

1002

PART-I
GENERAL ABILITY TEST

1002
1009
1001

Max Marks 2

1. How many straight lines can be drawn through 10 points on a circle?
 (A) 10 (B) 20 (C) 45 (D) Infinite
2. World Telecommunications and Information Society Day is celebrated every year on:
 (A) 15th March (B) 17th April (C) 17th May (D) 21st July
3. Under Akbar, the Mir Bakshi was required to look after
 (A) military affairs (B) the state treasury
 (C) the royal household (D) the land revenue system
4. Look at this series 22, 21, 23, 22, 24, 23, ... What number should come next?
 (A) 22 (B) 25 (C) 24 (D) 28
5. The largest glaciers are
 (A) mountain glaciers (B) alpine glaciers
 (C) continental glaciers (D) piedmont glaciers
6. Who is the father of Geometry?
 (A) Kepler (B) Euclid (C) Pythagorus (D) Aristotle
7. Satellite launching station is located at
 (A) Sriharikota (Andhra Pradesh) (B) Rameswaram (Kerala)
 (C) Salem (Tamilnadu) (D) Warangal (Andhra Pradesh)
8. Window is to pane as book is to
 (A) novel (B) cover (C) page (D) glass
9. Here are some words translated from an artificial language:
 gorbflur means fan belt
 pixngorbj means ceiling fan
 arthfusi means tile roof
 which word could mean "ceiling tile"?
 (A) gorbtlusi (B) flurgorbj (C) arthflur (D) pixnarth
10. Where is the permanent secretariat of the SAARC?
 (A) Kathmandu (B) New Delhi (C) Islamabad (D) Colombo
11. Algebra and Algorithm are associated with
 (A) Muhammad al Khwarzimi (B) Ibn Batuta
 (C) Aryabhata (D) Ptolemy
12. Nobel prize founder is associated with the:
 (A) discovery of law of gravity (B) inventor of the fluorescent tube
 (C) discovery of the planetary motion (D) inventor of dynamite
13. Internet owes its inception to the project:
 (A) Crossnet (B) Arpanet (C) Skynet (D) Bookemet
14. Which word is not synonymous with alter ego?
 (A) Doppelganger (B) Poltergeist (C) Spectre (D) Inferior

T

DC

22 21 23

Last 13

14

9

Last

6

7

DE

1

15. Which of the following is NOT associated with the DNA :

- (A) Adenine
- (B) Thymine
- (C) Retinine
- (D) Guanine

16. The creator of 'Sherlock Holmes' was :

- (A) Arthur Conan Doyle
- (B) Ian Fleming
- (C) Dr. Watson
- (D) Shakespeare

17. The name Kunjarani Devi is associated with

- (A) Wrestling
- (B) Weight lifting
- (C) Swimming
- (D) Athletics

18. The FTSE 100 index is used to measure stock market performance in which country ?

- (A) France
- (B) United Kingdom
- (C) Germany
- (D) Finland

19. What is the term that defines the maximum mass of a white dwarf star, approximately equal to 1.38 solar masses ?

- (A) Redshift
- (B) Roche's limit
- (C) Chandrasekhar limit
- (D) Hubble's limit

