168/2024

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. Unit of specific resistance is :

(A) Ω (B) $\Omega - m$

(C) Ω / m (D) Ω / mV

2. The value of temperature co-efficient of resistance depends upon :

(i) Nature of the material and temperature

(ii) Nature of the material and length of the material

(iii) Length of the material and volume of the material

(iv) Nature of the material and volume of the material

(A) Only (i) and (ii) (B) Only (ii) and (iii)

(C) Only (i) (D) Only (iii)

3. In resistor colour coding if the third band is gold, it represents a multiplying factor of :

(A) 0.01 (B) 0.1

(C) 0.2 (D) 0.5

4. Combined or equivalent resistance of a parallel circuit is :

(A) Less than the least amongst them

(B) Higher than the least amongst them

(C) Higher than the highest amongst them

(D) Less than the highest amongst them

5. Ceramic capacitor has a approximate capacitance range of :

(A) 3 pF to 30 pF (B) 2 μF to 2000 µF

(C) 3 pF to 2000 µF (D) 3 pF to 2 µF

6. Five equal capacitors connected in series have a resultant of 4 μF. When these connected in parallel and charged to 400 Vdc supply. Then the total energy stored is :

(A) 28 J (B) 38 J

(C) 18 J (D) 8 J

7. Two coils each having an inductance of 250 μH have combined inductance of 550 μH when connected series aiding and 450 μH when connected series opposing. Find the mutual inductance :

(A) 100 μH (B) 50 μH

(C) 25 μH (D) 150 μH

8. A coil has a resistance of 30 Ω and an inductance of 127.3 mH. It is connected across a 200 V, 50 Hz supply. Find impedance :

(A) 10 Ω (B) 50 Ω

(C) 350 Ω (D) 150 Ω

9. A transformer is an efficient device because it :

(A) It uses inductive coupling

(B) It uses capacitive coupling

(C) It uses electric coupling

(D) Is a static device

10. What is the approximate efficiency of large transformers?

(A) 95% (B) 75%

(C) 85% (D) 65%

11. In Silver Oxide cell, the anode is made up of :

(A) Silver Oxide

(B) Magnesium Oxide

(C) Zinc in an alkaline electrolyte

(D) Carbon in an alkaline electrolyte

12. In half wave rectifier DC output voltage in terms of V_S(rms) :

(A) 0.45 Vs(rms)
(B) 0.48 Vs(rms)
(C) 0.54 Vs(rms)
(D) 0.58 Vs(rms)

13. A device whose characteristics are very close to that of an ideal voltage source is a :

(A) Transistor
(B) DIAC
(C) FET
(D) Zener diode

14. Which of the following is a switching voltage regulator?

(A) 79S40
(B) 78S50
(C) 78S40
(D) 79S50

15. Inverter is a device that :

(A) converts fixed dc power into variable dc power
(B) converts variable dc power into fixed dc power
(C) converts ac power into dc power
(D) converts dc power into ac power

16. The resistance of voltmeter is usually

(A) Very low
(B) Low
(C) Medium
(D) High

17. Unit of susceptibility is

(A) Webbers/meter square
(B) Henry per meter
(C) Tesla
(D) No units

18. Range extension of Ammeter requires ———————— with milli ammeter

(A) A shunt resistor
(B) A series resistor
(C) Series multiplier
(D) None of these

19. Norton's theorem is ———————— form of an equivalent circuit

(A) Voltage (B) Current

(C) Both (A) and (B) (D) None of these

20. Air friction damping is used in the instrument which is

(A) Moving iron (B) Moving coil

(C) Induction (D) Hot wire

21. In an R – L – C circuit, the phase of the current with respect to the circuit voltage will be

(A) Leading

(B) Same

(C) Lagging

(D) Depends up on the value of L and C

22. Which of the following are used to increase the range of ammeters?

(A) Multipliers (B) Shunts

(C) Control spring (D) Potential transformers

23. The power in a pure inductive circuit is

(A) Zero (B) Unity

(C) Above unity (D) None of these

24. When ac voltage is connected to a PMMC meter, then

(A) The meter will get damaged

(B) The reading is zero

(C) Three pointer will oscillate to and fro

(D) The range of the pointer will move at all

25. Value of current at resonance in a series RLC circuit is affected by the value of:

(A) L (Inductance) (B) C (Capacitance)

