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ELECTRONICS AND COMMUNICATION ENGINEERING

1. An LVDT produces an output voltage of 2.6V for displacement 0.4mm. The sensitivity of LVDT is   ( )

    (1) 6.5 V/mm   (2) 5.5 V/mm

    (3) 7.5 V/mm   (4) 1 V/mm

$$\text{Sensitivity} = \frac{V_{rms}}{\text{Displacement}} = \frac{2.6V}{0.4mm} = 6.5 \text{ V/mm}$$

2. Thermistor has resistivity from _____ to _____ Ω cm.   ( )

    (1) 10^{-2} to 10^7 Ω-cm   (2) 10^{-1} to 10^9 Ω-cm

    (3) 10^1 to 10^9 W-cm   (4) 10^{-9} to 10^{+9} Ω-cm

3. At low output frequencies, the voltage waveform at the output of a cyclo converter is a ( )

    (1) Stepped voltage waveform

    (2) Rectangular voltage waveform

    (3) High quality simulsoidal waveform

    (4) Waveform rich in harmonics

4. Q-factor of series resonance circuit can be increased by   ( )

    (1) Using a coil of large inductance but of small ohmic resistance

    (2) Using a coil of large inductance and large ohmic resistance

    (3) Using a coil of small inductance and large ohmic resistance

    (4) Using a coil of small inductance and small ohmic resistance

5. The advantage of SCR over thyristor   ( )

    (1) Large size

    (2) Noiseless operation

    (3) Higher current handling capacity

    (4) Easy to install

6. Snow in a television picture is a result of   (   )

   (1) High Q in a tuned circuits

   (2) Excessive gain

   (3) Random noise in the signal

   (4) Insufficient wave traps

7. RMS value of the voltage function given by $V(t) = 100 + 25 \sin wt + 10 \sin 5 \, wt$ volts is (   )

   (1) 135V   (2) 125V

   (3) 113.3V   (4) 101.8V

8. A darlington pair is used for   (   )

   (1) High current gain

   (2) High power gain

   (3) Low distortion

   (4) High frequency operation

9. In a three phase synchronous motor, the magnitude of field flux   (   )

   (1) Varies with speed

   (2) Varies with load

   (3) Varies with power factor

   (4) Remains constant at all loads

10. The characteristic impedance of a transmission line depends on   (   )

    (1) Shape of the conductor

    (2) Surface treatment of conductors

    (3) Conductivity of the material

    (4) Geometrical configuration of the conductors

11. VHF television receiving antenna is usually   (   )

    (1) Parabolic   (2) Rhombic

    (3) Yagi-uda   (4) Broad side array

12. Quantization noise is a characteristic of   (   )

    (1) TDM   (2) FDM

    (3) PCM   (4) All the above

13. A wave guide behaves as a   (   )

    (1) Low pass filter

    (2) High pass filter

    (3) Band pass filter

    (4) Band elimination filter

14. For satellites a helical antenna is used because   (   )

    (1) It offers better bandwidth

    (2) It has circular polarization

    (3) It occupies less space

    (4) All the above

15. Balun _____   (   )

    (1) Is used in radars

    (2) Is auxiliary for power transformers

    (3) Is used for matching two signals of different frequencies

    (4) Is used to connect coaxial line to dipole antenna

16. The best excited reflector from a wave guide is   (   )

    (1) Parabolic   (2) Biconical

    (3) Corner   (4) Horn

17. The ionosphere plays a significant role in radiowave propagation at   (   )

    (1) High frequencies

    (2) Ultra high frequencies

    (3) Microwave frequencies

    (4) Optical frequencies

18. In case the height of transmission tower is increased   (   )

    (1) The line capacitance and inductance will not change

    (2) The line capacitance will decrease but line inductance will remain unaltered

    (3) The line capacitance will increase but line inductance will decrease

    (4) The line capacitance will decrease and line inductance will increase

19. After a target has been acquired, the best scanning system for tracking in   (   )

    (1) Conical   (2) Helical

    (3) Spiral   (4) Nodding

20. The effective refractive index of the ionosphere for radio waves is   (   )

    (1) More than unity

    (2) Less than unity