20. Machu Picchu is located in which country ?

- (A) Argentina
- (B) Ecuador
- (C) Columbia
- (D) Peru

4

$$\frac{45+190}{45+190+180}$$

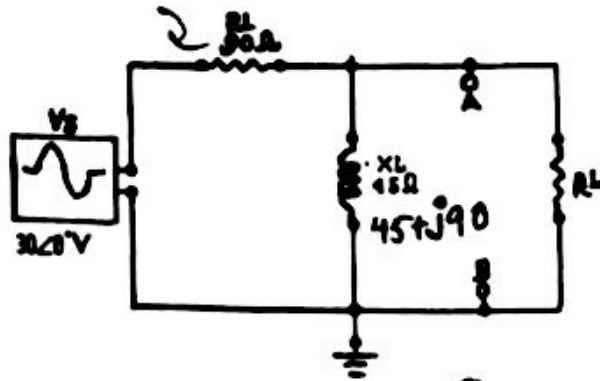
$$\frac{2100.62}{242.33}$$

$$0.406$$

$$\frac{XL}{R+XL} \times 30$$

$$\frac{14}{8}$$

1. Determine V_{TH} when R_1 is 180Ω and X_L is 90Ω :



$\frac{30}{90} \times 20$
 $\frac{20}{270}$

$\frac{90}{270} \times 20$
 $\frac{90}{270} \times 30$
 $\frac{45}{123}$

- (A) $135 \angle 63.4^\circ V$ (B) $13.5 \angle 63.4^\circ V$ (C) $12.2 \angle 0^\circ V$ (D) $122 \angle 0^\circ V$

2. A Kelvin double bridge is best suited for the measurement of

- (A) inductance (B) capacitance (C) low resistance (D) high resistance

3. A single phase diode bridge rectifier supplies a highly inductive load. The load current can be assumed to be ripple free. The ac supply side current waveform will be

- (A) sinusoidal (B) constant dc (C) square (D) triangular

$r = \frac{R_L}{3\sqrt{2}\omega L}$

4. A moving coil galvanometer is made into a dc ammeter by connecting

- (A) a low resistance across the meter (B) a high resistance in series with the meter
(C) a pure inductance across the meter (D) a capacitor in series with the meter

5. Basically, inter-atomic forces are:

- (A) electrostatic in nature (B) gravitational in nature
(C) magnetic forces (D) short-range forces

6. What is the degree of polynomial P defined by: $P(x) = -5(x-2)(x^3+5) + x^5$?

- (A) 2 (B) 3 (C) 4 (D) 5

7. The slope of the line that passes through the points (-1, 0) and (3, 8) is:

- (A) 1.5 (B) 2 (C) 2.5 (D) 3

$\frac{8-0}{3-(-1)}$

8. Which of these equations does not have a solution?

- (A) $\sin(100x) = 0.1$ (B) $\tan(x) = 1000$ (C) $2 \sin(x) = -3$ (D) $\cos^2 x - 1/4 = 0$

9. Express $i/(1-i)$ in the form of a complex number $a + bi$, (where a and b are real numbers):

- (A) $1/2 + i/2$ (B) $-1/2 + i/2$ (C) $1/2 - i/2$ (D) $1 - i$

$\frac{i}{1-i} \cdot \frac{(1+i)}{(1+i)}$

10. Multiplication of the binary numbers 111 and 11 yields:

- (A) 10010 (B) 10101 (C) 11011 (D) 11111

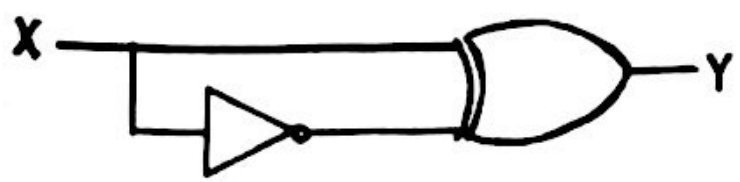
11. Roots of the algebraic equation $x^3 + x^2 + x + 1 = 0$ are:

- (A) (+1, +i, -i) (B) (+1, -1, +i) (C) (0, 0, 0) (D) (-1, +i, -i)

$\frac{i-1}{2}$

Handwritten calculations for binary multiplication and algebraic equations. Includes $111 \times 11 = 10001$, $\frac{2}{4} = 0$, $\frac{2}{4} = 0$, and $\frac{2}{4} = 0$.

12. The output Y of the logic circuit given below :



13. What is the chance that a leap year, selected at random, will contain 53 Saturdays ?

- (A) 5/7 (B) 1/7 (C) 3/7 (D) 2/7

14. Which of the following statements does NOT describe an advantage of digital technology ?

- (A) The values may vary over a continuous range.
 (B) The circuits are less affected by noise.
 (C) The operation can be programmed.
 (D) Information storage is easy.