(C) R (Resistance) (D) None of these

26. The time base signal in a CRO is:

(A) A sinusoidal signal

(B) A square wave signal

(C) A sawtooth signal

(D) A triangular wave signal

27. Ohm's law is not applicable to:

(A) DC circuits (B) High currents

(C) Small resistors (D) Semi conductors

28. The source of electron beam in a CRO is:

(A) Electron gun (B) Grid

(C) Focussing anode (D) Vertical deflection plates

29. Which one has negative temperature co-efficient of resistance?

(A) Copper (B) Carbon

(C) Aluminium (D) Iron

30. The internal resistance of an ammeter should be:

(A) Very small (B) Medium

(C) High (D) Infinity

31. According to Krichoff's first law current at a junction is:

(A) Sum of the incoming current

(B) Sum of the voltages

(C) Sum of the outgoing current

(D) Zero

32. Dual beam oscilloscope has:

(A) Two screens

(B) Two different phosphor coatings

(C) Two electron guns

(D) Single beam with time multiplexing

33. The "Superposition theorem" is essentially based on the concept of :

(A) Duality
(B) Linearity
(C) Reciprocity
(D) Non-linearity

34. The signal to be observed on the screen of an oscilloscope is applied for:

(A) Across its vertical plates
(B) Across its horizontal plates
(C) To the horizontal amplifier
(D) To the trigger circuit

35. The current carrying capacity of a copper wire having twice the diameter of another copper wire is:

(A) Twice as great
(B) Half as great
(C) Four times as great
(D) Three times as great

36. In a CRO 'X' axis normally represents:

(A) Time
(B) Gain
(C) Voltage
(D) Current

37. Moving Iron instruments have ———————— scale.

(A) Squared
(B) Uniform
(C) Log
(D) None of these

38. The diode when reverse biased, the current flowing through it due to the minority carriers is called :

(A) Forward current
(B) Saturation current
(C) Eddy current
(D) None of these

39. An Astable multivibrator using IC 555 has RA = 72 k Ohm, RB = 36 k Ohm and C = 10 μF Then what will be the frequency of oscillation :

(A) 10 kHz
(B) 100 Hz
(C) 1 Hz
(D) 100 kHz

40. The GBP of an OP-AMP is specified as 1 MHz What is the maximum gain that can be obtained using this Op-Amp at 1 kHz :

(A) 10 (B) 100

(C) 1000 (D) 10000

41. Transistor test with ohm meter base to collector and emitter in forward bias and reverse bias condition show low resistance so transistor is :

(A) Good (B) Open

(C) Short (D) None of these

42. What is the output resistance of common collector configuration of amplifier?

(A) Less than 100 Ω (B) More than 1000 Ω

(C) More than 10 KΩ (D) Less than 1 Ω

43. Current gain of a common emitter amplifier is :

(A) Ic/Ie (B) Ib/Ic

(C) Ie/Ic (D) Ic/Ib

44. In crystal oscillator the crystal also convert electrical energy into ———————— energy.

(A) Light energy (B) Magnetic energy

(C) Mechanical energy (D) Heat energy

45. Which transistor amplifier has an efficiency of about 85%?

(A) Class-A (B) Class-B

(C) Class-C (D) Class-AB

46. According to barkhausen, loop gain is :

(A) $A\beta = 1$ (B) $A\beta < 1$

(C) $A\beta > 1$ (D) None of these

47. The frequency of oscillations in Wein bridge oscillator is :

(A) $f = 2\pi / \sqrt{LC}$ (B) $f = 1/2\pi\sqrt{LC}$

(C) $f = 1/2\ \pi RC$ (D) $f = 1/2\pi LC$

48. The output of an oscillator may be square, triangular or saw tooth wave form, it is known as :

(i) Sinusoidal oscillators

(ii) Non sinusoidal oscillators

(iii) Relaxation oscillators

(A) Only (i) (B) Only (i) and (ii)

(C) Only (ii) and (iii) (D) Only (iii)

49. Clipper circuit has grate application in :

(i) Radars

(ii) Digital Computers

(iii) Radio Receivers

(A) Only (i) (B) Only (i) and (ii)

(C) Only (iii) (D) Only (i), (ii) and (iii)

