)   1 and 2

(C)   2 only

(D)   3 only

Common data for Questions 26 to 28

At room temperature a Si p-n junction diode with n-side is doped with donor concentration of 10^{16} cm^{-3} and p-side is doped with acceptor concentration of 10^{17} cm^{-3}. The relative permittivity of Si, $\epsilon r = 11.7$, $n_i = 10^{10}$ cm^{-3}.

26. The built in potential is

(A)   360 mV

(B)   420 mV

(C)   640 mV

(D)   780 mV

27. The depletion region width is

(A)   3.37 μm

(B)   33.7 μm

(C)   5.28 μm

(D)   8.91 μm

28. The junction capacitance per unit area with zero bias is

(A)   3.02 μF/m^2

(B)   26.15 μF/m^2

(C)   51.92 μF/m^2

(D)   72.75 μF/m^2

29. In the circuit shown below, for the MOS transistors, $u_n C_{ox} = 100$ μA/V^2 and the threshold voltage $V_t = 1$V. The voltage V_x at the source of the upper transistor is :
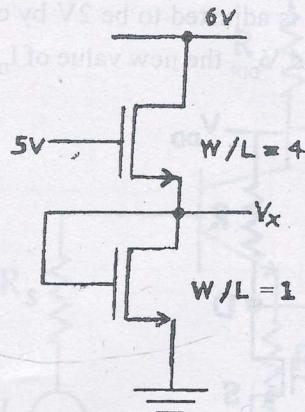
(A)   1 V   (B)   2 V

(C)   3 V   (D)   3.67 V

30. For a BJT the common base current gain $\alpha = 0.98$ and the collector base junction reverse bias saturation current $I_{CO} = 0.6$μA. This BJT is connected in the common emitter mode and operated in the active region with a base drive current $I_B = 20$μA. The collector current IC for this mode of operation is

(A)   0.98 mA   (B)   0.99 mA

(C)   1.0 mA   (D)   1.01 mA

31. In the circuit shown below, the silicon npn transistor Q has a very high value of β. The required value of R_2 in kΩ to produce $I_C = 1$ mA is
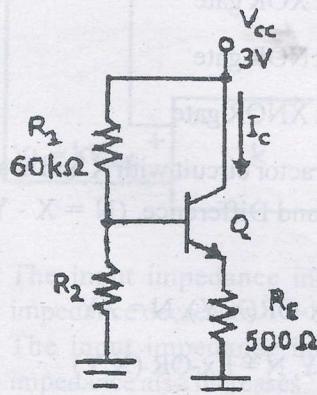
(A)   20   (B)   30

(C)   40   (D)   50

32. For the n-channel MOS transistor shown in the figure, the threshold voltage V_{Th} is 0.8 V. Neglect channel length modulation effects. When the drain voltage $V_D = 1.6$ V, the drain current I_D was found to be 0.5 mA. If V_D is adjusted to be 2V by changing the values of R and V_{DD}, the new value of I_D (in mA) is
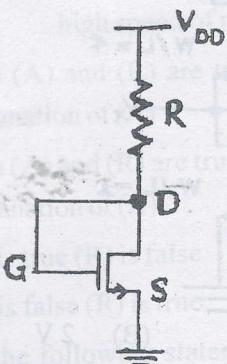
(A)   0.625

(B)   0.75

(C)   1.125

(D)   1.5

33. A 3-input majority gate is defined by the logic function $M(a,b,c) = ab + bc + ca$. Which one of the following gates is represented by the function $M(\overline{M(a, b, c)}, M(a, b, \overline{c}), c)$?

(A)   3-input NAND gate

(B)   3-input XOR gate

(C)   3-input NOR gate

(D)   3-input XNOR gate

34. In a half-subtractor circuit with X and Y as inputs, the Borrow (M) and Difference, (N = X - Y) are given by

(A)   M = Ex-OR(X,Y), N = XY

(B)   M = XY, N = Ex-OR (X,Y)

(C)   M = X'Y, N = Ex-OR (X,Y)

(D)   M = XY, N = (Ex-OR (X,Y))

35. The output Y in the circuit below is always '1' when
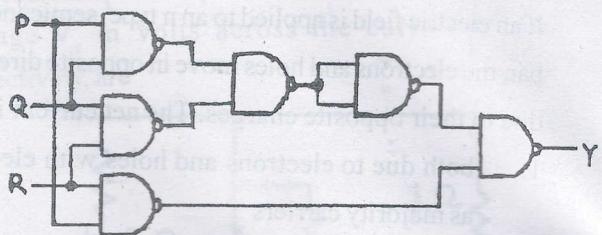
(A)   two or more of the inputs P,Q,R are '0'

(B)   two or more of the inputs P,Q,R are '1'

(C)   any odd number of the inputs P,Q,R is '0'

(D)   any odd number of the inputs P,Q,R is '1'

36. The logic function implemented by the circuit below is (ground implies logic 0)
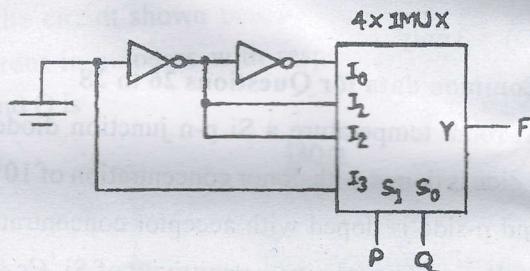
(A)   F = P AND Q   (B)   F = P OR Q

(C)   F = P XNOR Q   (D)   F = P XOR Q

37. In the differential amplifier shown in the figure, the magnitudes of the common-mode and differential-mode gains are A_{cm} and A_d, respectively. If the resistance R_E is increased, then
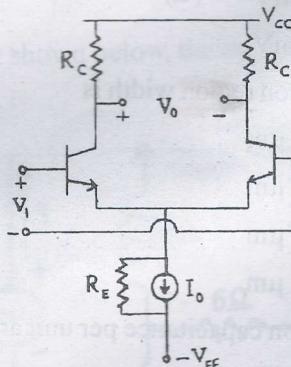
(A) A_{cm} increases

(B)   common-mode rejection ratio increases

(C) A_d increases

(D)   common-mode rejection ratio decreases

38. The ac schematic of an NMOS common-source stage is shown in the figure below, where part of the biasing circuits has been omitted for simplicity. For the n channel MOSFET M, the Transconductance $g_m = 1mA/V$, and body effect and channel length modulation effect are to be neglected. The lower cutoff frequency in Hz of the circuit is approximately at
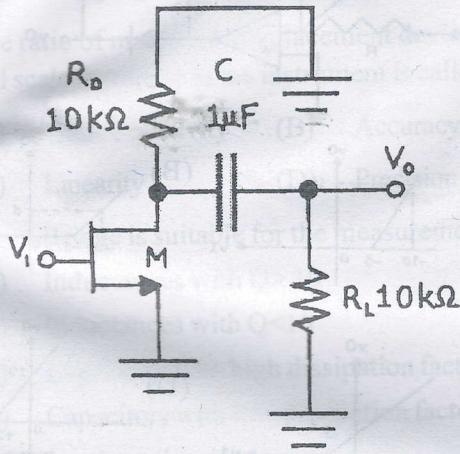
(A)   8

(B)   32

(C)   50

(D)   200

39. An RC coupled amplifier is assumed to have a single pole low frequency transfer function. The maximum lower cut-off frequency allowed for the amplifier to pass 50 Hz square wave with no more than 10% tilt is :

(A)   150 Hz

(B)   100 Hz

(C)   200 Hz

(D)   120 Hz

40. The cascode amplifier is a multistage configuration of

(A)   CC-CB

(B)   CE-CB

(C)   CB-CC

(D)   CE-CC

41. The feedback topology in the amplifier circuit the base bias circuit is not shown for (simplicity) in the figure is
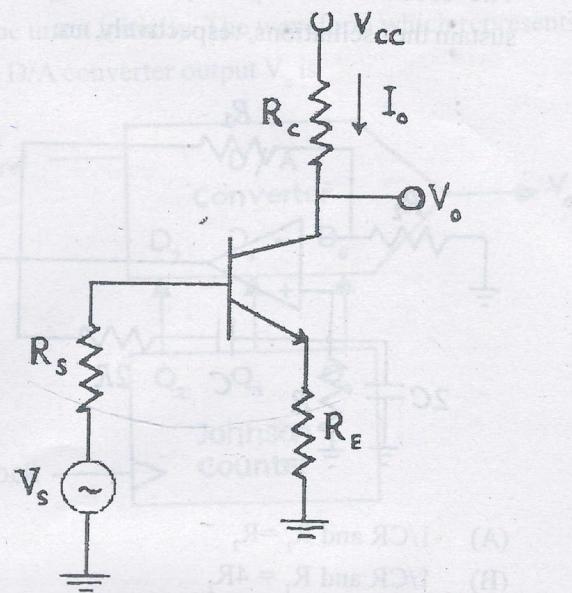
(A)   Voltage shunt feedback

(B)   Current series feedback

(C)   Current shunt feedback

(D)   Voltage series feedback

42. In a voltage-voltage feedback as shown below, which one of the following statements is TRUE if the gain k is increased?
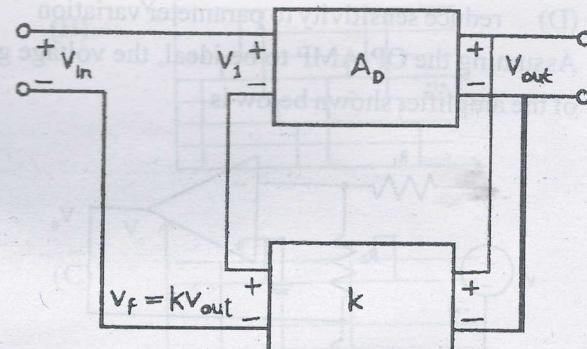
(A)   The input impedance increases and output impedance decreases

(B)   The input impedance increases and output impedance also increases

(C)   The input impedance decreases and output impedance also decreases

(D)   The input impedance decreases and output impedance increases

43. The circuit shown in the figure has an ideal op-amp. The oscillation frequency and the condition to sustain the oscillations, respectively, are
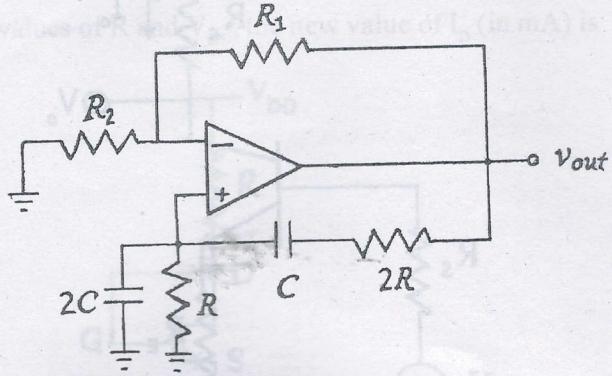
(A) $1/CR$ and $R_1 = R_2$

(B) $1/CR$ and $R_1 = 4R_2$

(C) $1/2CR$ and $R_1 = R_2$

(D) $1/2CR$ and $R_1 = 4R_2$

44. Negative feedback in a closed-loop control system DOES NOT

(A) reduce the overall gain

(B) reduce bandwidth

(C) improve disturbance rejection

(D) reduce sensitivity to parameter variation

45. Assuming the OP-AMP to be ideal, the voltage gain of the amplifier shown below is
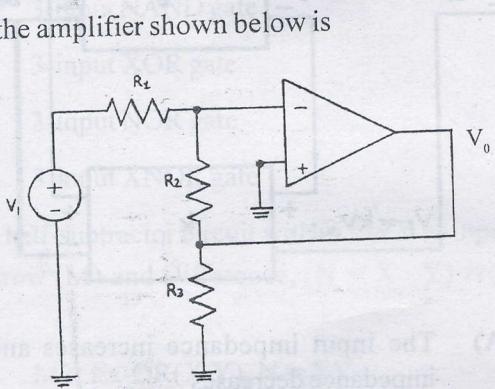
(A) $-R_2/R_1$

(B) $-R_3/R_1$

(C) $-(R_2 \| R_3)/R_1$

(D) $-(R_2 + R_3)/R_1$

46. The transfer characteristic for the precision rectifier circuit shown below is (assume ideal OP-AMP and practical diodes)

(A)

(B)

(C)

(D)
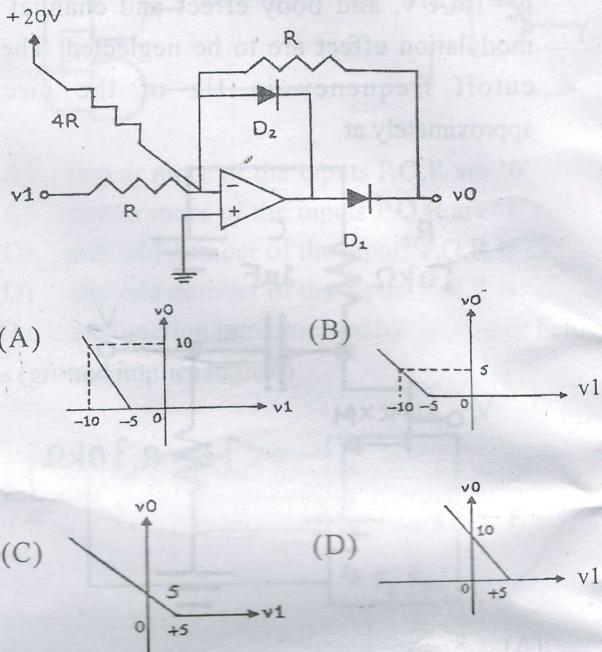
47. An amplifier using an op-amp with a slew rate SR=1 V/μsec has a gain of 40dB. If this amplifier has to faithfully amplify sinusoidal signals from dc to 20 kHz without any slew rate distortion, then the input signal must not exceed

(A) 795 mV

(B) 395 mV

(C) 79.5 mV

(D) 39.5 mV

48. The ideal op-amp has the following characteristics

(A) $R_i = \infty, A_v = \infty, R_o = 0$

(B) $R_i = 0, A_v = \infty, R_o = 0$

(C) $R_i = \infty, A_v = \infty, R_o = \infty$

(D) $R_i = 0, A_v = \infty, R_o = \infty$

49. The function of shunt in an ammeter is to

(A) bypass the current

(B) increase the sensitivity of the ammeter

(C) increase the resistance of ammeter

(D) none of the above

50. In majority of instruments damping is provided by

(A) fluid friction   (B) spring

(C) eddy currents   (D) all of the above

51. Which of the following essential features is possessed by an indicating instrument ?

(A) Deflecting device   (B) Controlling device

(C) Damping device   (D) All of the above

52. The ratio of maximum displacement deviation to the full scale deviation of the instrument is called:

(A) Static sensitivity   (B) Accuracy

(C) Linearity   (D) Precision

53. Hay's Bridge is suitable for the measurement of

(A) Inductances with Q> 10

(B) Inductances with Q<10

(C) Capacitors with high dissipation factor

(D) Capacitors with low dissipation factor

54. In CRO astigmatism is:

(A) Source of generating fast electrons

(B) Media for absorbing secondary emission electrons

(C) An additional focus control

(D) Time delay control in the vertical deflection system

55. The outputs of the two flip-flops Ql, Q2 in the figure shown are initialized to 0,0. The sequence generated at Ql upon application of clock signal is :
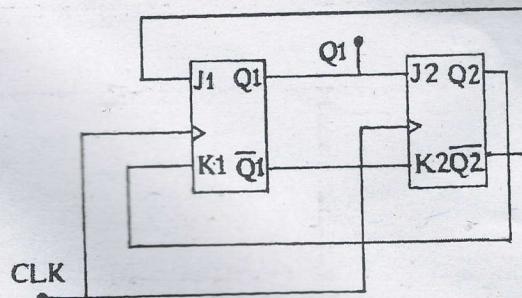
(A) 01110...   (B) 01010...

(C) 00110...   (D) 01100...