15. A flip flop has :

- (A) one stable state (B) no stable state (C) two stable states (D) none of these

16. A multiplexer has :

- (A) one input and several outputs (B) one input and one output
 (C) several inputs and several outputs (D) several inputs and one output

17. A serial in/parallel out, 4-bit shift register initially contains all 1s. The data nibble 0111 is waiting to enter. After four clock pulses, the register contains :

- (A) 0000 (B) 1111 (C) 0111 (D) 1000

18. An 8-bit serial in/serial out shift register is used with a clock frequency of 2 MHz to achieve a time delay (t_d)

- (A) 16 μs (B) 2 μs (C) 8 μs (D) 4 μs

19. The storage element for a static RAM is the

- (A) flip flop (B) resistor (C) capacitor (D) diode

20. Which is not a hard disk performance parameter ?

- (A) Seek time (B) Break time (C) Latency time (D) Access time

21. L1 is known as :

- (A) primary cache (B) secondary cache (C) SRAM (D) DRAM

22. Ferrite cores are used as they help in :

- (A) reducing the eddy currents (B) reducing the magnetic permeability
 (C) increasing the electrical conductivity (D) being more brittle

23. How many pins does the 4049 IC have ?

- (A) 14 (B) 16 (C) 18 (D) 20

24. TTL operates from a :

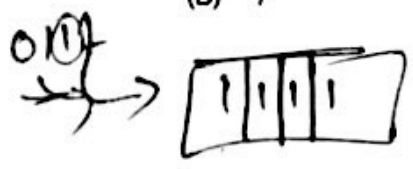
- (A) 9-volt supply (B) 3-volt supply (C) 12-volt supply (D) 5-volt supply

25. If a 3-input AND gate has eight input possibilities, how many of those possibilities will result in a HIGH output ?

- (A) 2 (B) 7 (C) 1 (D) 8

Later
 T_{clk} > t_{prop}

$T_{clk} = 2 \text{ MHz}$
 $t_{clk} = \frac{1}{2 \times 10^6} = 0.5 \mu\text{s}$
 $t_{pd} = 0.5 \mu\text{s}$
 $t_{d} = \frac{1}{2} \times 10^{-6} \times 8 = 0.5 \times 10^{-6}$



$\frac{1}{2} \times 10^{-6}$
 0.5×10^{-6}

26. A CMOS IC operating from a 3-volt supply will consume :

- (A) less power than a TTL IC
- (B) more power than a TTL IC
- (C) the same power as a TTL IC
- (D) no power at all

27. What does the small bubble on the output of the NAND gate logic symbol mean ?

- (A) open collector output
- (B) tristate
- (C) the output is inverted
- (D) none of these

28. A Schmitt trigger has $V_{T+} = 2.0\text{ V}$ and $V_{T-} = 1.2\text{ V}$. What is the hysteresis voltage of the Schmitt trigger ?

- (A) 0.4 volts
- (B) 0.6 volts
- (C) 0.8 volts
- (D) 1.2 volts

29. Identify the passive element in the following :

- (A) Voltage source
- (B) Inductor
- (C) Transistor
- (D) Current source

30. What would be the output voltage of a 7814 voltage regulator ?

- (A) -14V DC
- (B) +14V DC
- (C) Regulated 14V AC
- (D) -8V DC

31. In IC technology, dry oxidation (using dry oxygen) as compared to wet oxidation (using steam or water vapour) produces :

- (A) inferior quality oxide with a higher growth rate.
- (B) superior quality oxide with a higher growth rate.
- (C) superior quality oxide with a lower growth rate.
- (D) inferior quality oxide with a lower growth rate.

std 2.5×10^{-6}
 $d \approx \frac{1}{2000}$

32. A parity bit is :

- (A) used to indicate the uppercase letters
- (B) used to detect errors
- (C) is the first bit in the byte
- (D) is the last bit in the byte