50. Pin No 1 of IC LM 741 is :

(A) + VCC (B) – VCC

(C) Output (D) Offset null

51. Class B operation of amplifier, one in which the device current flows over :

(A) Half cycle (B) Full cycle

(C) Quarter cycle (D) Three quarters of cycle

52. The maximum power of a 555 IC can dissipate is around :

(A) 6 mW (B) 600 mW

(C) 5 W (D) 4 W

53. IGBT has :

(A) High input impedance and large bipolar current carrying capability

(B) Low input impedance and large bipolar current carrying capability

(C) High input impedance and small bipolar current carrying capability

(D) Low input impedance and small bipolar current carrying capability

54. An IGBT is driven by :

(A) Emitter current (B) Collector current

(C) Gate voltage (D) Gate current

55. Minimum amount of emitter current to place the UJT in negative resistance region is known as :

(A) Valley current (B) Peak point current

(C) Saturation current (D) None of the above

56. Typical value of intrinsic stand off ratio of UJT vary from :

(A) 0.4 to 0.9 (B) 0.5 to 0.9

(C) 0.4 to 1 (D) 0.5 to 0.8

57. The insulating layer of MOSFET is :

(A) Silicon monoxide (B) Silicon dioxide

(C) Germanium oxide (D) Germanium dioxide

58. In JFET,

(A) the voltage at the gate controls the main current

(B) the current through the gate controls the main current

(C) the voltage at source terminal controls the main current

(D) the voltage at drain terminal controls the main current

59. For the biasing of JFET,

(A) gate always forward biased

(B) gate is either forward or reverse biased

(C) gate always reverse biased

(D) bias voltage is not required at gate terminal

60. The maximum drain current (Id) of BFW 10 JFET is,

(A) 25 mA (B) 10 mA

(C) 100 mA (D) 20 mA

61. The current through the SCR can be turned off :

(A) only by reducing the load current below the holding current

(B) only by removing the gate current

(C) by reducing the forward break over voltage

(D) by reducing the forward blocking voltage

62. The terminals of TRIAC,

(A) Anode, Cathode, Gate

(B) Emitter, Base1, Base2

(C) Main terminal 1, Main terminal 2, Gate

(D) Gate, Emitter, Collector

63. Which of the following is a TRIAC?

(A) 2N 2646 (B) BT 136

(C) DB 3 (D) TYN 640

64. The DIAC acts in a similar manner to,

(A) two transistors connected in series

(B) two SCRs connected in antiparallel

(C) one diode and two resistors

(D) two diodes connected in reverse parallel

65. Ratio between minimum fusing current and current rating is termed as :

(A) Ripple factor
(B) Cut off factor
(C) Fusing factor
(D) Form factor

66. Which type of MCB is designed to protect circuits with inductive load?

(A) L series MCB
(B) G series MCB
(C) DC series MCB
(D) Both L series and DC series MCB

67. What is the full form of abbreviation ELCB used in electrical circuits?

(A) Electrical Live Contact Breaker
(B) Equipment Load Circuit Breaker
(C) Earth Leakage Circuit Breaker
(D) Earth Load Circuit Breaker

68. A device which opens or closes an auxiliary circuit under predetermined condition in the main circuit?

(A) Resistor
(B) Capacitor
(C) Fuse
(D) Relay

69. Which type of DC motor has 2 field coils, one is connected in series with the armature and the other is connected parallel with the armature?

(A) Series motor
(B) Shunt motor
(C) Compound motor
(D) Induction motor

70. For 100% AM modulation calculate the power transmitted by carrier signal if total power is 6000 W :

(A) 1000 W
(B) 2000 W
(C) 4000 W
(D) 6000 W

71. In Radio frequency spectrum Very Low Frequency (VLF) ranges from :

(A) 3 – 30 Hz
(B) 3 – 30 kHz
(C) 3 – 30 MHz
(D) 30 MHz – 3 GHz

72. An Omnidirectional antenna is designed to provide ———— radiation pattern.

(A) 0°
(B) 90°
(C) 180°
(D) 360°

73. Which of the following characteristics changes in Frequency Modulation?

(A) Carrier Wave frequency
(B) Modulating Wave frequency
(C) Carrier Wave Amplitude
(D) Modulating Wave Amplitude

74. According to Nyquist criteria of sampling theorem the sampling frequency is :

(A) Same as the signal frequency
(B) Twice the signal frequency
(C) 4 times of signal frequency
(D) 5 times of signal frequency

75. Which among the following is a digital modulation technique?

(A) AM
(B) FM
(C) Both AM and FM
(D) ASK

76. Which of the following device interconnects two separate electrical circuits by means of light sensitive optical interface?

(A) LED
(B) LASER
(C) Optocoupler
(D) LDR

77. The geographical area under one base station with a single transmitter and a receiver is known as :

(A) Cell
(B) Cluster
(C) Module
(D) Cell site

78. Which wireless technology link is used for mobile phone data transfer?

(A) SIM
(B) Barcode
(C) Bluetooth
(D) Multiplexer

79. The core of Optical fiber is made of :

(A) Silica or Glass
(B) Copper or Aluminium
(C) Copper or Silver
(D) Tungsten

80. The process of joining two ends of optical fiber using electric or mechanic means is :

(A) Soldering
(B) Splicing
(C) Crimping
(D) Spacing

81. Which among the following is not an advantage of Geosynchronous satellite?

(A) No need to switch from one satellite to other
(B) No coverage in polar region
(C) Remain stationary relative to earth station
(D) The effect of Doppler shift are negligible

82. The combination of Receiver, Amplifier and Transmitter in Satellite communication is known as :

(A) Transducer
(B) Multiplexer
(C) Sensor
(D) Transponder

83. If the number 25 in the radix x number system is equivalent to 15 in decimal, what is the value of x?

(A) 3
(B) 4
(C) 5
(D) 6

84. Which of the following statements is correct?

(A) Decimal 10 is represented as 1000 in binary code
(B) Decimal 9 is represented as 1011 in Excess-3 code
(C) Decimal 9 is represented as 1010 in BCD code
(D) Decimal 10 is represented as 1111 in Gray code

85. The simplified form of the logic expression $AB + \overline{A}B + A\overline{B} + \overline{A}\,\overline{B}$:

(A) 1 (B) A

(C) AB (D) 0

86. An OR gate with 2 inputs is followed by a NOR gate, where one input of the NOR gate is grounded. If inputs to the OR gate are $A = 1$ and $B = 0$, what will be the final output of the circuit?