    (3) Equal to unity

    (4) Either more or less than unity depends on the electron concentration

21. Indicate which of the following circuit could not demodulate SSB ?   (   )

    (1) Balanced modulator

    (2) Product detector

    (3) BFO

    (4) Phase discriminator

22. The velocity of electromagnetic wave in free space   (   )

    (1) Increases as the frequency increases

    (2) Is independent of frequency

    (3) Decreases as the frequency increases

    (4) Increases as the frequency decreases

23. In electromagnetic waves, polarization   (   )

    (1) Is caused by reflection

    (2) Is due to the transverse nature of waves

    (3) Is always vertical in an isotropic medium

    (4) Results from the longitudinal nature of the waves

24. Impedance inversion may be obtained with   (   )

    (1) a half-wave line   (2) a short circuited stub

    (3) a quarter-wave line   (4) an open-circuited stub

25. To prevent over loading of the last IF amplifier in a receiver, one should use   (   )

    (1) Double conversion   (2) Variable selectivity

    (3) Variable sensitivity   (4) Squelch circuit

26. Equalizing pulses in Television are sent during   ( )

   (1) Horizontal retrace

   (2) Horizontal blanking

   (3) Vertical blanking

   (4) Vertical retrace

27. The disadvantage of a two-hole directional coupler is   ( )

   (1) Narrow bandwidth

   (2) High SWR

   (3) High noise level

   (4) Poor directivity

28. If all television satellites use the same 3.7 to 4.2 GHz band for downlink signal, how can an earth station select one satellite ?   ( )

   (1) Tuning the waveguides

   (2) Narrow beam receiving antenna

   (3) Low-noise parametric amplifier

   (4) High Q cavity resonators

29. A superheterodyne receiver with an IF of 450 kHz is tuned to a signal at 1200 kHz. The image frequency is   ( )

   (1) 900 kHz   (2) 1650 kHz

   (3) 2100 kHz   (4) 750 kHz

   $$f_{im} = f_s + 2f_{if}$$

30. In case the antenna diameter in a radar system is increased to four times, the maximum range will increase by   ( )

   (1) $\sqrt{2}$ times   (2) 2 times

   (3) 4 times   (4) 8 times

31. A circuit with a resistor, inductor and a capacitor in series is resonant at *fo* Hz. If all the component values are now doubled, the new resonant frequency is   ( )

   (1) 2*fo*   (2) *fo*

   (3) $\dfrac{fo}{4}$ (4) $\dfrac{fo}{2}$

32. In a microprocessor, the register which holds the address of the next instruction to be fetched is ( )

    (1) Accumulator

    (2) Base pointer

    (3) Stack pointer

    (4) Instruction pointer

33. The output of a logic gate is '1' when all its inputs are at logic '0'. The gate is either ( )

    (1) a NAND or an Ex-OR gate

    (2) a NOR or an Ex-OR gate

    (3) an OR or an Ex-NOR gate

    (4) an AND or an Ex-OR gate

34. A 10 bit A/D converter is used to digitise an analog signal in the 0 to 5V range. The maximum peak ripple voltage that can be allowed in the DC. ( )

    (1) Nearly 10m V

    (2) Nearly 50m V

    (3) Nearly 25m V

    (4) Nearly 5.0m V

35. The minimum number of two input NAND gates required to implement the Boolean function $A + A\bar{B} + A\bar{B}C$ is ( )

    (1) Zero   (2) One

    (3) Four   (4) Seven

36. A carry look ahead adder has advantage over normal 'n' bit adder ( )

    (1) Faster

    (2) More accurate

    (3) Fewer gates required

    (4) Costs less

37. A pulse train can be delayed by a finite number of clock periods using ( )

    (1) A serial - in serial out shift register

    (2) A serial - in parallel out shift register

    (3) A parallel in serial out shift register

    (4) A parallel in parallel out shift register

38. Metastability in D-flip flop occurs when

   (1) Setup time of input data is not met

   (2) Clock period is too long

   (3) Set and reset are active simultaneously

   (4) D and Q pins are shortened

39. A full adder can be implemented with half adders and OR gates. A 4 bit parallel full adder without any initial carry requires ( )