33. How many 3-line-to-8-line decoders are required for a 1-of-32 decoder ?

- (A) 1
- (B) 2
- (C) 4
- (D) 8

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

- (A) 1
- (B) 2
- (C) 3
- (D) 4

35. The simplest equation which implements the K-map shown below is :

		\bar{C}	C
\bar{A}	\bar{B}	0	0
\bar{A}	B	1	1
A	B	1	1
A	\bar{B}	0	1

$T_{clk} = t_{pd}$
 $0.5 \mu s \ll t_{pd}$

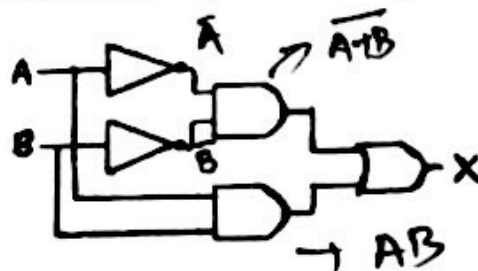
$T_{clk} > t_{pd}$
 $t_{pd} < 0.5 \mu s$
 $t_{pd} = \frac{0.5 \mu s}{80}$

- (A) $X = AC + B$
- (B) $X = \bar{A}\bar{B}$
- (C) $ABC + \bar{A}BC + A\bar{B}C$
- (D) $AB + \bar{A}\bar{B}$

$(A+B)$

36. Which of the following logic expressions represents the logic diagram shown ?

$\bar{A}\bar{B} + AB$



$(\bar{A+B}) + AB$
 $\bar{A} \cdot \bar{B} + AB$

- (A) $X = \bar{A}\bar{B} + AB$
- (B) $X = \bar{A}\bar{B} + \bar{A}B$
- (C) $X = \bar{A}\bar{B} + \bar{A}B$
- (D) $X = \bar{A}\bar{B} + AB$

Handwritten scribble

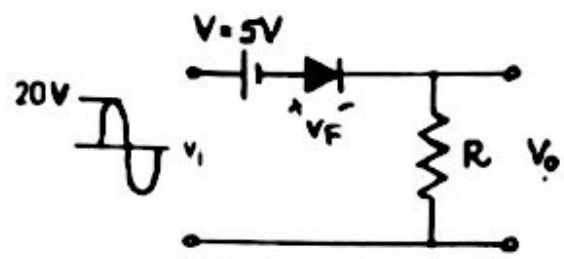
37 Each diode in a centre-tapped full-wave rectifier is _____ - biased and conducts for _____ of the input cycle

- (A) forward, 90°
- (B) reverse, 180°
- (C) forward, 180°
- (D) reverse, 90°

38 PIV is which of the following ?

- (A) peak input voltage
- (B) peak inverse voltage
- (C) peak immediate voltage
- (D) positive input voltage

39 Determine the peak value of the output waveform



Handwritten calculation:
 $V_o = V_i - V_F$
 $= 20 - 5$

- (A) 25V
- (B) 15V
- (C) -25V
- (D) -15V

40 Dielectric materials are primarily used for

- (A) charge storage
- (B) insulation
- (C) reducing dielectric loss
- (D) good conductivity

41 What is the peak inverse voltage across each diode in a voltage doubler ?

- (A) V_m
- (B) $2V_m$
- (C) $0.5V_m$
- (D) $0.25V_m$

42 How many layers of material does a transistor have ?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

43 Determine the value of α when $\beta = 100$

- (A) 1.01
- (B) 101
- (C) 0.99
- (D) Cannot be solved with the information provided

Handwritten calculation:
 $\frac{100}{101}$

44 An FET is a _____ - controlled device

- (A) Current
- (B) Voltage
- (C) Inductance
- (D) Charge coupled

45 What is the typical value for the input impedance Z for JFETs ?

- (A) $100 k\Omega$
- (B) $1M\Omega$
- (C) $10 M\Omega$
- (D) $1000 M\Omega$

46 In a MOSFET operating in the saturation region, the channel length modulation effect causes

- (A) an increase in the gate-source capacitance
- (B) a decrease in the transconductance
- (C) a decrease in the unity-gain cutoff frequency
- (D) a decrease in the output resistance

Handwritten calculation:
 $10^6 \text{ to } 10^8$

47 The internal circuitry of the 555 timer consists of _____, an R-S flip-flop, a transistor switch, an output buffer amplifier, and a voltage divider.