56. The output of a 3-stage Johnson (twisted ring) counter is fed to a digital-to-analog (D/A) converter as shown in the figure below. Assume all the states of the counter to be unset initially. The waveform which represents the D/A converter output V_o is

(A)

(B)

(C)

(D)
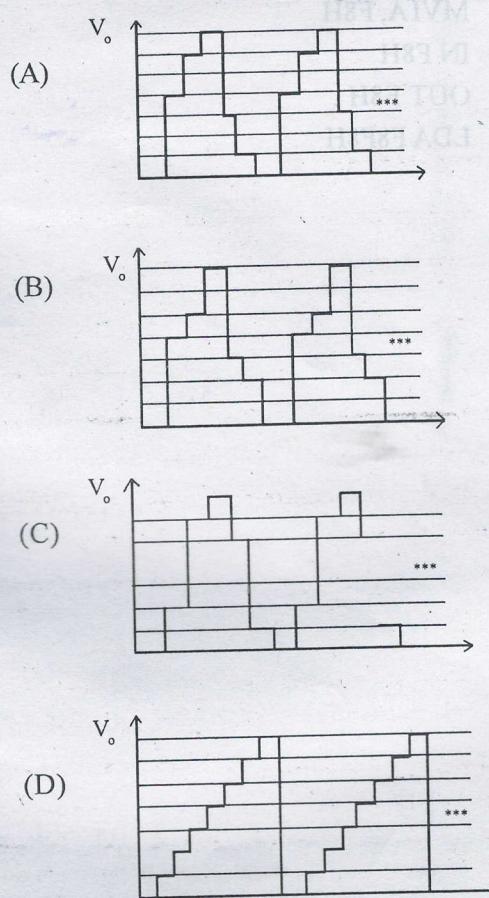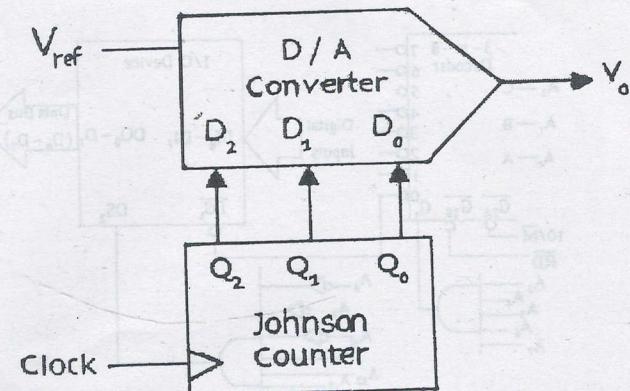
57. For the 8085 microprocessor, the interfacing circuit to input 8-bit digital data (DI0 - DI7) from an external device is shown in the figure. The instruction for correct data transfer is
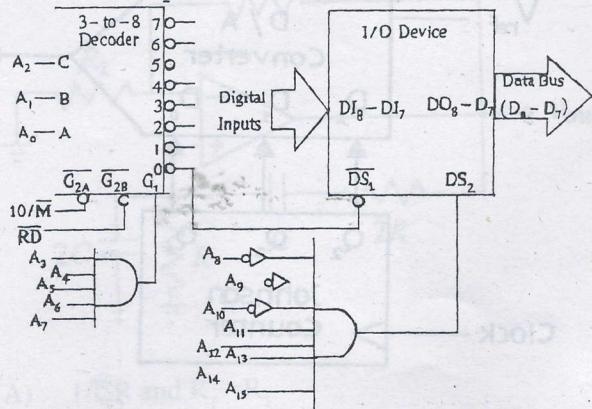
(A) MVI A, F8H
(B) IN F8H
(C) OUT F8H
(D) LDA F8F8H

58. In an 8085 microprocessor, the shift registers which store the result of an addition and the overflow bit are, respectively

(A) B and F
(B) A and F
(C) H and F
(D) A and C

59. Which one of the following is not a vectored interrupt?

(A) TRAP
(B) INTR
(C) RST 7.5
(D) RST 3

60. The register in the 8085A that is used to keep track of the memory address of the next op-code to be run in the program is the:

(A) stack pointer
(B) program counter
(C) instruction pointer
(D) Accumulator

ENTRANCE TEST-2016

FACULTY OF APPLIED SCIENCE & TECHNOLOGY

M.Sc. ELECTRONICS

Question Booklet Series **A**

Total Questions : 60
Time Allowed : 70 Minutes

Roll No. :

Instructions for Candidates :

1. Write your Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.

2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.

3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.

4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.

5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.

6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.

7. There will be 'Negative Marking' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.

8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.

9. Do not make any stray mark on the OMR sheet.

10. Calculators and mobiles shall not be permitted inside the examination hall.

11. Rough work, if any, should be done on the blank sheets provided with the question booklet.

12. OMR Answer sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.

13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.

14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

1. Voltage division law states that the voltage across an impedance in a loop containing a single voltage source and many impedances is given by :
   - (A) The magnitude of impedance only
   - (B) The value of voltage source only
   - (C) The magnitude of impedance and the value of voltage source
   - (D) None of the above

2. Norton's theorem can be used to transform a complex network into an equivalent network that contains :
   - (A) A voltage source in parallel with an equivalent resistance
   - (B) A voltage source in series with an equivalent resistance
   - (C) A current source in parallel with an equivalent resistance
   - (D) A current source in series with an equivalent resistance

3. A parallel LC resonance circuit has :
   - (A) Maximum impedance at resonance frequency
   - (B) Maximum current at resonance frequency
   - (C) Minimum impedance at resonance frequency
   - (D) None of the above

4. Which filter has maximum gain at its center/corner frequency ?
   - (A) A lowpass filter
   - (B) A highpass filter
   - (C) A bandpass filter
   - (D) A bandstop filter

5. Which of the following shall be created by adding a trivalent impurity to silicon ?
   - (A) Germanium
   - (B) A p-type semiconductor
   - (C) An n-type semiconductor
   - (D) A depletion region

6. What will be the average value of full-wave rectified voltage with a peak value of 150 V ?
   - (A) 127.3 V
   - (B) 141 V
   - (C) 95.49 V
   - (D) 63.5 V

7. Which of the following is correct about Zener diode ?
   - (A) Positive temperature voltage coefficient
   - (B) Negative temperature voltage coefficient
   - (C) Zero temperature voltage coefficient
   - (D) All of the above

8. Which of the following is used to determine Line regulation ?

    (A)   Load current

    (B)   Zener current and load current

    (C)   Changes in load resistance and output voltage

    (D)   Changes in output voltage and input voltage

9. Which of the following relates between β with α ?

    (A) $\beta = \dfrac{1}{1-\alpha}$ (B) $\beta = \dfrac{1}{1+\alpha}$

    (C) $\beta = \dfrac{\alpha}{1-\alpha}$ (D) $\beta = \dfrac{\alpha}{1+\alpha}$

10. What will be the collector voltage, if the base emitter junction is open ?

    (A)   Vcc   (B)   0V

    (C)   Floating   (D)   0.2V

11. The input resistance of a common base (CB) amplifier is :

    (A)   Very low   (B)   Very high

    (C)   Same as CE   (D)   Same as CC

12. Which of the following is correct about MOSFET ?

    (A)   MOSFET has two modes of operation : Enhancement and Depletion

    (B)   MOSFET has two types: n-channel and p-channel

    (C)   Most of the current digital ICs are implemented using MOSFETs

    (D)   All of the above

13. According to De-Morgan's law, $\overline{A+B}$ can be written as :

    (A) $A + \overline{B}$ (B) $\overline{A} + \overline{B}$

    (C) $A.\overline{B}$ (D) $\overline{A}.\overline{B}$

14. Which of the following is the correct hexadecimal representation of $(103)_{10}$?

    (A) $7F_{16}$ (B) 67_{16}

    (C) 81_{16} (D) 87_{16}

15. Which of the following is same as the logic function $f = xy + x.\bar{y} + \bar{x}.y + \bar{x}.\bar{y}$?

(A) $f = 1$

(B) $f = (\bar{x} + y)(x + \bar{y})$

(C) $f = (x.y) + (\bar{x}.\bar{y})$

(D) None of the above

16. Which of the following is the correct octal representation of $(291)_{10}$?

(A) 501_8

(B) 443_8

(C) 402_8

(D) 424_8

17. Which among the following logic family has lowest power dissipation ?

(A) TTL

(B) CMOS

(C) DTL

(D) ECL

18. Which of the following is the correct POS form of the Boolean function

$f(A,B,C) = \sum(1,3,5,6)$?

(A) $f(A,B,C) = \prod(0,2,7)$

(B) $f(A,B,C) = \prod(0,2,6,7)$

(C) $f(A,B,C) = \prod(0,2,4)$

(D) $f(A,B,C) = \prod(0,2,4,7)$

19. Which of the following can be performed by a multiplexer ?

(A) Serial to Parallel data conversion

(B) Parallel to Serial data conversion

(C) Parity Checking

(D) None of the above

20. What is the Excess 3 code for 1011?

(A) 1011

(B) 1111

(C) 1110

(D) 1100

21. If a square wave clock with a period of 6 µs drives a T type flip-flop with T=1, what would be the period of the output signal ?

(A) 6 µs

(B) 24 µs

(C) 10 µs

(D) 12 µs

22. Which of the following will transform an SR type Flip Flop into a D type Flip Flop ?

(A) Tying S and R inputs together

(B) Inverting S input

(C) Inverting R input

(D) Inverting R before tying with S

23. How many Flip Flops are required to design a Modulo-14 counter ?

    (A)   14   (B)   3

    (C)   4   (D)   5

24. How many bits of memory does a RAM of 2K × 8 have ?

    (A)   16000   (B)   2024

    (C)   2008   (D)   16384

25. What is the maximum efficiency of a class A power amplifier ?

    (A)   25%   (B)   50%

    (C)   79%   (D)   98%

26. Which amplifier operates in the linear region during one half cycle ?

    (A)   Class A   (B)   Class AB

    (C)   Class B   (D)   Class C

27. Which of the following is true about Wien bridge oscillator ?

    (A)   It has three RC circuits

    (B)   It has three LC circuits

    (C)   It has a series RC circuit and a parallel RC circuit

    (D)   None of the above

28. What should be loop phase shift for sustained oscillations ?

    (A)   0° or 360°   (B)   90°

    (C)   180°   (D)   270°

29. What will be the gain of a non-inverting amplifier with R = 3 KΩ and RF = 9 KΩ ?

    (A)   4   (B)   5

    (C)   10   (D)   5.5

30. An op-amp based Integrator has :

    (A)   Diode in the feedback path and capacitance in the series path

    (B)   Capacitance in the feedback path and resistance in the series path

    (C)   Resistance in the feedback path and capacitance in the series path

    (D)   Capacitance in the feedback path and diode in the series path

31. The 555 timer IC is available as :
    (A) 8-Pin DIP
    (B) 8-Pin TOP
    (C) 14-Pin DIP
    (D) 8-Pin Flat Package

32. Which of the following describes the frequency of an Astable Multivibrator ?
    (A) $f = \dfrac{0.9}{(R_1 + 2R_2)C}$
    (B) $f = \dfrac{1.44}{(R_1 + 2R_2)C}$
    (C) $f = \dfrac{0.9}{RC}$
    (D) $f = \dfrac{1.44}{RC}$

33. In PMMC controlling force is provided by :
    (A) Eddy Currents
    (B) Mechanical Friction
    (C) Air
    (D) Spring

34. What should be the value of shunt resistance, if a $1mA$ ammeter with a resistance of $100\,\Omega$ is to be converted to a $1A$ ammeter ?
    (A) $0.001\,\Omega$
    (B) $0.1001\,\Omega$
    (C) $100000\,\Omega$
    (D) $100\,\Omega$

35. In a series type of ohmmeter, the zero adjustment should be done by :
    (A) Changing the value of series resistance
    (B) Changing the value of shunt resistance connected across the meter movement
    (C) Changing both the series as well shunt resistance
    (D) Changing the battery voltage

36. What is indicated by the high torque to weight ratio in an analog indicating instrument ?
    (A) High friction loss
    (B) Low friction loss
    (C) Nothing with regard to friction loss
    (D) None of the above

37. Which of the following can be used to measure the frequency ?
    (A) Maxwell's bridge
    (B) Schering bridge
    (C) Heaviside Campbell bridge
    (D) Wien's bridge

38. An aquadag is used in a CRO to collect :

    (A)   Primary electrons

    (B)   Secondary emission electrons

    (C)   Both primary and secondary emission electrons

    (D)   None of the above

39. Which of the following can act as an inverse transducer ?

    (A)   Electrical resistance potentiometer (B)   LVDT

    (C)   Capacitance Transducer   (D)   Piezo electric crystals

40. In wire wound strain gauges, the change in resistance on application of strain is mainly due to :

    (A)   Change in length of wire

    (B)   Change in diameter of wire

    (C)   Change in both length and diameter of wire

    (D)   Change in resistivity

41. Which of the following flags is not included in 8085 Microprocessor ?

    (A)   Overflow Flag   (B)   Auxiliary Carry Flag

    (C)   Sign Flag   (D)   Parity Flag

42. Which of the following externally initiated operations can 8085 Microprocessor respond to ?

    (A)   Reset   (B)   Hold

    (C)   Both (A) and (B)   (D)   None of the above

43. Which of the following is not a valid instruction of 8085 Microprocessor ?

    (A)   ROR   (B)   MVI A, 35h

    (C)   STA 2000h   (D)   ADD A, B

44. Which of the following is correct about the 8085 instruction *LDA 16-bit* ?

    (A)   The contents of memory location specified by 16-bit operand is loaded in the accumulator

    (B)   The contents of memory location specified by HL pair is loaded in the accumulator

    (C)   Both (A) and (B)

    (D)   None of the above

45. How many RST (Restart) instructions are included in the instruction set of 8085 Microprocessor?

(A) 4   (B) 2

(C) 8   (D) 16

46. Which of the following Interrupts of the 8085 microprocessor is not automatically vectored?

(A) INTR   (B) TRAP

(C) RST N   (D) None of the above

47. Which of the following is correct about stack operation in 8085 microprocessor?

(A) With every POP operation stack pointer is decremented by 2

(B) With every POP operation stack pointer is incremented by 2

(C) Both Push and POP instructions modify carry flag

(D) Both Push and POP are 2 Byte instructions

48. Which of the following causes wait states to be introduced in the timing of the 8085 microprocessor?

(A) Ready   (B) Hold

(C) Both Ready and Hold   (D) None of the above

49. The frequency components present in single sided spectrum of monotone amplitude modulation with $f_c = 100kHz$ and $f_m = 1kHz$ are:

(A) $100kHz$, $1kHz$ (B) $100kHz$, $1kHz$, $99kHz$

(C) $100kHz$, $1kHz$, $101kHz$ (D) $100kHz$, $101kHz$, $99kHz$

50. In amplitude modulation the pattern produced by the peaks of the carrier signal is called as:

(A) Index   (B) Envelope

(C) Audio signal   (D) Upper side frequency

51. In an amplitude modulated system, the total power radiated is 105 W. The power of the carrier is 85 W. What is modulation index?