   (1) 8 half adders, 4-OR gates

   (2) 8 half adders, 3-OR gates

   (3) 7 half adders, 4-OR gates

   (4) 7 half adders, 3-OR gates

40. In a 4 bit weighted resistor DAC, the resistor value corresponding to LSB is 32 K ohm. The resistor value corresponding to MSB will be ( )

   (1) 32 K ohm   (2) 8 K ohm

   (3) 4 K ohm   (4) 16 K ohm

41. If the memory chip size is 256 x 1 bits, then the number of chips required to makeup 1K (1024) bytes of memory is ( )

   (1) 32   (2) 24

   (3) 12   (4) 8

42. Which of the following is an example of volatile memory ? ( )

   (1) ROM   (2) RAM

   (3) PROM   (4) Hard disk

43. The Basic memory cell of DRAM consists of ( )

   (1) a capacitor

   (2) an inductor

   (3) a flip flop

   (4) a transistor acting as a capacitor

44. Number of flip flops required to build a binary counter circuit to count from 0 to 1023 is ( )

   (1) 1   (2) 6

   (3) 10   (4) 24

45. When a CPU is interrupted, it   (   )

    (1) Stops execution of instructions

    (2) Acknowledges interrupt and branches to a subroutine

    (3) Acknowledges interrupt and continues

    (4) Acknowledges interrupt and waits for next instruction from interrupting device

46. In an 16 bit microprocessor, words are stored in two consecutive memory locations. The entire
    word can be read in one operation provided the first   (   )

    (1) Word is even

    (2) Word is odd

    (3) Memory location is odd

    (4) Memory location is even

47. How many address lines needed to address each memory location in a 2048 × 4 memory chip ?

                                                                                     (   )

    (1) 10   (2) 11

    (3) 8   (4) 12

48. The interface chip used for data transmission between 8086 and a 16 bit ADC is   (   )

    (1) 8259   (2) 8255

    (3) 8253   (4) 8251

49. The maximum power efficiency of an AM modulator is   (   )

    (1) 25%   (2) 50%

    (3) 75%   (4) 100%

50. The signal to quantisation noise ratio is an n bit PCM system   (   )

    (1) Depends upon the sampling frequency employed

    (2) Is independent of the value of 'n'

    (3) Increases with increasing value of 'n'

    (4) Decreases with increasing value of 'n'

51. The envelope detector is a/an   (   )

    (1) Synchronous detector

    (2) Asynchronous detector

    (3) Product demodulator

    (4) Coherent detector

52. The bit rate of a digital communication system is 34 M bits/sec. The modulation scheme is QPSK. The bank rate of the system is ( )

    (1) 68 M bits/sec

    (2) 34 M bits/sec

    (3) 17 M bits/sec

    (4) 8.5 M bits/sec

53. An increase in the modulation index leads to increase in band width in case of ( )

    (1) AM (2) FM

    (3) PM (4) Both FM and PM

54. In a 100% Amplitude modulated signal, if the total transmitted power is P, the carrier power will be ( )

    (1) $\frac{2}{3}$ P (2) $\frac{1}{2}$ P

    (3) $\frac{1}{3}$ P (4) $\frac{1}{4}$ P

55. An FM signal with modulation index m_f is passed through a frequency tripler. The modulation index of the output signal will be ( )

    (1) m_f (2) $3m_f$

    (3) $9m_f$ (4) $27m_f$

56. Message switching in computer communication ( )

    (1) Is a store and forward system

    (2) Requires a dedicated path between transmitter and receiver

    (3) Is used only for long messages

    (4) Does not require a buffer at transmitter

57. The capacity of a channel is given by the ( )

    (1) Number of digits used in coding

    (2) Volume of information it can take

    (3) Maximum rate of information transmitted

    (4) Bandwidth required for information

58. If the number of bits per sample in a PCM system is increased from m to m + 1, the improvement in signal-to-quantisation noise ratio will be ( )