- (A) a comparator
- (B) a voltage amplifier
- (C) two comparators
- (D) a peak detector

48 A crystal demonstrates the _____ effect when a mechanical force across the crystal causes a small voltage to be generated

- (A) photoelectric
- (B) Co-pitts
- (C) flywheel

49. What is another name for a bistable multivibrator ?

- (A) Oscillator (B) Flip flop (C) an on-off switch (D) None of these

50. Why must CMOS devices be handled with care ?

- (A) so they don't get dirty
 (B) because they break easily
 (C) because they can be damaged by static electricity discharge
 (D) because they can give minor shocks

51. The high input impedance of MOSFETs

- (A) allows faster switching (B) reduces input current and power dissipation
 (C) prevents dense packing (D) creates low-noise reactions

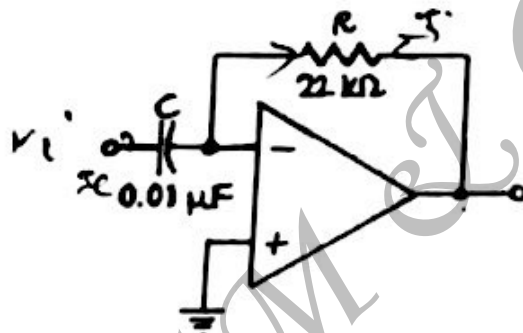
52. The unit of energy is

- (A) Watt (B) Newton (C) Kilowatt hour (D) Pascal

53. E-MOSFETs are generally used in switching applications because

- (A) of their very low input capacitance (B) of their threshold characteristic ($V_{GS(th)}$)
 (C) of their high-frequency response capabilities (D) of their power handling

54. Refer to the given figure. This circuit is known as



Handwritten notes and equations:

$$I_c = I_o$$

$$C \frac{dv_i}{dt} = -I_o$$

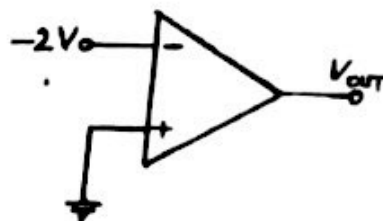
$$-RC \frac{dv_i}{dt} = -\frac{v_o}{R}$$

- (A) a non inverting amplifier (B) a differentiator
 (C) an integrator (D) a summing amplifier

55. In a(n) state when the input voltage exceeds a specified reference voltage, the output changes

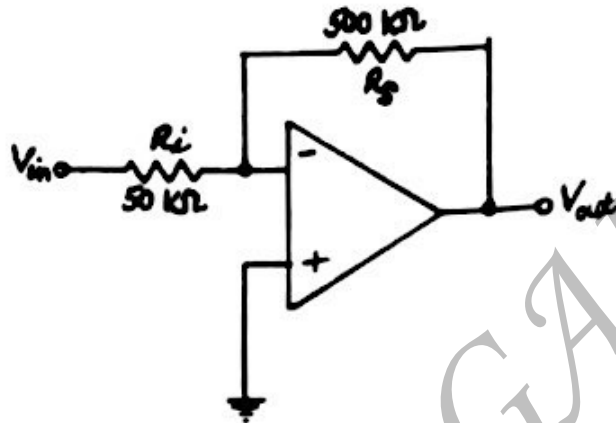
- (A) integrator (B) differentiator (C) summing amplifier (D) comparator

56. Refer to the given figure. Determine the output voltage

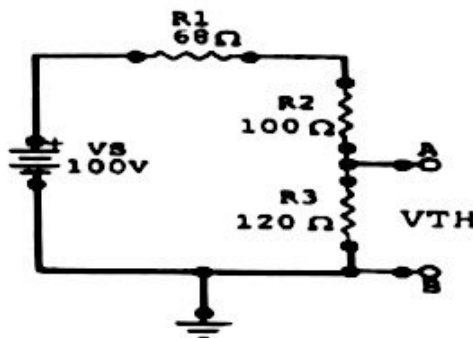


- (A) +2V (B) -2V (C) +V_{sat} (D) -V_{sat}

57. A good example of hysteresis is a (n)
 (A) AM radio (B) Thermostat (C) Alarm Clock (D) None of these
58. A differentiator is used to measure
 (A) the sum of the input voltages. (B) the difference between two voltages.
 (C) the area under a curve (D) the rate of change of the input voltage
59. In a comparator with output bounding, what type of diode is used in the feedback loop?
 (A) Schottky (B) Varactor (C) Zener (D) Junction
60. Refer to the given figure. The input impedance of this circuit is