(A) 0.685   (B) 0.587

(C) 0.586   (D) 0.865

52. Which of the following is/are the disadvantages of Amplitude Modulation ?
    (A) Complexity   (B) Bandwidth
    (C) Power   (D) Both (B) and (C)

53. What is the intermediate frequency of FM receiver ?
    (A) Between 88 MHz and 108 MHz
    (B) Between 540 kHz and 1640 kHz
    (C) 455 kHz
    (D) 10.70 MHz

54. What is the frequency range for FM radio stations?
    (A) 100 MHz - 110 MHz   (B) 95 MHz-105 MHz
    (C) 90 MHz - 110 MHz   (D) 88 MHz-108 MHz

55. For which of the following modulation techniques, Radio Detector is used as a demodulator ?
    (A) FM Modulation   (B) AM Modulation
    (C) DSBSC modulation   (D) SSBSC modulation

56. What function does the detector or discriminator in an AM or an FM receiver perform ?
    (A) Detects the difference frequency from the mixer
    (B) Changes the RF to IF
    (C) Recovers the audio signal
    (D) Maintains a constant IF amplitude

57. Which of the following must be true in order to faithfully recover the signal from its sampled version ?
    (A) Sampling frequency should be at least twice the highest frequency component present in the signal
    (B) Sampling frequency should be at least twice the smallest frequency component present in the signal
    (C) Sampling frequency should be at most twice the highest frequency component present in the signal
    (D) None of the above

58. In which of the following, Multiphase switching signals are required ?

    (A) PWM   (B) PPM
    (C) PAM   (D) None of the above

59. In which of the following, 1's and 0's are represented by two different amplitudes ?

    (A) ASK   (B) PSK
    (C) FSK   (D) DPSK

60. What is the last block in PCM ?

    (A) Sampler   (B) Anti-Aliasing Filter
    (C) Encoder   (D) Quantizer

1. Time-delay and Phase can be measured by using a :
   (A) VTVM   (B) CRO
   (C) TVM   (D) PMMC

2. The external resistance inserted in the PMMC circuit for increasing the range is called :
   (A) Shunt resistance   (B) Series resistance
   (C) Multiplier   (D) Both (A) and (C)

3. The maximum current that can be safely carried in PMMC instruments is :
   (A) 10 mA   (B) 15 mA
   (C) 20 mA   (D) 25 mA

4. For measurements of capacitance and Dielectric loss, which one of the Bridges is used ?
   (A) Schering Bridges   (B) Maxwells Bridge
   (C) Maxwell wein Bridge   (D) None of the above

5. In Thermocouple instruments, which one of the following principle is used ?
   (A) Seeback effect   (B) Peltier effect
   (C) Johnson's effect   (D) Both (A) and (B)

6. The 8085 has :
   (A) 16 address lines   (B) 32 address lines
   (C) 4 address lines   (D) 8 address lines

7. Total memory which can be accessed by Intel-8085 is :
   (A) 2K bytes   (B) 4K bytes
   (C) 16K bytes   (D) 64K bytes

8. In a microprocessor, the address of the next instruction to be executed is stored in :
   (A) Stack pointer   (B) Address latch
   (C) Program Counter   (D) General Purpose Register

9. In a 8085 Microprocessor, the status of output pins S_0, S_1 for READ operation is :
   (A) 00   (B) 01
   (C) 10   (D) 11

10. The CALL location (in Hexadecimal) for TRAP is :
    (A) 0024   (B) 003C
    (C) 0034   (D) 002C

11. Intel 8255 is a :
    (A) Programmable Peripheral Interface (PPI)
    (B) Programmable DMA Controller
    (C) Programmable Interrupt Controller (PIC)
    (D) None of the above

12. Data are stored in the stack using :
    (A) FIFO   (B) LIFO
    (C) Both (A) and (B)   (D) None of the above

13. Subroutines are called by :
    (A) CALL instruction   (B) JMP instruction
    (C) Shift   (D) Push

14. A carrier is simultaneously modulated by two Sine waves, using modulation
    index of 0.4 and 0.3, the resultant modulation index will be :
    (A) 1.0   (B) 0.7
    (C) 0.5   (D) 0.35

15. In a 100% Amplitude Modulated signal, if the total transmitted power is
    P, then carrier power will be :
    (A) 2/3 P   (B) 1/2 P
    (C) 1/3 P   (D) 1/4 P

16. Amplitude Modulation is :
    (A) Non-Linear   (B) Linear
    (C) Both Linear and Non-linear   (D) Neither linear nor Non-linear

17. The most common detector used in an A.M. radio broadcast receiver is :
    (A) Envelope detector   (B) Coherent detector
    (C) Discriminator   (D) Ratio detector

18. In a narrow band FM system, the highest modulating frequency is f_m. The bandwidth of the system will be :
   - (A) 6 f_m
   - (B) f_m
   - (C) 2 f_m
   - (D) 10 f_m

19. The modulating frequency in FM is increased from 10 kHz to 20 kHz. The bandwidth will get :
   - (A) doubled
   - (B) halved
   - (C) increased by 20 kHz
   - (D) increased tremendously

20. Following is not an advantage of FM over AM :
   - (A) Noise immunity
   - (B) Fidelity
   - (C) Capture effect
   - (D) Sputtering effect

21. An angle modulated signal is given by
   $S(t) = \cos 2\pi (2 \times 10^6 t + 30 \sin 150t + 40 \cos 150t)$.
   The maximum frequency and phase deviations of $S(t)$ are :
   - (A) 10.5 kHz, 14 π rad
   - (B) 6.0 kHz, 80 π rad
   - (C) 10.5 kHz, 100 π rad
   - (D) 7.5 kHz, 100 π rad

22. The PWM needs :
   - (A) more power than PPM
   - (B) more samples per second than PPM
   - (C) more bandwidth than PPM
   - (D) None of the above

23. In PCM, the quantization noise depends on :
   - (A) Sampling rate
   - (B) Number of Quantization levels
   - (C) Signal power
   - (D) None of the above

24. Which of the following modulation is analog in nature ?
   - (A) PCM
   - (B) DPCM
   - (C) DM
   - (D) None of the above

25. The main objective of a 'Cell' in a Cellular Mobile System is :
   - (A) Frequency reuse
   - (B) Higher bandwidth
   - (C) Simple Modulation Technique
   - (D) Hand off

26. If R_3 gets open circuited in Fig. 1; the reading across the ideal Voltmeter 'V' will be :

Fig. 1

(A) Fall to zero   (B) Increase slightly

(C) Decrease slightly   (D) Equal to 100 volt

27. Current through a discharging capacitor exhibits :
   (A) An exponential decaying function
   (B) A linear function
   (C) A step function
   (D) None of these

28. In a series RLC circuit, at resonance :
   (A) Current is minimum   (B) Current is maximum
   (C) Impedance is maximum   (D) None of these

29. The Thevenian equivalent resistance between terminals A and B in Fig. 2 is :
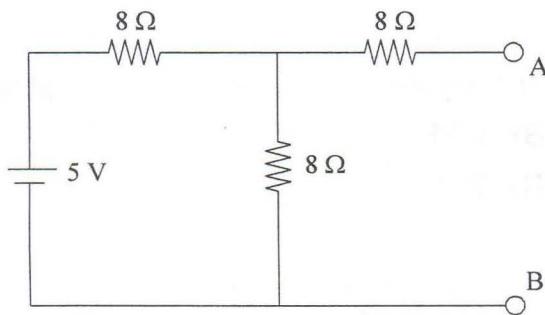
Fig. 2

(A) 8 ohm   (B) 24 ohm

(C) 10 ohm   (D) 12 ohm

30. Recombination is the process in which :
   (A) An electron falls into a hole
   (B) A positive and a negative ion bond together
   (C) A valance electron becomes a conduction electron
   (D) All the above

31. The Depletion region consists of :
   (A) Minority carriers
   (B) Positive and negative ions
   (C) Majority carriers
   (D) None of the above

32. The value of DC voltage at the output of Half-wave rectifier with input V sin ωt is :
   (A) V
   (B) $\dfrac{V}{\pi}$

   (C) $\dfrac{2V}{\pi}$
   (D) 0.707 V

33. An LED :
   (A) Emits light when reverse biased
   (B) Emits light when forward biased
   (C) Senses light when reverse biased
   (D) Acts as a variable resistance

34. If I_C is 70 times greater than I_B, then β of transistor is :
   (A) 0.7
   (B) 0.35
   (C) 70
   (D) 700

35. When operating in cutoff and saturation regions, transistor acts like :
   (A) A linear amplifier
   (B) A switch
   (C) Variable capacitor
   (D) Variable resistance

36. The gate source voltage for JFET as shown in Fig. 3 (assuming $V_d = 7.0$ V) is :
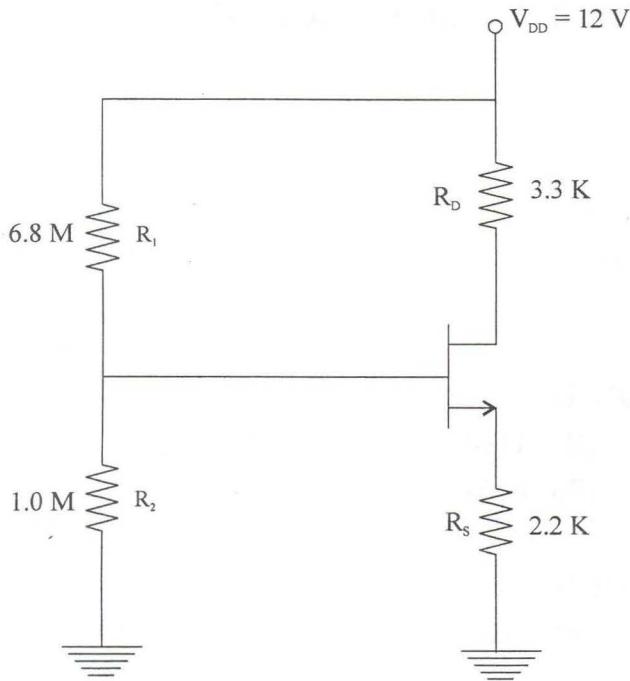
Fig. 3

(A) 1.52 V
(B) −5 V
(C) −1.8 V
(D) 3.34 V

37. For a D-MOSFET, $I_{Dss} = 10.0$ mA and $V_{GS(off)} = -8.0$ V, the drain current for $V_{GS} = -3$ V is :

(A) 18.9 mA
(B) 3.91 mA
(C) 39.1 mA
(D) .391 mA

38. One's complement of a binary number can be found by :

(A) Changing all 1's to 0's
(B) Changing all 0's to 1's
(C) Changing all 0's to 1's and all 1's to 0's
(D) Adding 1 to the obtained number after performing the action described at (C)

39. The expression for Sum function in case of a Half adder with inputs A and B :

(A) $Y = \overline{A \oplus B}$
(B) $Y = A + B$
(C) $Y = A \oplus B$
(D) $Y = A.B$

40. Which of the following Flip-Flop does not have race-around problem ?
   (A) T Flip-Flop
   (B) D Flip-Flop
   (C) JK Flip-Flop
   (D) JK-Master Slave Flip-Flop

41. A ring counter is :
   (A) A combinational circuit
   (B) Circulating Shift Register
   (C) A Shift Register with feedback
   (D) Both (B) and (C)

42. The gray code of a binary number 1011 is :
   (A) 1011
   (B) 1110
   (C) 1111
   (D) 0001

43. The parity of binary number 100110011 is :
   (A) Even
   (B) Odd
   (C) 4
   (D) 5

44. The number of Flip-Flops required for Modulo-10 counter is :
   (A) 10
   (B) 3.35
   (C) 5
   (D) 4

45. The counter requiring maximum number of Flip-Flops for a given MOD number is :
   (A) Ripple counter
   (B) BCD counter
   (C) Ring counter
   (D) Programmable counter

46. The bandwidth of an amplifier is determined by :
   (A) Mid range gain
   (B) The critical frequencies
   (C) The roll-off rate
   (D) The input capacitance

47. At upper critical frequency, the output voltage of an amplifier is 10.0 V. The peak voltage in midrange of amplifier is :
   (A) 7.07 V
   (B) 6.9 V
   (C) 14.14 V
   (D) 10 V

48. Cross over distortion occurs in _____ amplifiers.

   (A) Push pull   (B) Class A

   (C) Class AB   (D) None

49. The maximum overall efficiency of a transformer-coupled class-A amplifier is :

   (A) 78.5 %   (B) 25 %

   (C) 85 %   (D) 50 %

50. Negative feedback in amplifiers :

   (A) Lowers its lower cutoff frequency

   (B) Raises its upper 3-dB frequency

   (C) Increases bandwidth

   (D) All the above

51. Shunt derived and series-fed feedback in an amplifier :

   (A) Increases its output impedance

   (B) Decreases its output impedance

   (C) Increases its input impedance

   (D) Both (B) and (C)

52. A Collpits oscillator uses :

   (A) Tapped coil   (B) Inductive feedback

   (C) Tapped capacitance   (D) Tapped resistance

53. The frequency of oscillation of Phase Shift oscillator with all the three resistance branches of phase shift network equal to R and capacitance branches equal to C is given by :

   (A) 0.065/RC Hz   (B) $1/\pi\sqrt{RC}$ Hz

   (C) $1/2\pi\sqrt{RC}$ Hz   (D) None of these

54. The feedback element in an integrator is :

   (A) Inductor   (B) Resistor

   (C) Capacitor   (D) Zener diode

55. A triangular wave is applied to input of a differentiator, the output is :
   (A) DC level
   (B) Inverted triangular wave
   (C) Square wave
   (D) The first harmonic of triangular wave

56. In a scaling adder, the input resistors are :
   (A) All of same value
   (B) All of different value
   (C) Each proportional to weight of its input
   (D) Related by a factor of 2

57. Slew rate of an operational amplifier is defined as :
   (A) Maximum rate of change of output voltage
   (B) Minimum rate of change of output voltage
   (C) Zero rate of change of output voltage
   (D) Average rate of change of output voltage

58. The function of input attenuators in instruments like VTM, CRO etc. is to :
   (A) Increase input impedance
   (B) Attenuate the frequency range
   (C) Attenuate the input signal amplitude without altering the frequency contents
   (D) Attenuate the input impedance

59. In a CRT the highest positive potential is given to :
   (A) Focusing Electrodes
   (B) Cathode
   (C) Vertical Deflection plates
   (D) Positive deflection acceleration anode

60. The resolution of a digital Ammeter with 3-digit display is :
   (A) 1/10000   (B) 1/1000
   (C) 1/4   (D) 1/3

1. An n-type semiconductor material :
    (A) Is intrinsic
    (B) Has trivalent impurity atoms added
    (C) Has pentavalent impurity atoms added
    (D) Requires no doping

2. What types of impurity atoms are added to increase the number of conduction-band electrons in intrinsic silicon ?
    (A) Bivalent   (B) Octavalent
    (C) Pentavalent   (D) Trivalent

3. Doping of a semiconductor material means :
    (A) That a glue-type substance is added to hold the material together
    (B) That impurities are added to increase the resistance of the material
    (C) That impurities are added to decrease the resistance of the material
    (D) That all impurities are removed to get pure silicon

4. What type of diode circuit is used to clip off portions of signal voltages above or below certain levels ?
    (A) Limiter   (B) Clamper
    (C) IC voltage regulator   (D) None of the above

5. For a silicon transistor, when a base-emitter junction is forward-biased, it has a nominal voltage drop of :
    (A) 0.7 V   (B) 0.3 V
    (C) 0.2 V   (D) VCC

6. Which of the following is true for an n-p-n or p-n-p transistor ?
    (A) $I_E = I_B + I_C$ (B) $I_B = I_C + I_E$
    (C) $I_C = I_B + I_E$ (D) None of the above

7. What type(s) of gate-to-source voltage(s) can a depletion MOSFET (D-MOSFET) operate with ?

(A) Zero
(B) Positive
(C) Negative
(D) Any of the above

8. If V_D is less than expected (normal) for a self-biased JFET circuit, then it could be caused by a(n) :

(A) Open R_G
(B) Open gate lead
(C) FET internally open at gate
(D) All of the above

9. Identify what type of filter this circuit is, and calculate its cutoff frequency :
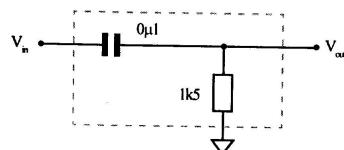
(A) *Low-pass* filter, $f_{cutoff} = 1.061$ kHz
(B) *Band-pass* filter, $f_{cutoff} = 2.061$ kHz
(C) *High-pass* filter, $f_{cutoff} = 1.061$ kHz
(D) *All-pass* filter, $f_{cutoff} = 2.061$ kHz

10. What kind of filtering action does this resonant circuit provide ?

(A) *Band-pass* filter
(B) *All-pass* filter
(C) *High-pass* filter
(D) *Low-pass* filter
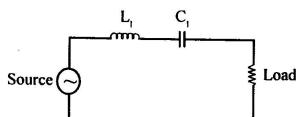
11. Find the value of R_L for maximum power to R_L :
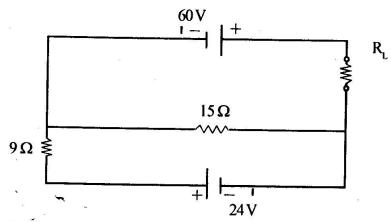
(A) 5.625 ohms   (B) 5.9 ohms

(C) 6.125 ohms   (D) 4.65 ohms

12. Norton's Theorem is used in a situation where the current through or the voltage across a load of _____ is the variable of interest.