    (1) 3 dB
    (2) 6 dB
    (3) 2 mdB
    (4) m dB

59. A PLL can be used to demodulate ( )

    (1) PAM signals
    (2) PCM signals
    (3) FM signals
    (4) DSB-SC signals

60. For the delivery of individual packets from the source host to the destination host _____ layer is responsible ( )

    (1) Physical layer
    (2) Data link layer
    (3) Network layer
    (4) Transport layer

61. We need to download text document of 100 pages per minute, with an average of 24 lines with 80 characters in each line when each character requires 8 bits. What is the required bit rate of the channel ? ( )

    (1) 2 Mbps
    (2) 1 Mbps
    (3) 1.536 Mbps
    (4) 2.536 Mbps

62. The value of SNR_{dB} for a noiseless channel is ( )

    (1) 1 dB
    (2) 10 dB
    (3) 100 dB
    (4) infinity

63. Shannon capacity (for 'B' bandwidth of the channel) is ( )

    (1) $B \log_2 (1 + SNR)$

    (2) $B \log_{10} (1 + SNR)$

    (3) $\frac{1}{B} \log_2 (1 + SNR)$

    (4) $B \log_2 (SNR)$

64. For the circuit shown below the output F is given by ( )

Fig. 2

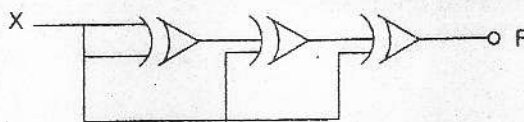(1) F = 1   (2) F = 0

(3) F = x   (4) F = $\bar{x}$

65. Number of interrupts (Hardware) supported by 8051 microcontroller ( )

(1) 1   (2) 2

(3) 4   (4) 5

66. The probability that an electron in a metal occupies the fermilevel at any temperature ($> 0^0$K) ( )

(1) 0   (2) 1

(3) 0.5   (4) 0.1

67. In an extrinsic semiconductor, the hall coefficient $\dot{R}_H$ ( )

(1) Increases with increase of temperature

(2) Changes with the change of magnetic field

(3) Decreases with increase of temperature

(4) Is independent of the change of temperature

68. The diffusion potential across a p-n junction ( )

(1) Decreases with increasing doping concentration

(2) Increases with decreasing doping concentration

(3) Does not depend on doping concentration

(4) Increases with increasing in doping concentration

69. A zener diode works on the principle of ( )

(1) Tunneling of charge carriers across the junction

(2) Thermionic emission

(3) Diffusion of charge carriers across the junction

(4) Hopping of charge carriers across the junction

(5) Zener breakdown

70. When a junction diode is used in switching applications, the forward recovery time is ( )

    (1) Of the order of the reverse recovery time

    (2) Negligible in comparision to the reverse recovery time

    (3) Greater than the reverse recovery time

    (4) Equal to the mean carrier life time τ for the excess minority carriers

71. The break down voltage of a transistor with its base open its βV_{CEO} and with emitter open is βV_{CBO}, then ( )

    (1) $\beta V_{CEO} = \beta V_{CBO}$

    (2) $\beta V_{CEO} > \beta V_{CBO}$

    (3) $\beta V_{CEO} < \beta V_{CBO}$

    (4) Is not related to βV_{CBO}

72. If for a silicon npn transistor, the base to emitter voltage V_{BE} is 0.7V and the collector to base voltage V_{CB} is 0.2V, then the transistor is operating in the ( )

    (1) Normal active mode   (2) Saturation mode

    (3) Inverse active mode   (4) Cut-off mode

73. The voltage gain of a given common source JFET amplifier depends on its ( )

    (1) Input impedance

    (2) Amplification factor

    (3) Dynamic drain resistance

    (4) Drain load resistance

74. In a common Emitter amplifier, the un bypassed emitter resistance provides

    (1) Voltage shunt feedback

    (2) Current series feedback

    (3) Negative voltage feedback

    (4) Positive current feedback

75. To avoid thermal runaway in the design of an analog circuit, the operating point of the BJT should be such that it satisfies the condition ( )