(A) 0

(B) 1

(C) Always 0, regardless of A and B

(D) Always 1, regardless of A and B

87. How many select inputs are required for 1:32 demultiplexer?

(A) 3 (B) 4

(C) 5 (D) 6

88. How many 2-to-4-line decoders are required to implement a 4-to-16-line decoder?

(A) 2 (B) 3

(C) 4 (D) 5

89. A 2 input XOR gate can be implemented using a 2:1 multiplexer by :

(A) Connecting one input to the select line, and the other to both data inputs

(B) Connecting one input to the select line, the second input to one data input and the complement of the second input to the other data input

(C) Connecting both inputs to the select line, leaving the data inputs unconnected

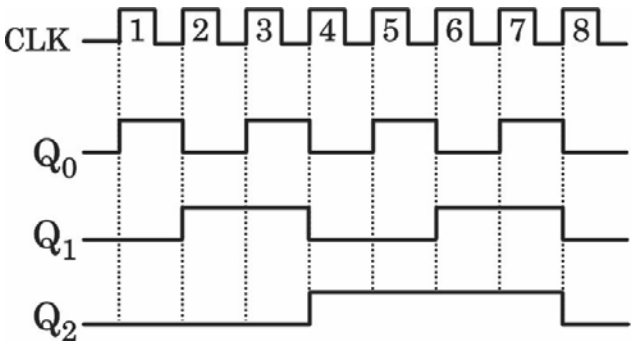
(D) Connecting one input to select line and the other input to data input, while grounding the second data input

90. In a D flipflop, the complement of output is fed back to input. If the clock frequency is 30 Hz, what will be the frequency of the output?

(A) 30 Hz (B) 60 Hz

(C) 15 Hz (D) 10 Hz

91. The waveforms of a counter are show in the figure below. This is a :



(A) Ring counter
(B) 3-bit ripple counter
(C) Johnson counter
(D) 4-bit ripple counter

92. In a 4-bit ripple counter, if the time period of the input clock pulse is 16 μs, what is the time period of output wave at the most significant bit?

(A) 32 μs
(B) 64 μs
(C) 128 μs
(D) 256 μs

93. What is the ROM address space for an 8051 with 8 KB of on chip ROM?

(A) 0000H to 1FFFH
(B) 0000H to 2FFFH
(C) 0000H to 7FFFH
(D) 0000H to 0FFFH

94. What is the behaviour of the reset pin in the 8051 microcontroller?

(A) The reset pin is active low and requires a low pulse to be activated
(B) The reset pin is active high and requires a low pulse to be activated
(C) The reset pin is active high and requires a high pulse to be activated
(D) The reset pin is active low and requires a high pulse to be activated

95. Match the following addressing modes with their corresponding 8051 Instructions

(1)	Register	(i)	MOV R5, #25H
(2)	Direct	(ii)	ADD A, R7
(3)	Immediate	(iii)	MOV A, @ R0
(4)	Register Indirect	(iv)	MOV R0, 40H

Select the correct match from the options given below

(A) (1)-(iii), (2)-(iv), (3)-(i), (4)-(ii)
(B) (1)-(iii), (2)-(i), (3)-(iv), (4)-(ii)
(C) (1)-(ii), (2)-(i), (3)-(iv), (4)-(iii)
(D) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)

96. Which of the following is an example of a passive transducer?

(A) Photovoltaic cells
(B) Thermocouple
(C) Piezoelectric transducer
(D) Strain gauge

97. Which characteristic of a thermistor makes it extremely suitable for precision temperature control systems?

(A) Low thermal conductivity
(B) High resistance variation with temperature
(C) Low specific heat
(D) Linear-temperature-resistance relationship

98. Which of the following is not an advantage of LVDT?

(A) Linearity
(B) High hysteresis
(C) Ruggedness
(D) High sensitivity

99. In an inductive transducer, increasing the reluctance of the core will

(A) Decrease the inductance
(B) Increase the inductance
(C) Stabilize the inductance
(D) Not affect the inductance

100. The current flow that occurs when two dissimilar conductors are joined to form a thermocouple is primarily due to which effect?

(A) Thomson effect
(B) See beck effect
(C) Peltier effect
(D) Hall effect

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