(A) Varying values   (B) Fixed values

(C) Similar values   (D) Two values

13. Which type of power amplifier is biased for operation at less than 180° of the cycle ?

(A) Class A   (B) Class B or AB

(C) Class C   (D) Class D

14. Which of the push-pull amplifiers is presently the most popular form of the class B power amplifier ?

(A) Quasi-complementary   (B) Transformer-coupled

(C) Complementary-symmetry   (D) None of the above

15. Which of the following improvements is (are) a result of the negative feedback in a circuit ?
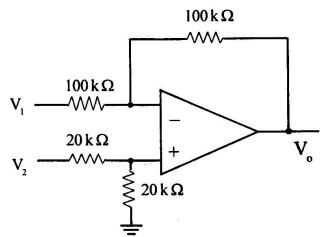
    (A) Lower output impedance   (B) Reduced noise

    (C) More linear operation   (D) All of the above

16. This circuit is a _____ oscillator.
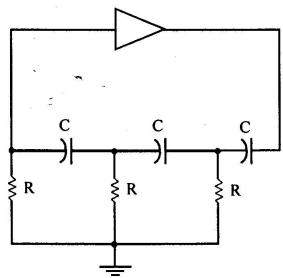
    (A) Phase-shift   (B) Wien bridge

    (C) Colpitts   (D) Hartley

17. Determine the output voltage when $V_1 = -V_2 = 1$ V :

    (A) 0 V   (B) –2 V

    (C) 1 V   (D) 2 V

18. Calculate the output voltage if $V_1 = V_2 = 700\,mV$:

(A)   0 V
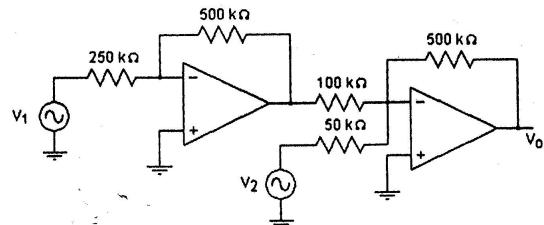
(B)   –12 V

(C)   12 V

(D)   –8 V

19. What is the function of the comparators in the 555 timer circuit ?

    (A)   To compare the output voltages to the internal voltage divider

    (B)   To compare the input voltages to the internal voltage divider

    (C)   To compare the output voltages to the external voltage divider

    (D)   To compare the input voltages to the external voltage divider

20. What is the output pulse width of the waveform at the output of the circuit in figure below ?

    (A)   1.65 ms

    (B)   1.82 ms

    (C)   4.98 ms

    (D)   5.46 ms
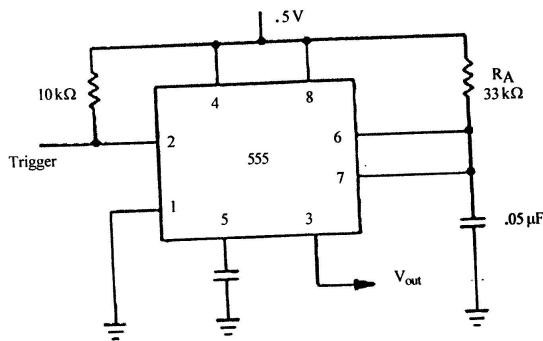
21. Determine the output voltage of the following regulator (assuming that the input voltage is sufficiently high to allow normal operation) :
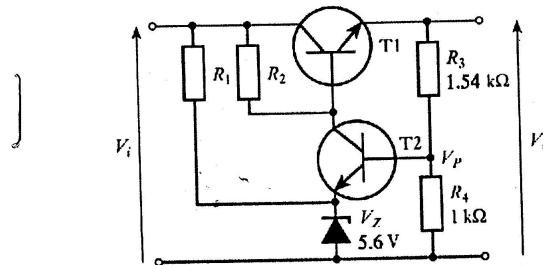

    (A)   11 V   (B)   12 V
    (C)   15 V   (D)   16 V

22. Which of the following statements is incorrect ?
    (A)   The output voltage of a switching regulator is controlled by altering the switching frequency
    (B)   A great advantage of switching regulators is that their power consumption is very low
    (C)   Switching regulators use switching speeds of 20 kHz or more
    (D)   Both bipolar transistors and FETs have very good switching characteristics

23. One of the most widely used forms of light sensor is the photodiode. Which of the following statements is correct ?
    (A)   A photodiode is an example of a photoconductive sensor
    (B)   A photodiode can be used as either a photoconductive or a photovoltaic sensor
    (C)   A photodiode is an example of a photovoltaic sensor
    (D)   A photodiode is an example of a photoconductive and photovoltaic sensor

24. An LED is forward-biased. The diode should be on, but no light is showing. A possible trouble might be :
    (A)   The diode is open
    (B)   The series resistor is too small
    (C)   None. The diode should be off if forward-biased
    (D)   The power supply voltage is too high

25. Consider the statement, "Either $-2 \le x \le -1$ or $1 \le x \le 2$". The negation of this statement is :

    (A) $x < -2$ or $2 < x$ or $-1 < x < 1$ (B) $x < -2$ or $2 < x$

    (C) $-1 < x < 1$ (D) $x \le -2$ or $2 \le x$ or $-1 < x < 1$

26. A sufficient condition that a triangle T be a right triangle is that $a^2 + b^2 = c^2$. An equivalent statement is :

    (A)   If T is a right triangle then $a^2 + b^2 = c^2$

    (B)   If $a^2 + b^2 = c^2$ then T is a right triangle

    (C)   If $a^2 + b^2\,6 \ne c^2$ then T is not a right triangle

    (D)   T is a right triangle only if $a^2 + b^2 = c^2$

27. Using binary arithmetic, a number y is computed by taking the n-bit two's complement of $x - c$. If n is eleven, $x = 101000010012$ and $c = 101012$ then $y =$:

    (A)   011000011112   (B)   011000011002

    (C)   011000111002   (D)   010001111002

28. Consider the statement, "If n is divisible by 30 then n is divisible by 2 and by 3 and by 5". Which of the following statements is equivalent to this statement ?

    (A)   If n is not divisible by 30 then n is divisible by 2 or divisible by 3 or divisible by 5

    (B)   If n is not divisible by 30 then n is not divisible by 2 or not divisible by 3 or not divisible by 5

    (C)   If n is divisible by 2 and divisible by 3 and divisible by 5 then n is divisible by 30

    (D)   If n is not divisible by 2 or not divisible by 3 or not divisible by 5 then n is not divisible by 30

29. As an engineer you are confronted with a TTL circuit board containing dozens of IC chips. You have taken several readings at numerous IC chips, but the readings are inconclusive because of their erratic nature. Of the possible faults listed, select the one that most probably is causing the problem :

   (A) A defective IC chip that is drawing excessive current from the power supply

   (B) A solar bridge between the inputs on the first IC chip on the board

   (C) An open connection between the inputs on the first IC chip on the board

   (D) A defective output IC chip that has an internal open to V_{cc}.

30. Which of the following is an important feature of the sum-of-products form of expressions ?

   (A) All logic circuits are reduced to nothing more than simple AND and OR gates

   (B) The delay times are greatly reduced over other forms

   (C) No signal must pass through more than two gates, not including inverters

   (D) The maximum number of gates that any signal must pass through is reduced by a factor of two

31. The following waveform pattern is for a(n) :
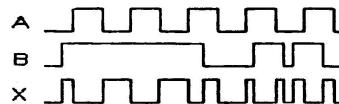
   (A) 2-input AND gate   (B) 2-input OR gate
   (C) Exclusive-OR gate   (D) None of the above

32. Which of the following is the primary advantage of using the BCD code instead of straight binary coding ?

   (A) Fewer bits are required to represent a decimal number with the BCD code

   (B) The relative ease of converting to and from decimal

   (C) BCD codes are easily converted to hexadecimal codes

   (D) BCD codes are easily converted to straight binary codes

33. For the given circuit, what memory location is being addressed ?

   (A) 10111

   (B) 249

   (C) 5

   (D) 157
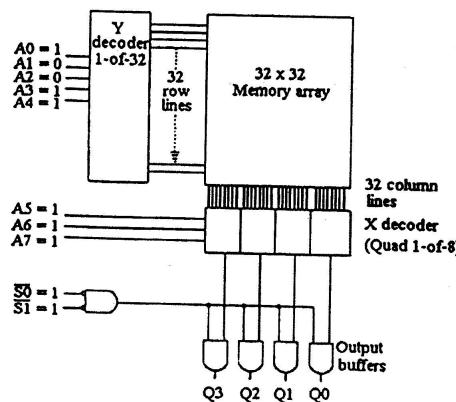
34. How many flip-flops are in the 7475 IC ?

   (A) 1

   (B) 2

   (C) 4

   (D) 8

35. An RC circuit used in a nonretriggerable 74121 one-shot has an R_{EXT} of 49 Kilo Ohm and a C_{EXT} of 0.2 micro farad. The pulse width (t_w) is approximately
   _____ .

   (A) 6.9 micro second

   (B) 6.9 millisecond

   (C) 69 millisecond

   (D) 690 millisecond

36. To completely load and then unload an 8-bit register requires how many clock pulses ?
    (A) 2   (B) 4
    (C) 8   (D) 16

37. What type of circuit is used at the interface point of an input port ?
    (A) Decoder   (B) Latch
    (C) Tristate buffer   (D) None of the above

38. The suitable programmable counter for 8086 microprocessor is :
    (A) 8253 chip   (B) 8254 chip
    (C) 8359 chip   (D) 8251 chip

39. What is the address space of 8086 CPU ?
    (A) 1MB   (B) 256KB
    (C) 1KB   (D) 64KB

40. Memory chips of four different sizes as below are available :
    1. $32 \text{ k} \times 4$ 2. $32 \text{ k} \times 16$
    3. $8 \text{ k} \times 8$ 4. $16 \text{ k} \times 4$
    All memory chips as mentioned in the above list are Read/Write memory. What minimal combination of chips or chip alone can map full address space of 8085 microprocessor ?
    (A) 1 and 2   (B) 1 only
    (C) 2 only   (D) 4 only

41. In an instruction of 8085 microprocessor, how many byte are present ?
    (A) One or two   (B) One, two or three
    (C) One only   (D) Two or three

42. In 8085 microprocessor, how many interrupts are maskable ?
    (A) Two   (B) Three
    (C) Four   (D) Five

43. How many times will the following loop be executed :

```
            LXIB       0010 H
    LOOP :  DCX        B
            MOV        A, B
            ORA        C
            JNJ        LOOP
```

    (A) 10   (B) 100
    (C) 16   (D) 15

44. If the accumulator of an intel 8085A microprocessor contains 37H and the previous operation has set the carry flag, the instruction ACl 56H will result in :

(A) 8E H

(B) 94 H

(C) 7E H

(D) 84 H

45. Is there any difference between following declarations ?

    extern int fun ();

    int fun ();

(A) Both are identical

(B) No difference, except extern int fun(); is probably in another file

(C) int fun(); is overrided with extern int fun();

(D) None of these

46. If the binary equivalent of 5.375 in normalized form is 0100 0000 1010 1100 0000 0000 0000 0000, what will be the output of the program (on intel machine) ?

```
#include<stdio.h>
#include<math.h>
int main()
{
    float a=5.375;
    char *p;
    int i;
    p = (char*)&a;
    for(i=0; i<=3; i++)
        printf("%02x\n", (unsigned char)p[i]);
    return 0;
}
```

(A) 40 AC 00 00

(B) 04 CA 00 00

(C) 00 00 AC 40

(D) 00 00 CA 04

47. What would be the equivalent pointer expression for referring the array element a[i][j][k][l] ?

(A) ((((a+i)+j)+k)+l)

(B) *(*(*(*(a+i)+j)+k)+l)

(C) (((a+i)+j)+k+l)

(D) ((a+i)+j+k+l)

48. How many times "IndiaBIX" is get printed ?

```c
#include<stdio.h>
int main ()
{
    int x;
    for(x=-1; x<=10; x++)
    {
        if(x < 5)
            continue;
        else
            break;
        printf("IndiaBIX");
    }
    return 0;
}
```

(A) Infinite times   (B) 11 times

(C) 0 times   (D) 10 times

49. Which of the following statements is correct about the following program ?

```c
#include<stdio.h>
int main()
{
    struct emp
    {
        char name[25];
        int age;
        float sal;
    };
    struct emp e[2];
    int i=0;
    for(i=0; i<2; i++)
        scanf("%s %d %f", e[i].name, &e[i].age, &e[i].sal);
    for(i=0; i<2; i++)
        scanf("%s %d %f", e[i].name, e[i].age, e[i]sal);
    return 0;
}
```

(A) Error: scanf() function cannot be used for structures elements

(B) The code runs successfully

(C) Error: Floating point formats not linked abnormal program termination

(D) Error: structure variable must be initialized

50. What will be the output of the program ?

```c
#include<stdio.h>
int main()
{
    typedef int arr[5];
    arr iarr = {1, 2, 3, 4, 5};
    int i;
    for(i=0; i<4; i++)
        printf("%d,", iarr[i]);
}
```

(A) 1, 2, 3, 4

(B) 1, 2, 3, 4, 5

(C) No output

(D) Error: Cannot use typedef with an array

51. What is the purpose of "rb" in fopen() function used below in the code ?

```c
FILE *fp;
fp = fopen("source.txt", "rb");
```

(A) Open "source.txt" in binary mode for reading

(B) Open "source.txt" in binary mode for reading and writing

(C) Create a new file "source.txt" for reading and writing

(D) None of the above

52. If the file 'source.txt' contains a line "Be my friend" which of the following will be the output of below program ?

```c
#include<stdio.h>
int main()
{
    FILE *fs, *ft;
    char c[10];
    fs=fopen("source.txt", "r");
    c[0] = getc(fs);
    fseek(fs, 0, SEEK_END);
    fseek(fs, -3L, SEEK_CUR);
    fgets(c, 5, fs);
    puts(c);
    return 0;
}
```

(A) Friend   (B) frien

(C) end   (D) Error in fseek();

53. What frequency range is used for FM radio transmission ?
    (A) Very Low Frequency : 3 kHz to 30 kHz
    (B) Low Frequency : 30 kHz to 300 kHz
    (C) High Frequency : 3 MHz to 30 MHz
    (D) Very High Frequency : 30 MHz to 300 MHz

54. An example of an analog communication method is :
    (A) Laser beam   (B) Microwave
    (C) Voice grade telephone line   (D) All of the above

55. If the baud rate is 400 for a QPSK signal, the bit rate is _____ bps.
    (A) 100   (B) 400
    (C) 800   (D) 1600

56. The constellation diagram of 16-QAM has _____ dots.
    (A) 4   (B) 16
    (C) 8   (D) None of the above

57. For a _____ channel, the Nyquist bit rate formula defines the theoretical maximum bit rate.
    (A) Noisy   (B) Noiseless
    (C) Bandpass   (D) Low-pass

58. For a _____ channel, we need to use the Shannon capacity to find the maximum bit rate.
    (A) Noisy   (B) Noiseless
    (C) Bandpass   (D) Low-pass

59. A signal is measured at two different points. The power is P1 at the first point and P2 at the second point. The dB is 0. This means _____.
    (A) P2 is zero   (B) P2 equals P1
    (C) P2 is much larger than P1   (D) P2 is much smaller than P1

60. If the bit rate for an ASK signal is 1200 bps, the baud rate is _____.
    (A) 300   (B) 400
    (C) 600   (D) 1200

1. The energy band in which free electrons exist is the :
   - (A) First band
   - (B) Second band
   - (C) Conduction band
   - (D) Valence band

2. Electron hole pairs are produced by :
   - (A) Recombination
   - (B) Thermal energy
   - (C) Ionization
   - (D) Doping

3. The average value of half-wave rectified voltage with a peak value of 200 V is :
   - (A) 63.7 V
   - (B) 127.3 V
   - (C) 141 V
   - (D) 0 V

4. Line regulation is determined by :
   - (A) Load current
   - (B) Zener current and load current
   - (C) Changes in load resistance and output voltage
   - (D) Changes in output voltage and input voltage

5. Collector-feedback bias is :
   - (A) Based on the principle of positive feedback
   - (B) Based on β multiplication
   - (C) Based on the principle of negative feedback
   - (D) None of the above