    (1) $V_{CE} = \dfrac{V_{CC}}{2}$ (2) $V_{CE} \leq \dfrac{V_{CC}}{2}$

    (3) $V_{CE} > \dfrac{V_{CC}}{2}$ (4) $V_{CE} < 0.78 \, V_{CC}$

76. In the circuit shown in figure, if $e_1 = 2V$, $e_2 = 5V$, $e_3 = 1V$ and $E = 2V$, then which of the diodes will be conducting and what will be e_0 ( )
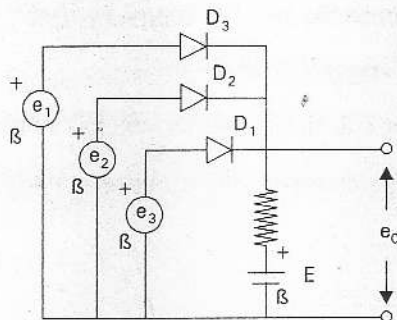

Fig. 3

(1) D_3 ; 1V   (2) D_1; 2V

(3) D_2; 5V   (4) D_1; 5V

77. In a bootstrap sweep circuit, the amplifier gain A should be ( )

(1) Infinity   (2) Finite

(3) Unity   (4) Zero

78. For elimination of hysteresis in a selimitt trigger, the loop gain must be ( )

(1) < 1   (2) > 1

(3) = 1   (4) = ∞

79. A _____ multivibrator is used for digital operations like counting and storing of binary information

( )

(1) Bistable

(2) Monostable

(3) Astable

(4) Schmitt Trigger

80. For a perfect differentiator ( )

(1) RC = T   (2) RC << T

(3) RC >> T   (4) RC = 0.5T

81. A 5V step is applied to an RC low pass circuit with R = 10K ohms and C = 100PF. The time for the capacitor to fully charge is ( )

(1) 1μ sec   (2) 0.1μ sec

(3) 10μ sec   (4) 5μ sec

82. If a network contain B branches, and N Nodes, then the number of mesh current equations would be   ( )

    (1) $B - (N - 1)$ (2) $N - (B - 1)$

    (3) $B - N - 1$ (3) $(B + N) - 1$

83. Three equal resistances of 5 ohms are connected in delta. What is the resistance in one of the arms of the equivalent star circuit ?   ( )

    (1) 5 ohms   (2) 1.33 ohms

    (3) 2.66 ohms   (4) 10 ohms

84. The rms current through a 10 K ohm resistor is 5 mA. What is the rms voltage drop across the resistor ? $(V = IR)$ ( )

    (1) 10V   (2) 5V

    (3) 50V   (4) 0V

85. The current in a pure inductor   ( )

    (1) Lags behind the voltage by 90^0

    (2) Leads the voltage by 90^0

    (3) Is in phase with the voltage

    (4) Lags behind the voltage by 45^0

86. In a given series RLC circuit, X_C is 150 ohms and X_L is 80 ohms, what is the total reactance ? and what is the type of reactance ?   ( )

    (1) 70 ohm, inductive

    (2) 70 ohm, capacitive

    (3) 70 ohm, resistive

    (4) 150 ohm, capacitive

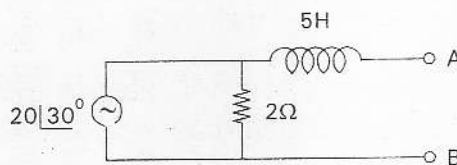87. Thevenin's impedance of the circuit at its terminals A and B in the given circuit is   ( )

Fig. 4

    (1) 5H   (2) 2 ohm

    (3) 1.4 ohm   (4) 7H

88. In a series RLC circuit of L = 15mH, C = 0.015μF and R = 80 ohms, what is the impedance at the resonant frequency ? ( )

(1) (15mH)w

(2) (0.015F)w

(3) 80 ohms

(4) $\dfrac{1}{(w \times 0.015)}$

89. The transient current in an RLC circuit is oscillatory when ( )

(1) $R = 2\sqrt{L/C}$

(2) R = 0

(3) $R > 2\sqrt{L/C}$

(4) $R < 2\sqrt{L/C}$

90. The dynamic characteristic of an instrument is ( )

(1) Resolution

(2) Fidelity

(3) Drift

(4) Precision

91. A 0 to 250 milliammeter has an accuracy of 2% full scale reading. The ammeter measures 150mA, then its limiting error is ( )