6. In a certain emitter follower circuit, the current gain is 50. The power gain is approximately:
   - (A) $50 A_v$
   - (B) 50
   - (C) 1
   - (D) (A) and (B)

7. The constant current area of a FET lies between :
   - (A) Cutoff and saturation
   - (B) Cutoff and pinch-off
   - (C) 0 and I_{DSS}
   - (D) Pinch-off and breakdown

8. A MOSFET differs from JFET mainly because :

  (A) Of the power rating

  (B) The MOSFET has two gates

  (C) The JFET has a pn junction

  (D) MOSFETs do not have a physical channel

9. Thevinin's theorem can be used to transform a complex network into an equivalent network contain :

  (A) A voltage source in parallel with an equivalent resistance

  (B) A voltage source in series with an equivalent resistance

  (C) A current source in parallel with an equivalent resistance

  (D) A current source in series with an equivalent resistance

10. A series LC resonance circuit has :

  (A) Maximum impedance at resonance frequency

  (B) Maximum current at resonance frequency

  (C) Minimum impedance at resonance frequency

  (D) (B) and (C)

11. When the gain of the filter is minimum at its centre frequency, it is :

  (A) A lowpass filter   (B) A highpass filter

  (C) A bandpass filter   (D) A bandstop filter

12. The quality factor of a bandpass filter depends on :

  (A) The critical frequencies

  (B) Only on bandwidth

  (C) The center frequency and the bandwidth

  (D) Only on the centre frequency

13. An amplifier that operates in the linear region at all times is :

  (A) Class A   (B) Class AB

  (C) Class B   (D) Class C

14. Crossover distortion is a problem for :

    (A) Class A amplifiers   (B) Class AB amplifiers

    (C) Class B amplifiers   (D) All of these amplifiers

15. A phase shift oscillator has :

    (A) Three RC circuits   (B) Three LC circuits

    (C) A T-type circuit   (D) A π-type circuit

16. The main feature of a crystal oscillator is :

    (A) Economy   (B) Reliability

    (C) Stability   (D) High frequency

17. If $A_{Vd} = 3500$ and $A_{Cm} = 0.35$, the CMRR is :

    (A) 1225   (B) 10,000

    (C) 80 dB   (D) (B) and (C)

18. A voltage follower :

    (A) Has a gain of 1   (B) Is non-inverting

    (C) Has no feedback resistor   (D) All of the above

19. The output of differentiator is proportional to :

    (A) The RC time constant

    (B) The rate at which the input is changing

    (C) The amplitude of the input

    (D) (A) and (B)

20. The frequency of the output pulses in mono-stable multivibrator circuit is :

    (A) A function of the time constant RC of the biasing resistor and the coupling capacitor

    (B) Double the frequency of the triggering pulses

    (C) Same as the frequency of the triggering pulses

    (D) Half the frequency of the triggering pulses

21. An SCR can be turned off by :
    (A) Forced commutation
    (B) A negative pulse on the gate
    (C) Anode current interruption
    (D) (A) and (C)

22. The Diac is :
    (A) A thyristor
    (B) A bilateral two-terminal device
    (C) Like two parallel-4 layer diodes in reverse direction
    (D) All of the above

23. Which of the following is not a characteristic of the UJT ?
    (A) Intrinsic standoff ratio
    (B) Negative resistance
    (C) Bilateral conduction
    (D) Peak-point voltage

24. The internal resistance of a photodiode :
    (A) Increases with light intensity when reverse-biased
    (B) Decreases with light intensity when reverse-biased
    (C) Increases with light intensity when forward-biased
    (D) Decreases with light intensity when forward-biased

25. According to De-Morgan's law, $\overline{A + BC}$ can be written as :
    (A) $A + \overline{BC}$
    (B) $A . \overline{BC}$
    (C) $\overline{A} . \overline{BC}$
    (D) None of the above

26. BCD representation of 85 is :
    (A) 1000 0101
    (B) 1100 0101
    (C) 1000 0001
    (D) 1001 0101

27. The logic function $f = \overline{(x.\overline{y}) + (\overline{x}.y)}$ is the same as :
    (A) $f = (x + y)(\overline{x} + \overline{y})$
    (B) $f = (\overline{x} + y)(x + \overline{y})$
    (C) $f = (x.y) + (\overline{x}.\overline{y})$
    (D) None of the above

28. The decimal equivalent of the Octal number $(765)_8$ is :
    (A) 501
    (B) 522
    (C) 555
    (D) 424

29. The logic family with low power dissipation is :
    - (A) TTL
    - (B) CMOS
    - (C) DTL
    - (D) ECL

30. ASCII stands for :
    - (A) American Standard Code for Information Interchange
    - (B) · American System Code for Information Interchange
    - (C) American System Code for International Information
    - (D) None of the above

31. The output of 5-input XOR gate is high when :
    - (A) All the inputs are low
    - (B) Even number of inputs are high
    - (C) Odd number of inputs are high
    - (D) None of the above

32. Gray code for 101011 is :
    - (A) 101011
    - (B) 111110
    - (C) 111101
    - (D) 110010

33. JK FF can be transformed into T FF by :
    - (A) Tying J and K
    - (B) Inverting J
    - (C) Inverting K
    - (D) None of the above

34. The number of FFs required to design Modulo-10 counter is :
    - (A) 10
    - (B) 3
    - (C) 2
    - (D) 4

35. 1K bytes of memory is equal to :
    - (A) 1000 bytes
    - (B) 1024 bytes
    - (C) 1008 bytes
    - (D) None of the above

36. Master-slave FF is a modified version of :
    - (A) JK FF
    - (B) SR FF
    - (C) D FF
    - (D) None of the above

37. If the μp has address bus of 14 bit wide and hence the memory which can be accessed by this address bus is :

    (A) 2 K bytes   (B) 32 K bytes

    (C) 16 K bytes   (D) 64 K bytes

38. In a microprocessor, the address of the next instruction to be executed, is stored in :

    (A) . Stack pointer   (B) Address latch

    (C) Program counter   (D) General purpose register

39. MOV Dx, Sx in 8085 μp is a :

    (A) Data transfer instruction   (B) Control instruction

    (C) Branching instruction   (D) Machine instruction

40. In an immediate addressing mode, the value of the operand is :

    (A) Given in the instruction   (B) Contained in a memory location

    (C) Present at the port   (D) None of the above

41. An array is :

    (A) Collection of similar types of data items

    (B) Collection of different types of data items

    (C) Collection of float and integer values

    (D) None of the above

42. Which one of the following controls the program flow :

    (A) Switch   (B) for

    (C) while   (D) All of the above

43. A header file ends with :

    (A) :   (B) ;

    (C) ,   (D) None of the above

44. Pointer to pointer is a variable which stores :

    (A) The address of another pointer variable

    (B) The immediate data

    (C) Both float and integer data

    (D) Address of integer variables only

45. In FM, modulation index m_f is equal to (Δf is the frequency deviation and f_m is the modulating signal frequency) :

(A) $\Delta f \, f_m$

(B) $\dfrac{\Delta f}{f_m}$

(C) $\dfrac{f_m}{\Delta f}$

(D) $\dfrac{1}{\Delta f \, f_m}$

46. In an amplitude modulated system, the total power radiated 112.5 W. The power of the carrier is 100 W. What is modulation index ?

(A) 1

(B) 0.5

(C) 0.75

(D) None of the above

47. Analog Modulation scheme with lesser bandwidth requirement is :

(A) AM

(B) DSBSC

(C) SSBSC

(D) VSB

48. Bandwidth of FM becomes equal to that of Am when :

(A) $\beta=1$

(B) $\beta=0.5$

(C) $\beta=0.1$

(D) $\beta=10$

49. In TV transmission, picture signal is amplitude modulated and sound signal is frequency modulated. This is done because :

(A) It is not possible to frequency modulate the picture signal

(B) Bandwidth requirement is minimized

(C) Sound signal is more susceptible to noise than picture signal

(D) Synchronization of picture frames becomes easier

50. A signal can be faithfully recovered from its sampled version if :

(A) Sampling frequency is at least twice the highest frequency present in the signal

(B) Sampling frequency is at least twice the smallest frequency present in the signal

(C) Sampling frequency is at most twice the highest frequency present in the signal

(D) None of the above

51. 1's and 0's are represented by two different frequencies in :
   (A) ASK
   (B) PSK
   (C) FSK
   (D) DPSK

52. The error in PCM can be reduced by :
   (A) By decreasing the number of quantization levels
   (B) · By increasing the number of quantization levels
   (C) By increasing the Sampling frequency
   (D) By decreasing Sampling frequency

53. In PMMC, damping force is provided by :
   (A) Eddy currents
   (B) Mechanical Friction
   (C) Air
   (D) None of the above

54. A swamping resistor is added in series with the coil of meters to avoid :
   (A) Temperature error
   (B) Frequency error
   (C) Parallex error
   (D) All of the above

55. The value of multiplier resistor required to design a voltmeter of 10 V range with a PMMC of internal resistance of 1 KΩ and I_{fsd} = 100μA is:
   (A) 1 KΩ
   (B) 9 KΩ
   (C) 10 KΩ
   (D) 99 KΩ

56. The value of external resistance at half scale deflection in case of series type ohmmeter is :
   (A) Half the internal resistance of the meter
   (B) The internal resistance of the meter
   (C) 1/4th of the internal resistance of the meter
   (D) None of the above

57. Kelvin's double bridge is an extension of :
   (A) Wheatstone bridge
   (B) Schering bridge
   (C) Maxwell's bridge
   (D) Hay bridge

58. To measure using Lissasous Figures, CRO is operated in :

    (A) XY mode

    (B) X5 mode

    (C) TV mode

    (D) None of the above

59. The purpose of the synchronizing control in a CRO is to :

    (A) Focus the spot on the screen

    (B) Lock the display of signal

    (C) Adjust the amplitude of display

    (D) Control the intensity of the spot

60. Which of the following is actuator :

    (A) Microphone

    (B) LVDT

    (C) Piezoelectric transducer

    (D) Loudspeaker

Electronics - 2010

1. The current flowing 3KΩ resistance in the circuit given in Figure (1) will be :
   - (a) 10 mA
   - (b) 7 mA
   - (c) 4 mA
   - (d) 3 mA
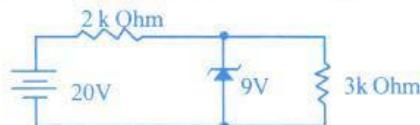
Figure (1)

2. The value of h_i and h_r for the circuit shown in Figure (2) respectively are :
   - (a) 10 ohm, – 0.2
   - (b) 20 ohm, – 0.4
   - (c) 30 ohm, – 0.5
   - (d) 40 ohm, – 1.0
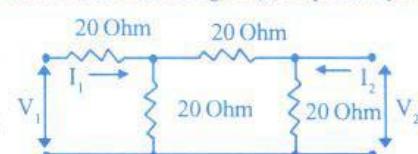
Figure (2)

3. A p-n junction diode is a
   - (a) linear device
   - (b) passive device
   - (c) unilateral device
   - (d) active linear device

4. Zener breakdown in a p-n junction results due to :
   - (a) impact ionization
   - (b) rupture of covalent bonds
   - (c) thermal instability
   - (d) barrier lowering

5. The dc and ac load line of a transistor :
   - (a) intersect with each other
   - (b) have positive slope
   - (c) are parallel to each other
   - (d) are parallel to voltage axis

6. Identify the false statement. The common collector amplifier offers :
   - (a) low output impedance
   - (b) high voltage gain
   - (c) high input impedance
   - (d) high current gain

7. In case of MOSFET the voltage at which the drain current saturates is known as :
   - (a) punch-through voltage
   - (b) breakdown voltage
   - (c) pinch-off voltage
   - (d) threshold voltage

8. Which of the following is not possible to fabricate in IC technology ?
   - (a) Resistor
   - (b) Capacitor
   - (c) Diode
   - (d) Inductor

9. The value of the resistance R for maximum power transfer in the network shown in Figure (3) is :

(a) 25Ω
(b) 10Ω
(c) 9Ω
(d) 5Ω
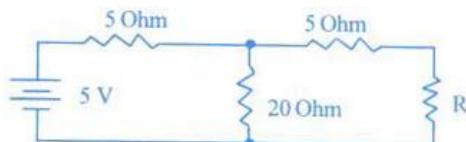
Figure (3)

10. The circuit shown in Figure (4a) has the Norton equivalent circuit shown in Figure (4b). The value of I_{eq} and R_{eq} respectively will be :

(a) 0.25A, 5Ω
(b) 0.50A, 10Ω
(c) 5A, 40Ω
(d) 10A, 20Ω
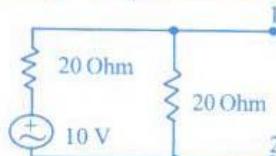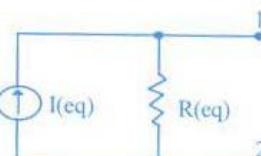
Figure (4a)   **Figure (4b)**

11. The energy stored in a capacitor at any instant is given by :

(a) one half of the product of the capacitance and the square of the voltage across it at that instant

(b) the product of the capacitance and the square of the voltage across it at that instant

(c) one half of the product of the capacitance and the voltage across it at that instant

(d) the product of the capacitance and the voltage across it at that instant

12. The power factor is given by :

(a) peak power times 0.707
(b) the ratio of the true power to apparent power
(c) sine of the phase difference between voltage V and current I
(d) cos of the phase angle between true power and apparent power

13. A power amplifier has gain of 20dB and an input voltage level of 2mV. Assuming that the input and output impedances are the same. The voltage level at the amplifier output will be :

(a) 5 mV   (b) 10 mV
(c) 20 mV   (d) 40 mV

14. $\dfrac{a}{(s+b)}$ is the transfer function that realizes the characteristics of a :

    (a) high pass filter   (b) band pass filter

    (c) band reject filter   (d) low pass filter

15. When 1011_2 is multiplied by 101_2 the result will be :

    (a) 111101   (b) 111011

    (c) 110111   (d) 111110

16. A two input XOR gate has inputs A and B, the output of the gate is given by :

    (a) $A B + \bar{A}\, \bar{B}$ (b) $\bar{A} B + A \bar{B}$

    (c) $A(\bar{A} + B)$ (d) $A B$

17. The number of inputs and outputs in a full adder respectively are :

    (a) 3 and 2   (b) 3 and 3

    (c) 2 and 2   (d) 2 and 1

18. The logical expression $A + AB$ on simplification reduces to :

    (a) AB (b) A

    (c) $A + B$ (d) B

19. Identify the false statement from the following :

    (a) ECL gate do not saturate

    (b) Complementary outputs are available with ECL gate

    (c) The power dissipation in ECL logic gates is low relative to the other logic families

    (d) Capacitive loading limits the fan out in ECL gate

20. The gray code of the binary number 101010_2 is :

    (a) 010101_2 (b) 010110_2

    (c) 111011_2 (d) 111111_2

21. The characteristic values of power dissipation and propagation delay time for Low power Schottky TTL devices are respectively :

    (a) 10mW, 10ns   (b) 15mW, 6ns

    (c) 2mW, 10ns   (d) 100mW, 35ns

EL

22. With an RS latch a high S and a low R sets its output to _____ , and a low S and high R sets its output to _____ .

    (a)   0, 0   (b)   1, 0

    (c)   0, 1   (d)   1, 1

23. N number of flip-flops connected in series divide the clock frequency by a factor of :

    (a) 2^N (b) 2^{N-1}

    (c) 2^{N+1} (d)   N

24. A mod-10 counter can divide the clock frequency by a factor of :

    (a)   16   (b)   10

    (c)   4   (d)   2

25. The maximum number of memory locations that an address bus with 16 bits can access is :

    (a)   16000   (b)   32536

    (c)   65536   (d)   60536

26. The 8156 is a 2,048 bit static RAM with 256 words of 8 bits each. The number of address lines this RAM has :

    (a)   256   (b)   32

    (c)   16   (d)   8

27. Identify the correct statement from the following :

    (a)   It is much simpler to work with dynamic RAMs than static RAMs with regard to design complexity of the RAM chips

    (b)   The static RAM contains more memory cells than dynamic RAM of the same physical size

    (c)   The dynamic RAM need to refresh the memory every few milliseconds

    (d)   In construction of a static RAM a MOSFET and capacitor are required.

28. The Boolean expression $(\overline{AB})\,(\overline{A}\,B)$ on simplification reduces to :

    (a) $A + B$ (b) $A \oplus B$

    (c) $A\,B$ (d) $A(A+B)$

29. The output of the circuit shown in Fig (5) will be given by :

    (a) $Y = A + B$
    (b) $Y = A - B$
    (c) $Y = A \oplus B$
    (d) $Y = \bar{A} + \bar{B}$

Figure (5)
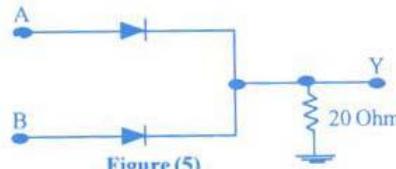
30. Adding inverters to the inputs of an AND gate produces :

    (a) OR function
    (b) NOR function
    (c) Exclusive-OR function
    (d) XNOR function

31. Identify the false statement from the following :

    (a) ECL gate usually have complementary outputs
    (b) ECL gate has higher power requirements
    (c) ECL gate has higher noise margins than that of TTL
    (d) High speed operation is not possible in case of ECL gates because the transistors saturate in ECL gates.

32. The output Y of the circuit shown in Fig. (6) is given by :

    (a) $Y = ABC$
    (b) $Y = \bar{A}BC$
    (c) $Y = A\overline{BC}$
    (d) $Y = AB\bar{C}$

Figure(6)
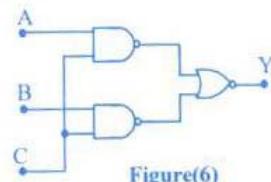
33. Ones complement of a binary number is found by :

    (a) changing all zeros of the number to ones and all zeros of the number to zeros then adding 1 to the resultant number
    (b) changing all zeros of the number to ones and all ones of the number to zeros
    (c) changing only all zeros of the number to ones
    (d) changing only all ones of the number to zeros

34. The number of restart instructions in 8085 μP is :

    (a) 8
    (b) 5
    (c) 4
    (d) 1

35. The input pins of 8085 μP chip for the interrupt signal are from :
   (a) Pins 11 to 15   (b) Pins 6 to 10
   (c) Pins 1 to 5   (d) Pins 14 to 18

36. On execution of the following programme :
   LXI H, !FFFH
   INX H
   MOV A, H
   ADI 10H
   STA 1000H
   HLT
The contents of the memory location 1000H will be :
   (a) FF_H (b) 10_H
   (c) 30_H (d) $2F_H$

37. The signals carried by pins 29 and 33 of the 8085 μP respectively are :
   (a) $\overline{WR}, \overline{RD}$ (b) $HOLD, HLDA$
   (c) S_0, S_1 (d) $\overline{RESETN}, CLK$

38. If the current amplification factor α of a transistor is 0.99, the current amplification factor β of the transistor will be :
   (a) 9   (b) 49
   (c) 79   (d) 99

39. For a common emitter configuration, the collector current I_c for a given base current I_B is given by :
   (a) $I_C = \beta I_B + I_{CBO}$ (b) $I_C = \beta I_B + (1 - I_{CBO})$
   (c) $I_C = \beta I_B + (1 + \beta) I_{CBO}$ (d) $I_C = \beta I_B + \beta I_{CBO}$

40. A transistor having h-parameter $h_{ie} = 5000\Omega$, $h_{re} = 1.6 \times 10^{-4}$, $h_{fe} = 56$, $h_{oe} = 50\mu A/V$. The current gain of the CE amplifier with load resistance of 50KΩ will be :
   (a) -8 (b) -16
   (c) -32 (d) -64

41. The decibel equivalent of power gain 100 is :
   (a) 10dB   (b) 20dB
   (c) 30dB   (d) 40dB

42. Identify the false statement from the following :

    (a) In a Darlington amplifier configuration the output of one amplifier is coupled into the input of the next one by directly connecting emitter of one transistor to the base of the other transistor

    (b) Darlington amplifier provides excellent characteristics of high input impedance and low output impedance

    (c) Darlington amplifier provides low current gain

    (d) Darlington amplifier is often used in high gain amplifiers because of its high current gain

43. How many different sets of input conditions of A, B, and C will produce a high output in the circuit shown in Figure (7) ?

    (a) 10
    (b) 8
    (c) 6
    (d) 4

Figure (7)

44. In class-A amplifier when a transistor is driven from the edge of saturation region to cutoff, then for every 1 W output power the power consumed internally is :

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

45. The trans-conductance of a MOSFET is :

    (a) independent of the drain current

    (b) directly proportional to the drain current

    (c) directly proportional to square root of the drain current

    (d) inversely proportional to square root of the drain current

46. Unijunction transistor is a :

    (a) variable capacitance device
    (b) relaxation oscillator
    (c) current controlled device
    (d) voltage controlled device

47. Identify the correct statement from the following. In an RC coupled amplifier :
    (a) the low frequency response is affected by junction capacitances and high frequency response is affected by coupling capacitor
    (b) only high frequency response is affected by coupling and bypass capacitors
    (c) the low frequency response is affected by coupling and bypass capacitors
    (d) the coupling capacitor do not affect the frequency

48. Class-B push-pull amplifiers there exists
    (a) intermodulation distortion
    (b) cross-over distortion
    (c) even harmonic distortion
    (d) neither even harmonic nor odd harmonic distortion

49. The maximum theoretical efficiency of an amplifier in class-B operation is
    (a) 78.5%   (b) 50.5 %
    (c) 40.5 %   (d) 25.5 %

50. If the emitter resistance of a common emitter amplifier is not bypassed by a capacitor the emitter resistance provides a :
    (a) Negative voltage feedback   (b) Current series feedback
    (c) Voltage shunt feedback   (d) Positive current feedback

51. The current I_D in circuit shown in Figure (8) will be equal to :
    (a) 5mA
    (b) 10mA
    (c) 15mA
    (d) 20mA
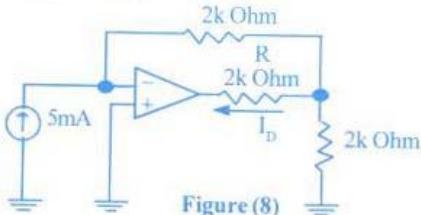
Figure (8)

52. The circuit shown in Figure (9) is a :
    (a) Logarithmic amplifier
    (b) Differentiator
    (c) Antilogarithmic amplifier
    (d) Integrator

Figure (9)
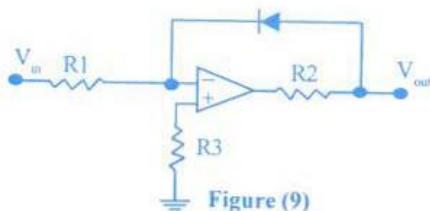
53. If the internal gain of an amplifier is 300 and feedback fraction β is 0.03, the loop gain of the amplifier is :

(a) 3   (b) 30

(c) 90   (d) 100

54. If C_{BE} and C_{CB} represent the base-emitter and collector-base capacitances of a transistor respectively. If the transistor is employed in common emitter amplifier having voltage gain A, the input capacitance C_{in} of the amplifiers is given by :

(a) $C_{in} = C_{BE} + AC_{CB}$ (b) $C_{in} = C_{BE} + C_{CB}$

(c) $C_{in} = C_{BE} + (1 + A)C_{CB}$ (d) $C_{in} = C_{CB} + (1 + A)C_{BE}$

55. Which of the following pin pairs in 741 Op Amp IC are for power supply connections ?

(a) 2 and 3   (b) 6 and 8

(c) 1 and 5   (d) 7 and 4

56. Identify the false statement. The ideal Op Amp would exhibit :

(a) Infinite voltage gain

(b) Infinite input resistance

(c) Zero output voltage when input voltage is zero

(d) Infinite output resistance

57. The minimum quantity that an instrument can measure is known as :

(a) Precision   (b) Resolution

(c) Accuracy   (d) Sensitivity

58. The relative limiting error of product of two terms is equal to the :

(a) sum of the of the relative error of the terms

(b) difference of the relative error of the terms

(c) division of the relative error of the terms

(d) product of the relative error of the terms

59. In a differential amplifier the difference mode gain A_{VD} = 1000 and CMMR=100. If the inputs V_1 and V_2 of the amplifier are 1.0mV and 0.9mV respectively, the output voltage of the amplifier will be :

(a) 10.95 mV   (b) 20.95 mV

(c) 109.5 mV   (d) 1095 mV

60. A moving coil galvanometer is converted into a DC ammeter by connecting :
  (a) a capacitor of appropriate capacitance across the galvanometer
  (b) a resistor of appropriate resistance across the galvanometer
  (c) a resistor of appropriate resistance in series with galvanometer
  (d) an inductor of appropriate inductance across the galvanometer

ROUGH WORK

ELECTRONICS

1. In a bridge-type full-wave rectifier, if V_m is the peak voltage across the secondary of the transformer, the maximum voltage coming across each reverse-biased diode is :

    (a) V_m

    (b) $2 V_m$

    (c) $\frac{1}{2} V_m$

    (d) $V_m / \sqrt{2}$

2. Which of the following is a unipolar device ?

    (a) P-N junction diode

    (b) Zener diode

    (c) Tunnel diode

    (d) Schottky diode

3. Lowest output resistance is obtained in :

    (a) CB

    (b) CE

    (c) CC

    (d) both (a) and (b)

4. In the case of BJT amplifier, bias stability is achieved by :

    (a) keeping the base current constant

    (b) keeping I_C and V_{CE} constant irrespective of the undesired changes in base current

    (c) keeping the temperature constant

    (d) keeping the temperature and base current constant

5. JFET has main drawback of :

    (a) having low input impedance

    (b) having high output impedance

    (c) being noisy

    (d) having small gain-bandwidth product

6. The most popular form of IC package is :

    (a) TO-5

    (b) DIL

    (c) Flat Pack

    (d) All of the above

7. A network is said to be non-linear if it does not satisfy :

    (a) homogenity condition

    (b) superposition condition

    (c) both (a) and (b)

    (d) associative condition

8. The superposition theorem is applicable to :

    (a) linear, non-linear and time variant responses

    (b) linear and non-linear resistors only

    (c) linear responses only

    (d) none of the above

9. Selectivities of different resonance circuits are compared in terms of their :

    (a) impedances

    (b) reactances

    (c) frequencies

    (d) bandwidths

10. The dual of a loop is :

    (a) twig

    (b) node

    (c) mesh

    (d) tree

11. A square wave with a period of 10 µs drives a T flip-flop. The period of the output signal will be :

    (a)   100 µs

    (b)   20 µs

    (c)   10 µs

    (d)   5 µs

12. While .... is the fastest unsaturated logic gate .... has the excellent noise immunity.

    (a)   ECL, TTL

    (b)   TTL, ECL

    (c)   ECL, HTL

    (d)   RTL, DTL

13. The ASCII is a 7-bit code for :

    (a)   letters

    (b)   numbers

    (c)   other symbols

    (d)   all of the above

14. Odd parity of wood can be conveniently tested by :

    (a)   XOR gate

    (b)   OR gate

    (c)   XNOR gate

    (d)   NAND

15. A multiplexer is known as :

    (a)   multivibrator

    (b)   data selector

    (c)   decoder

    (d)   seven segment display

16. For which of the following flip-flop the output is clearly defined for all considerations of two inputs ?

   (a)   D

   (b)   RS

   (c)   JK

   (d)   T

17. A complete microcomputer system consists of :

   (a)   microprocessor

   (b)   memory

   (c)   add-ons

   (d)   all of the above

18. The most common addressing techniques employed by a CPU is :

   (a)   immediate

   (b)   direct

   (c)   indirect

   (d)   all of the above

19. Which of the following is the user programmed semiconductor memory ?

   (a)   SRAM

   (b)   DRAM

   (c)   EPROM

   (d)   All of the above

20. For a memory system, the cycle time is :

   (a)   same as the access time

   (b)   longer than the access time

   (c)   shorter than the access time

   (d)   none of the above

21. In C programming language, which of the following type of operators enjoys highest precedence :

    (a)   relational operators

    (b)   equality operator

    (c)   logical operators

    (d)   arithmetic operators

22. The single character input/output functions are :

    (a)   scanf( ) and printf( )

    (b)   getchar( ) and printf( )

    (c)   scanf( ) and putchar( )

    (d)   getchar( ) and putchar( )

23. The two statements that can be used to change the flow of control are :

    (a)   if and switch

    (b)   if and while

    (c)   switch and do-while

    (d)   break and continue

24. The comma operator (,) is primarily used in conjunction with :

    (a)   for statement

    (b)   if-else statement

    (c)   do-while statement

    (d)   all of the above

25. Arrays that do not have their dimensions explicitly specified are called :

    (a)   unsized arrays

    (b)   undimensional arrays

    (c)   initialized arrays

    (d)   no size of arrays

26. C contains two special pointer operators :

   (a) * and &

   (b) * and &&

   (c) & and &&

   (d) % and &

27. The feature that allows you to define new data types that are equivalent to existing data types is :

   (a) pointer

   (b) typedef

   (c) structure

   (d) union

28. A union consists of a number of elements that :

   (a) all occupy the same space in memory

   (b) must be structures

   (c) are grouped neat to each other in memory

   (d) all have the same type

29. Which of the following is not a linked data structure ?

   (a) Linear linked list

   (b) Circular linked list

   (c) Linked list with multiple pointers

   (d) None of the above

30. In linked lists with multiple pointers :

   (a) components are all linked together in some sequential manner

   (b) there is no beginning and no end

   (c) components are arranged hierarchically

   (d) forward and backward transversal within the list is permitted

31. Which of the following parameters is used for distinguishing between a small signal and a large signal amplifier ?

    (a)   Voltage gain

    (b)   Frequency response

    (c)   Harmonic distortion

    (d)   Input/output impedances

32. Class AB operation is often used in power amplifiers in order to :

    (a)   get maximum efficiency

    (b)   remove even harmonics

    (c)   over come crossover distortion

    (d)   reduce collector dissipation

33. A thyristor is a semiconductor switch which is :

    (a)   unilateral and astable

    (b)   bilateral and astable

    (c)   unilateral and bistable

    (d)   bilateral and bistable

34. The crystal oscillator frequency is very stable due to :

    (a)   rigidity of crystal

    (b)   size of crystal

    (c)   structure of crystal

    (d)   high Q of the crystal

35. The requirement of an oscillator using positive feedback amplifier as an oscillator, is that :

    (a)   there must be positive feedback

    (b)   initially the value of loop gain AB must be greater than unity

    (c)   after the desired level is reached the loop gain AB must decrease to unity

    (d)   all of the above

36. UJT when used for triggering an SCR has waveform :

    (a) sine wave

    (b) square wave

    (c) saw tooth wave

    (d) trapezoidal

37. Most of the linear ICs are based on the two transistor differential amplifier because of its :

    (a) input voltage dependent linear transfer characteristic

    (b) high voltage gain

    (c) high input resistance

    (d) high CMRR

38. The type of multivibrator used for generation of clock pulses is :

    (a) monostable multivibrator

    (b) astable multivibrator

    (c) bistable multivibrator

    (d) none of the above

39. The material used for the construction of LED is :

    (a) Si

    (b) Ge

    (c) GaAsP

    (d) None of the above

40. Which of the following is *not* classified as a photoconductive device ?

    (a) a photovoltaic cell

    (b) a PIN photodiode

    (c) a phototransistor

    (d) a light dependent resistor

41. Electronic voltmeter provides more accurate readings in high resistance circuits as compared to a non-electronic voltmeter because of :
    (a) high V/ohm ratings
    (b) high ohm/V ratings
    (c) low meter resistance
    (d) high resolution

42. In a CRT the length l of the magnetic field in the initial direction of the electron beam when compared with the radius of curvature of that beam is :
    (a) very large
    (b) very small
    (c) equal
    (d) negligibly small

43. The Miller sweep circuit normally used in a CRO is basically :
    (a) voltage to current converter circuit
    (b) a current to voltage converter circuit
    (c) an integrator circuit
    (d) a differentiator

44. The disadvantage of Maxwell's bridge is that :
    (a) inductance measurement is frequency dependent
    (b) it cannot be used to measure inductance for large values of Q
    (c) both inductance and Q cannot be measured
    (d) resistance of the inductor measurement is frequency dependent