(1) 2%

(2) 6.66%

(3) 3.33%

(4) 2.5%

92. A moving coil ammeter has a scale of 100 divisions and gives full scale reading of 10A. The resolution of the instrument which can read upto $\dfrac{1}{2}$ of the full scale division is ( )

(1) 50mA

(2) 5mA

(3) 0.5mA

(4) 10mA

93. The deflection sensitivity of a CRT is 0.05 mm/v and an unknown voltage is applied to the horizontal deflection plate, which shifts the spot by 5mm towards right. The unknown applied voltage is (E_d = D/S) ( )

(1) 10V

(2) 1V

(3) 1000V

(4) 100V

94. A CRO in auto mode with the sweep can be locked to trigger a signal by the signal itself, then the input signal frequency is (vertical / horizontal = 6/5) ( )

(1) Equal to 50Hz

(2) Less than 50Hz

(3) Greater than 50Hz

(4) Under all the above conditions

95. A lissajous pattern on a CRO is stationary and has six vertical maximum values and five horizontal maximum values. The frequency of horizontal input is 1500Hz. Then the frequency of vertical input is ( )

(1) 1500 Hz (2) 1800 Hz

(3) 2400 Hz (4) 1000 Hz

96. Two voltmeters A_1 and A_2 are connected in series across a dc line. A_1 reads 70 volts and has a resistance of 150 ohms per volt. Voltmeter A_2 has a total resistance of 20,000 ohms. Then the line voltage is ( )

(1) 220 V (2) 400 V

(3) 203.3V (4) 101.6V

97. The term "flyback" is associated with ( )

(1) Zener diode (2) CRT

(3) Rectifier (4) SCR

98. The characteristic impedance Z_0 of a lossless transmission line is equal to ( )

(1) $\sqrt{LC}$ (2) $\sqrt{\dfrac{L}{C}}$

(3) $\sqrt{\dfrac{C}{L}}$ (4) $\dfrac{1}{\sqrt{LC}}$

99. The standing wave ratio (SWR) equal to unity implies that ( )

(1) The transmission line is open circuited

(2) The transmission line is short circuited

(3) The transmission line characteristic impedance is equal to zero

(4) The transmission line characteristic impedance equal to load impedance

100. A wire of strain gauge is 0.1m long and has an initial resistance of 120 ohms. On application of force, the wire length increases by 0.21 m, $\Delta R = 10$ ohm. The gauge factor of the device is ( )

(1) 1 (2) 1.25

(3) 1.50 (4) 1.75

$$GF = \frac{\Delta R / R}{\Delta L / L} = 0.039$$

KEY

1. 1	2. 2	3. 3	4. 1	5. 3	6. 3	7. 4	8. 1	9. 4	10. 4
11. 3	12. 3	13. 2	14. 2	15. 4	16. 4	17. 1	18. 2	19. 1	20. 2
21. 4	22. 2	23. 2	24. 3	25. 3	26. 3	27. 1	28. 2	29. 3	30. 3
31. 4	32. 4	33. 2	34. 4	35. 1	36. 1	37. 1	38. 1	39. 4	40. 3
41. 1	42. 2	43. 4	44. 3	45. 2	46. 4	47. 2	48. 2	49. 2	50. 3
51. 2	52. 3	53. 2	54. 1	55. 2	56. 1	57. 3	58. 2	59. 3	60. 3
61. 3	62. 4	63. 1	64. 2	65. 2	66. 2	67. 2	68. 4	69. 5	70. 2
71. 3	72. 1	73. 2,3,4	74. 2	75. 2	76. 3	77. 3	78. 3	79. 1	80. 2
81. 4	82. 1	83. 2	84. 3	85. 1	86. 2	87. 2	88. 3	89. 4	90. 2
91. 3	92. 1	93. 4	94. 1	95. 2	96. 3	97. 2	98. 2	99. 4	100. 5