45. What type of bridge is recommended for measuring resistances less than 1 ohm ?
    (a) Wheatstone bridge
    (b) Schering bridge
    (c) Maxwell bridge
    (d) Kelvin bridge

46. A voltmeter has 100 divisions on 0-100 V range. One-tenth of each division can be read with certainty. The resolution of the meter is :

    (a) 0.1 V

    (b) 0.01 V

    (c) 1.0 V

    (d) 1.01 V

47. The resistance of a strain gauge should be high :

    (a) to increase sensitivity

    (b) to reduce hysteresis effects

    (c) to swamp out the effects of variations of resistance in other parts of the bridge

    (d) none of the above

48. Piezo electric transducers are :

    (a) active transducers

    (b) passive transducers

    (c) secondary transducers

    (d) none of the above

49. The resolution of a digital ammeter with 3-digit display is :

    (a) 1/2

    (b) 1/3

    (c) 1/8

    (d) 1/4

50. A set of independent current measurements were taken and recorded as follows 12.8 A, 12.2 A, 12.5 A, 13.1 A, 12.9 A and 12.4 A. The standard deviation is :

    (a) 0.283 A

    (b) 0.300 A

    (c) 0.399 A

    (d) 0.414 A

51. In a 100% amplitude modulated signal, if the total transmitted power is P, then carrier power will be :

(a) $\dfrac{2}{3}$ P

(b) $\dfrac{1}{2}$ P

(c) $\dfrac{1}{3}$ P

(d) $\dfrac{1}{4}$ P

52. In a narrow band FM system, the highest modulating frequency is f_m. The bandwidth of the system will be :

(a) 6 f_m

(b) f_m

(c) 2 f_m

(d) 10 f_m

53. In TV transmission, picture signal is amplitude modulated and sound signal is frequency modulated. This is done because :

(a) it is not possible to frequency modulate the picture signal

(b) bandwidth requirement is minimised

(c) sound signal is more susceptible to noise than picture signal

(d) synchronisation of picture frames becomes easier

54. The most common detector used in an AM radio broadcast receiver is :

(a) envelope detector

(b) coherent detector

(c) discriminator

(d) ratio detector

55. The main advantage of PCM system is :

(a) lower bandwidth

(b) lower power

(c) lower noise

(d) none of the above

56. Pulse communication system that is inherently highly immune to noise is :

    (a)   PAM

    (b)   PWM

    (c)   PPM

    (d)   PCM

57. Which of the following antenna gives circular polarization ?

    (a)   Yagi-uda

    (b)   Parabolic

    (c)   Dipole

    (d)   Helical

58. The ground wave eventually disappears as one moves from transmitter because of :

    (a)   surface attenuation

    (b)   diffraction

    (c)   loss of line of sight

    (d)   tilting

59. Which of the following statements is *not* valid for FM systems ?

    (a)   It needs less bandwidth

    (b)   It offers better S/N ratio

    (c)   It requires less modulating power

    (d)   All of the above

60. In a TV which of the following stages has AGC bias ?

    (a)   Mixer

    (b)   Local oscillator

    (c)   RF amplifier

    (d)   AFT discriminator

ELECTRONICS

1. A differential amplifier has common-mode gain of 0.02 db and differential-mode gain of 200 db. Its CMMR in db is :

   (A) 0.02 db

   (B) 4.80 db

   (C) 80.0 db

   (D) 200.0 db

2. If the cut-in voltage for silicon diodes D_1 and D_2 used in the circuit shown in Fig.(1) is 0.6 V, the output voltage V_o for $V_1 = 5$ V and $V_2 = 5$ V is :
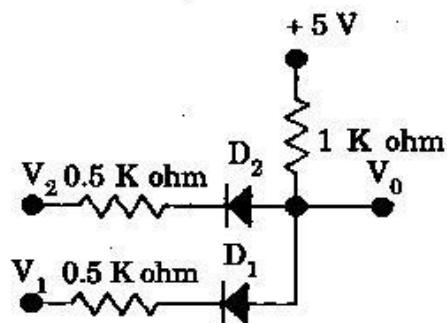
Fig. (1)

   (A) 0 V

   (B) 5 V

   (C) 10 V

   (D) 15 V

3. Identify the *true* statement. An emitter follower has :

   (A) low input impedance and high voltage gain

   (B) high output impedance and unity current gain

   (C) low input impedance and unity current gain

   (D) high input impedance and unity voltage gain

4. Bridge rectifiers are preferred because :

(A) ripple factor of the bridge rectifier is less than that of centre-tap full-wave rectifier

(B) PIV in case of bridge rectifier is half that of a centre-tap full-wave rectifier

(C) the regulation in case of bridge rectifiers is higher than that in case of centre-tap full-wave rectifier

(D) the rectification efficiency is larger than that in case of centre-tap full-wave rectifier

5. In a p-n junction the Zener breakdown is caused by :

(A) field ionization

(B) impact ionization

(C) thermal runaway

(D) punchthrough mechanism

6. Identify the *true* statement. In case of avalanche breakdown of a p-n junction :

(A) direct band rupture occurs due to high electric field

(B) the charge carriers acquire high energies sufficient to produce electron-hole pairs by impact ionization

(C) electron-hole pairs are generated because of the increase in junction temperature

(D) negligible current flows across the junction

7. A transistor is said to be in saturation region when :

(A) emitter-base junction is forward biased and collector-base junction is reverse biased

(B) both emitter-base junction and collector-base junction are reverse biased

(C) both emitter-base junction and collector-base junction are forward biased

(D) emitter base-junction is reverse biased and collector-base junction is forward biased

8. Semiconductors having Fermi level within the allowed bands are known as :
   (A) degenerate semiconductors
   (B) non-degenerate semiconductors
   (C) compensated semiconductors
   (D) intrinsic semiconductors

9. In case of a MOSFET the drain-source voltage at which the drain current becomes nearly constant is called :
   (A) punchthrough voltage
   (B) cut-in voltage
   (C) early voltage
   (D) pinch-off voltage

10. The use of a bypass capacitor across emitter resistor in transistor circuits is to :
    (A) avoid shift in the Q-point
    (B) stabilize the circuit against temperature variations
    (C) avoid loss of signal gain
    (D) stabilize the circuit against the variation in β

11. For a p-n-p transistor if $\alpha = 0.98$ and $I_{CBO} = 5\ \mu A$, then for a base current of $100\ \mu A$ the collector current I_C is :
    (A) 1.50 mA
    (B) 2.50 mA
    (C) 3.15 mA
    (D) 5.15 mA

12. The voltage gain of a source follower employing FET is usually :
    (A) slightly less than unity but positive.
    (B) equal to unity but negative.
    (C) never less than +200.
    (D) slightly greater than unity but negative

13. Under thermal equilibrium the product of the electron and hole carrier concentrations in a semiconductor is :
   (A)   dependent on the doping concentrations
   (B)   independent on the doping concentrations
   (C)   greater than square of the intrinsic concentrations
   (D)   less than square of the intrinsic concentrations

14. The Schottky diode clamping across the collector-base junction of the transistor in case of Schottky-TTL is used :
   (A)   to increase the current gain of the transistor
   (B)   to prevent transistor from junction breakdown
   (C)   to prevent transistor from saturation
   (D)   to prevent transistor from thermal runaway

15. According to the De Morgan's theorem :
   (A)   An n-input NAND gate is equivalent to an n-input bubbled AND gate
   (B)   An n-input OR gate is equivalent to an n-input bubbled AND gate
   (C)   OR gate and NOR gate are complement to each other
   (D)   An n-input NAND gate is equivalent to n-input bubbled OR-gate

16. The output logic Y of the circuit shown in Fig. (2) is :
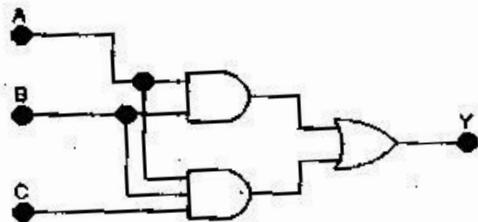
Fig. (2)

   (A)   ABC
   (B)   AB
   (C)   AC
   (D)   A

17. The number of load gates that a logic device can drive reliably is called the :

(A) fan-out

(B) fan-in

(C) standard load

(D) current sink

18. The potential divider method of biasing in transistor amplifiers is used as it :

(A) increases the voltage gain of the amplifier

(B) makes the operating point stable against the variations of β

(C) reduces the noise of the amplifier

(D) prevents transistor from thermal run away

19. The equivalent resistance between A and B terminals of the circuit shown in Fig. (3) is :

Fig. (3)

(A) R

(B) 2R

(C) $(1 + \sqrt{5})R$
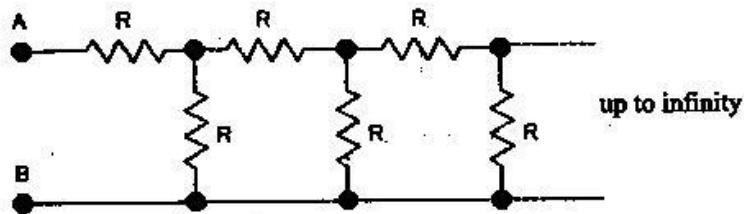
(D) $(1 + \sqrt{10})R$

20. For a step voltage input an integrator produces :

    (A)   a sine wave

    (B)   a square wave

    (C)   a narrow spike

    (D)   a ramp

21. For the circuit shown in Fig. (4) the output V_{out} will be :
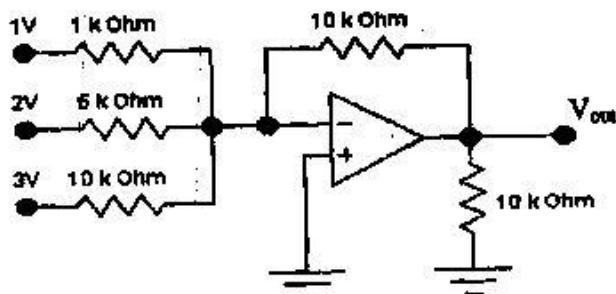
Fig. (4)

    (A)   –17 V

    (B)   –15 V

    (C)   –9.6 V

    (D)   –6 V

22. The resolution of 4-digit 0-10 V DVM is :

    (A)   1 V

    (B)   1 mV

    (C)   1 μV

    (D)   1 pV

23. For an input voltage $V_{in} = 10 \sin (2000\ t)$ µV the output voltage V_{out} for the circuit shown in Fig. (5) will be :
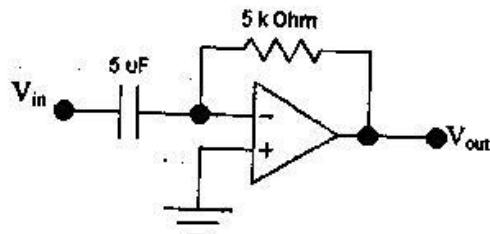
Fig. (5)

(A) $-100 \cos (2000\ t)$ µV

(B) $-100 \sin (2000\ t)$ µV

(C) $-500 \cos (2000\ t)$ µV

(D) $-500 \sin (2000\ t)$ µV

24. One of the following devices has no negative region in its static I-V characteristics. The device is :

(A) Thyristor

(B) Tunnel diode

(C) Gunn diode

(D) Zener diode

25. If the data stored at memory locations 0800 and 0801 is $2C_H$ and 51_H respectively, then on execution of the program :

LDA 0800

MOV B,A

LDA 0801

ADD B

STA 0802

the contents of the memory location 0802 will be :

(A) $7D_H$

(B) $7E_H$

(C) 20_H

(D) 51_H

26. LDA is a...........................byte instruction and belongs to...................addressing
    mode group.
    (A) one, direct
    (B) two, register
    (C) three, direct
    (D) two, intermediate

27. Early voltage is usually determined from the :
    (A) input characteristics of CE transistor
    (B) input characteristics of CB transistor
    (C) output characteristics of CB transistor
    (D) output characteristics of CE transistor

28. If the current gain α of a transistor is 0.99, the current gain β of the transistor
    will be :
    (A) 49.0
    (B) 50.0
    (C) 69.0
    (D) 99.0

29. The maximum frequency of oscillation of a Wien bridge oscillator employing
    an Op-Amp is limited by the :
    (A) slew rate of the operational amplifier
    (B) output offset voltage of the operational amplifier
    (C) output offset current of the operational amplifier
    (D) gain of the amplifier

30. In case of a phase shift oscillator, each RC circuit produces a phase shift of :
    (A) 30°
    (B) 60°
    (C) 90°
    (D) 180°

31. In every practical oscillator the loop gain is kept :

    (A)   exactly equal to the unity

    (B)   slightly less than unity

    (C)   slightly greater than unity

    (D)   not less than 10

32. Identify the true statement from the following :

    (A)   The input resistance in a voltage series feedback amplifier decreases while that in a voltage-shunt feedback amplifier increases

    (B)   The input resistance both in a voltage-series feedback amplifier and voltage-shunt feedback amplifier decreases

    (C)   The input resistance both in a voltage-series feedback amplifier and voltage-shunt feedback amplifier increases

    (D)   The input resistance in a voltage-series feedback amplifier increases while that in a voltage-shunt feedback amplifier decreases

33. The temperature coefficient of resistance in case of semiconductors is :

    (A)   zero

    (B)   infinity

    (C)   positive

    (D)   negative

34. The Fermi energy level in case of intrinsic semiconductors lies :

    (A)   halfway between the conduction and valance bands

    (B)   within the valance band

    (C)   within the conduction band

    (D)   close to the bottom of the conduction band

35. When a sinusoidal voltage of frequency 60 Hz is applied across the primary terminals of the transformer in case of full-wave rectifier, the lowest frequency alternating component across the load will have the frequency :

   (A) 30 Hz

   (B) 60 Hz

   (C) 90 Hz

   (D) 120 Hz

36. The reverse leakage current I_{CBO} :

   (A) increases with increase in I_E

   (B) decreases with increase in temperature

   (C) increases with increase in temperature

   (D) decrease with increase in V_{CB}

37. In case of RC coupled amplifier the main component which results in decrease in its gain in low frequency range :

   (A) is coupling capacitor

   (B) are the junction capacitances

   (C) is the emitter resistance

   (D) is emitter resistance bypass-capacitor

38. In case of class-A operation of an amplifier the output current flows for :

   (A) full cycle

   (B) less than full cycle but more than half cycle

   (C) half cycle

   (D) less than half cycle

39. The maximum efficiency of class-B operation will not exceed :

    (A)   25%

    (B)   50%

    (C)   60.5%

    (D)   78.5%

40. The circuit shown in Fig. (6) is :
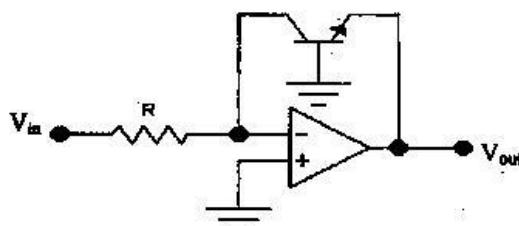
Fig. (6)

    (A)   an integrator

    (B)   a logarithmic amplifier

    (C)   a differentiator

    (D)   an adder

41. The Boolean expression for a two input A and B exclusive-OR gate is given by :

    (A) $f(A, B) = A + B$

    (B) $f(A, B) = AB$

    (C) $f(A, B) = \bar{A} B + A\bar{B}$

    (D) $f(A, B) = \bar{A} + B$

42. The Boolean expression $A + \bar{A}$ will always have logic value :

    (A)   0

    (B)   A

    (C) $\bar{A}$

    (D)   1

43. The Boolean expression $A + \bar{A}B$ is equal to :

   (A)   AB

   (B)   A + B

   (C) $\bar{A}B + A\bar{B}$

   (D)   A

44. The output Y in the circuit shown in Fig. (7) is given by :
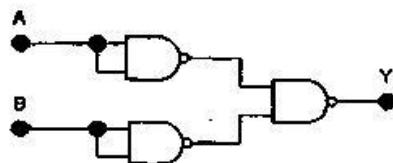
Fig. (7)

   (A)   A + B

   (B)   AB

   (C) $\bar{A}B + A\bar{B}$

   (D) $(A + \bar{B})(\bar{A} + B)$

45. For 50 µA meter movement with a coil resistance of 200 Ω. What shunt resistance is required to extend the range to 250 µA ?

   (A)   200 Ω

   (B)   150 Ω

   (C)   100 Ω

   (D)   50 Ω

46. If m is the modulation index the ratio between the total power in the amplitude modulated wave to the unmodulated carrier power is given by :

(A) $m^2/2$

(B) $1 + m^2/2$

(C) $1 + m^2$

(D) $(1 + m^2)/2$

47. A carrier wave is simultaneously modulated by two sine waves with modulation indices of 0.3 and 0.4, the total modulation index is :

(A) 1.7

(B) 0.7

(C) 0.5

(D) 0.34

48. Identify the *true* statement from the following. In a superheterodyne receiver :

(A) a constant frequency difference is maintained between the local oscillator and the RF circuit

(B) no local oscillator is used

(C) a frequency difference equal to twice the intermediate frequency is maintained between local oscillator and RF circuit

(D) local oscillator frequency is normally double the IF

49. Identify the *false* statement from the following :

(A) FM has an infinite number of side bands.

(B) In FM the total transmitted power always remains constant with depth of modulation

(C) In FM the amplitude of the carrier component does not remain constant

(D) In FM with increased depth of modulation the required bandwidth is decreased

Electronics 13

50. The image frequency of a superheterodyne receiver :

   (A)   is not rejected by the IF tuned circuit

   (B)   is produced within the receiver

   (C)   is independent of the frequency to which the receiver is tuned

   (D)   is due to the insufficient adjustment of channel receiver

51. The carrier wave $V_c = 80 \sin (2 \times 10^6 t)$ is amplitude modulated by a modulating signal $V_m = 4 \sin (200t)$, the modulation index is :

   (A)   0.01

   (B)   0.05

   (C)   0.25

   (D)   0.50

52. If δ and f_m represent the frequency deviation and modulating frequency the modulation index of FM is given by :

   (A) f_m/δ

   (B) δ/f_m

   (C) δf_m

   (D) $\delta f_m/2$

53. In case of frequency modulation :

   (A)   the total number of side bands depend on the modulation index

   (B)   the carrier frequency cannot disappear.

   (C)   the amplitude of any side band does not depend on the modulation index

   (D)   the amplitude of any side band depends on the modulation index

54. In C-programming the **while (expression) statement** is used to carry out looping operation. The included statements will executed repeatedly as long as the value of the expression is :

   (A)   zero

   (B)   one only

   (C)   negative

   (D)   not zero.

55. In C-programming the expression **++k** is equivalent to :

   (A)   **k=k+1+1**

   (B)   **k=k-1**

   (C)   **k=k+1**

   (D)   **k=k+k**

56. In C-programming the global variables are the variables defined :

   (A)   inside the function program

   (B)   outside the main program

   (C)   inside the main program

   (D)   in function declaration statement

57. Identify the *false* statement from the following :

   (A)   A pointer is a variable which holds the memory address of another variable.

   (B)   A pointer allows to return structured variables from a function

   (C)   A pointer allows to pass variables, arrays, functions, strings and structures to a function arguments

   (D)   A pointer does not support dynamic allocation and deallocation of memory segments

58. Identify the *false* statement. In C-programming :

   (A) all processor directives begin with the sharp sign #

   (B) the processor directive is terminated by a semicolon

   (C) only one processor directive can occur in a line

   (D) the processor directive may appear at any place in source file

59. The electromagnetic wave when travelling through the free space will suffer only one of the following :

   (A) Reflection

   (B) Refraction

   (C) Attenuation

   (D) Absorption

60. The highest frequency that will return to earth by a given atmospheric layer after being beamed straight up at it is known its :

   (A) critical frequency

   (B) maximum useable frequency

   (C) window

   (D) resonant frequency

ELECTRONICS

1. In case of amplitude modulation if three sine waves simultaneously modulate the carrier with individual modulation indices m_1, m_2 and m_3, then total modulation index is given by :

   (A) $\sqrt{m_1^2 + m_2^2 + m_3^2}$

   (B) $m_1 + m_2 + m_3$

   (C) $\sqrt[3]{m_1 m_2 m_3}$

   (D) $(m_1 + m_2 + m_3)/2$

2. Identify the false statement with regard to advantages and disadvantages of FM :

   (A) FM is, or can be made, relatively immune to the effects of noise

   (B) A much smaller channel is required by FM, up to 1/10 times as small as that needed by AM

   (C) FM transmitting and receiving equipments tend to be more complex

   (D) The amplitude of the FM wave is constant. It is thus independent of modulation index

3. The absorption of radio waves by the atmosphere depends on :

   (A) the distance from the transmitter

   (B) the polarization of the wave

   (C) the frequency of the wave

   (D) both the distance and the polarization of the wave

4. The most suitable method out of the following in measurement of the resistance of expected value less than 1 Ω is :

   (A) Limit bridge method

   (B) Wheatstone's bridge method

   (C) Loss of charge method

   (D) Kelvin's bridge method

5. The diffusion current density is :

   (A) directly proportional to the concentration gradient of charge carriers

   (B) inversely proportional to the concentration gradient of charge carriers

   (C) independent of the concentration gradient of charge carriers

   (D) directly proportional to concentration of charge carriers

6. With increase in temperature :

   (A) the resistivity of a conductor decreases while that of a semiconductor increases

   (B) the resistivity of both conductor and semicodnuctor increases

   (C) the resistivity of both conductor and semiconductor decreases

   (D) the resistivity of a conductor increases and that of semiconductor decreases

7. The ratio of electron and hole concentrations in case of an intrinsic semi-conductor is :

   (A) greater than one

   (B) less than one

   (C) equal to one

   (D) equal to square of the intrinsic carrier concentration

8. In case of a centre-tap full-wave rectifier if V_{max} is the peak voltage across the secondary of the transformer, the voltage appearing across the non-conducting diode is :

(A) V_{max}

(B) $2 V_{max}$

(C) $\sqrt{2}V_{max}$

(D) $V_{max}/\sqrt{2}$

9. In common base configuration if I_E is the emitter current and α is the current gain, the part of the emitter current which forms the collector current is :

(A) αI_E

(B) $(1 - \alpha)I_E$

(C) $(1 - \alpha)I_E + \alpha$

(D) $(1 + \alpha)I_E$

10. The configuration having the highest input resistance, lowest output resistance and voltage gain less than unity is :

(A) CE

(B) CC

(C) CB

(D) Both CE and CB

11. The graph plotted between the drain current I_D and gate-source voltage V_{GS} for a given drain source voltage V_{DS} of a MOSFET is called its :

(A) output characteristics

(B) input characteristics

(C) transfer characteristics

(D) load line

12. The process used in growing thin layers of the material on the semiconductor surface in fabrication of the semiconductor devices is known as :

(A) Lithography

(B) Metallization

(C) Diffusion

(D) Epitaxy

13. The operation of N-channel JFET involves flow of :

(A) electrons

(B) holes

(C) both electrons and holes

(D) doping impurity ions

14. The principle of superposition is a fundamental consequence of :

(A) non-linearity

(B) linearity

(C) reciprocity

(D) both non-linearity and reciprocity

15. The branch relationship of a two terminal resistive element is linear if it is :

(A) homogeneous

(B) additive

(C) homogeneous and additive

(D) none of the above

16. In model analysis of networks the choice of a reference node :

   (A)   alters the currents flowing through its branches

   (B)   effects the operation of the network

   (C)   alters the voltage across the elements

   (D)   affects the voltage of various nodes

17. The drain-source voltage at which the channel opening of a JFET reduces to zero is known as :

   (A)   cut-in voltage

   (B)   punch-through voltage

   (C)   pinch-off voltage

   (D)   breakdown voltage

18. The quality factor of any circuit is given by :

   (A) 2π times the energy dissipated per cycle divided by the energy stored per cycle

   (B) 2π times the energy stored per cycle divided by the energy dissipated per cycle

   (C) 2π times the energy stored per cycle

   (D) 2π times the energy dissipated per cycle

19. The normal binary code of Gray 11011 is :

    (A) 11111

    (B) 11110

    (C) 11010

    (D) 10010

20. At resonance frequency ω, the Q of a series LCR circuit is given by :

    (A) $\omega L/R$

    (B) $\omega C/R$

    (C) $R/\omega L$

    (D) ω/RL

21. A device said to be active if its I-V characteristic lies in the :

    (A) 1st quadrant

    (B) 2nd and 4th quadrants

    (C) 1st and 3rd quadrants

    (D) 3rd quadrant

22. The threshold voltage of p-channel enhancement MOSFET is :

    (A) zero

    (B) positive

    (C) negative

    (D) independent of device geometry

23. $\dfrac{b}{s^2 + as + b}$ is a second order filter gain function that realizes the characteristics of a :

(A) band pass filter

(B) band reject filter

(C) high pass filter

(D) low pass filter

24. Identify the false statement from the following. The RC filters offer :

(A) increased circuit reliability because for all the processing steps can be automated

(B) improvement in performance because high quality components can be realized

(C) an increase in parasitic

(D) simpler design process

25. The frequency response curve of a first order filter rolls-off at a rate of :

(A) 10 db/decade

(B) 20 db/decade

(C) 10 db/octave

(D) 20 db/octave

26. The total number of sets of input conditions that will produce a high output from a three-input OR gate is :

(A) 7

(B) 8

(C) 15

(D) 16

Electr.

7

27. The logic expression $\overline{\overline{A+B}} + \overline{\overline{A} + \overline{B}}$ on simplification reduces to :

   (A)   A + B

   (B)   A

   (C)   AB

   (D)   B

28. A NAND gate with all inputs connected together will function as :

   (A)   OR gate

   (B)   AND gate

   (C)   NOT gate

   (D)   NOR gate

29. According to De Morgan's theorem :

   (A)   the complement of the product of two or more variables is equal to the sum of the variables

   (B)   the complement of the product of two or more variables is equal to the product of the variables

   (C)   the complement of the product of two or more variables is equal to the product of the complements of the variables

   (D)   the complement of the product of two or more variables is equal to the sum of the complements of the variables

30. When 2's complement of a binary number is taken twice, the result will be :

(A) square of the original number

(B) double of the original number

(C) original number

(D) half of the original number

31. When binary number 1110101 is divided by the number 1001, the result is :

(A) 1001

(B) 1101

(C) 1010

(D) 0101

32. In Schottky TTL families a Schottky diode clamping between base and collector of the transistor is used to :

(A) prevent transistor saturation

(B) prevent transistor breakdown

(C) prevent short circuit failure

(D) increase the fan-in

33. Identify the false statement. Excess-3 code :

(A) is an unweighted code

(B) is used in representing a alphanumeric data

(C) is a self-complementing code

(D) uses only 10 of the 16 possible 4-bit code groups

34. In logic circuits the positive logic is one in which :

(A) logic 0 and logic 1 are represented by negative and positive voltages respectively

(B) logic 0 and logic 1 are represented by zero and positive voltages respectively

(C) the voltage corresponding to logic 0 is lower than that corresponding to logic 1

(D) the voltage corresponding to logic 0 is higher than that corresponding to logic 1

35. With a NAND RS-latch a low R and low S produces :

(A) high output

(B) low output

(C) no change

(D) race condition

36. A multivibrator which continuously switches between two quasi-stable states without external excitation is known as :

(A) bistable multivibrator

(B) monostable multivibrator

(C) astable multivibrator

(D) flip-flop

37. The logical value of the logical function A + A is :

(A) 0

(B) 1

(C) A

(D) $\bar{A}$

38. The minimum number of JK flip-flops required for designing a modulus-10 counter is :

(A) 4

(B) 6

(C) 8

(D) 10

39. Identify the *correct* statement from the following :

(A) Static RAM is volatile while dynamic RAM is non-volatile

(B) Static RAM is non-volatile while dynamic RAM is volatile

(C) Both static and dynamic RAM are volative

(D) Both static and dynamic RAM are non-volatile

40. Dynamic RAM :

(A) uses bipolar or MOS flip-flop

(B) uses MOSFET's and capacitors

(C) needs no refreshing of the data

(D) contains less memory cells than a static RAM on the same chip area

41. The 8085 A microprocessor has :

   (A)   10 restart instructions

   (B)   8 restart instructions

   (C)   6 restart instructions

   (D)   4 restart instructions

42. The execution of RST2 instruction vectors to location :

   (A) 0000_H

   (B) 0008_H

   (C) 0010_H

   (D) 0018_H

43. The hardware restart of 8085A microprocessor which has the highest priority and when active branches the program to location 0024_H is :

   (A)   RST 7.5

   (B)   RST 6.5

   (C)   RST 5.5

   (D)   Trap

44. The decrease in gain of an RC coupled amplifier at low frequency is mainly due to :

   (A)   junction capacitances of the transistor

   (B)   emitter resistance

   (C)   coupling capacitor

   (D)   voltage divider resistances used for self-biasing of the amplifier

45. If R_i and R_o are the input and output resistances of an amplifier, its power gain in decibels equals its voltage gain in decibels when :

(A) $R_i = 2R_o$

(B) $R_i = R_o$

(C) $R_i = R_o/2$

(D) $R_i = 5R_o$

46. A phasor is :

(A) a vector representing the magnitude and phase of an alternating quantity

(B) graph representing the frequecny and phase of an amplifier

(C) an instrument used for determination phase difference between two time varying quantities

(D) a colour tag for distinguishing between different phases of 3-phase supply

47. When the output flows for less than one-half cycle of the input signal, the amplifier is said to operate in :

(A) Class-A mode

(B) Class-AB mode

(C) Class-B mode

(D) Class-C mode

48. If an amplifier has an overall current gain of 200 and input resistance of 20 kΩ with a load resistance of 10 kΩ. The overall voltage gain of the amplifier is :

   (A)   20 dB

   (B)   40 dB

   (C)   60 dB

   (D)   80 dB

49. Two amplifiers having mid band voltage gains 20 dB and 40 dB are connected in cascade. The overall voltage gain of the cascade configuration will be :

   (A)   800 dB

   (B)   60 dB

   (C)   30 dB

   (D)   2 dB

50. A class-B push-pull amplifier suffers from :

   (A)   intermodulation distortion

   (B)   excess harmonic distortion

   (C)   cross-over distortion

   (D)   none of the above

51. An amplifier with a voltage gain of 1000 uses 1/100th of its output in negative feedback, the gain with feedback is :

   (A)   90.9

   (B)   80.9

   (C)   20.9

   (D)   10.9

52. A program that accepts a high-level language program as input and generates a corresponding machine language program as output is called :
    (A) Linker
    (B) Loader
    (C) Compiler
    (D) Editor

53. Out of the following bridges which one is used for determination the capacitance :
    (A) Schering bridge
    (B) Wheatstone bridge
    (C) Kelvin bridge
    (D) Hay bridge

54. Which one of the following operators does *not* belong to unary operator group ?
    (A) ++
    (B) <=
    (C) --
    (D) size of

55. Identify the *false* statement from the following :
    (A) an integer quantity cannot be added to or subtracted from a pointer variable
    (B) a pointer variable can be assigned the address of an ordinary variable
    (C) a pointer variable can be assigned the value of another pointer variable
    (D) a pointer variable can be assigned a null (zero) value

56. If $i = 1$, then on execution of $++ i$ statement the value of i will be :
   (A) 1
   (B) 2
   (C) 3
   (D) 4

57. Identify *false* statement. In C programming :
   (A) a process directive may appear at any place in a source file
   (B) only one processor directive can occur in a line
   (C) a processor directive is terminated by a semicolon
   (D) all processor directives begin with the sharp sign (#)

58. In C programming when working with stream-oriented data file, one has to establish first a buffer area. This is accomplished by :
   (A) fwrite
   (B) fopen
   (C) fclose
   (D) FILE

59. Which of the following operators enjoys the highest precedence in C programming ?
   (A) Unary operators
   (B) Logical operators
   (C) Relational operators
   (D) Arithmetic operators

60. Idetnify the *false* statement from the following :
   (A) A Union contains members whose individual data types may differ from one another
   (B) The members that compose a union each are assigned its unique storage area within the computer's memory
   (C) The members that compose a union all share the same storage area within the computer's memory
   (D) A union can be member of a structure and a structure can be a member of a union.