61. 10^{17} power for SI units is prefixed as tera, 10^{19} power is prefixed as
 (A) exa (B) peta (C) yotta (D) zetta
62. One mole of any substance contains number of constituent particles.
 (A) 6.022×10^{23} (B) 6.022×10^{19} (C) 1.602×10^{23} (D) 1.602×10^{19}
63. The SI unit of the magnetic field intensity is
 (A) Weber (B) Henry (C) Tesla (D) Farad
64. Dimensions of power as expressed in Mass (M), Length (L) and Time (T) are expressed as
 (A) ML^2/T^3 (B) ML^3/T^3 (C) ML^2/T^2 (D) ML^2/T^4
65. Find the Thevenin equivalent (V_{th} and R_{th}) between terminals A and B of the circuit given below.



168

120
 $\rho = \frac{W}{L \cdot A}$
 $\frac{W}{L \cdot A} = \frac{H}{m \cdot m^2}$
 $\frac{W}{L \cdot A} = \frac{H}{m^3}$
 $\frac{W}{L \cdot A} = \frac{H}{m^3}$
 $\frac{W}{L \cdot A} = \frac{H}{m^3}$

- (A) 4.16 V, 120 Ω (B) 41.6 V, 120 Ω (C) 4.16 V, 70 Ω (D) 41.67 V, 70 Ω

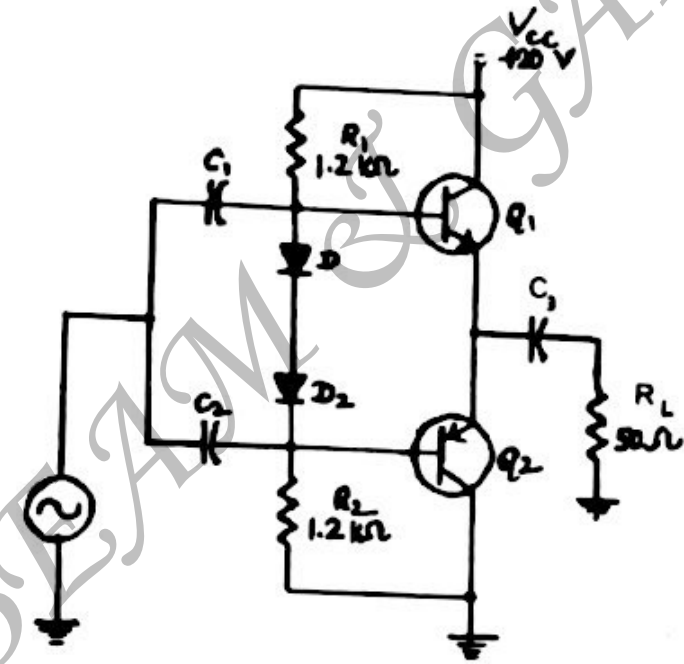
$\phi = \frac{MMF}{R_m}$

$\frac{e}{\Delta \mu \mu r}$

$L = \frac{N^2}{S}$

66. For a given wirewound core, an increase in current through the coil
 (A) reverses the flux lines
 (B) decreases the flux density
 (C) increases the flux density
 (D) causes no change in flux density
67. The unit for reluctance is:
 (A) Tesla
 (B) Ampere-Turns/Metre
 (C) Weber/metre
 (D) Weber
68. The can conduct current in either direction and is turned on when a breakover voltage is exceeded:
 (A) SCR
 (B) SCS
 (C) Triac
 (D) Diac
69. Class amplifiers are normally operated in a push-pull configuration in order to produce an output that is a replica of the input:
 (A) A
 (B) B
 (C) C
 (D) AB
70. If the steel disk in a crankshaft position sensor has stopped with the tab in the magnet's air gap, the induced voltage:
 (A) increases
 (B) decreases
 (C) is zero
 (D) will remain constant
71. You have an oscilloscope across R_L and it shows a zero signal voltage. The problem might be that

$F = qE$
 $E = \frac{W}{P \times t}$
 $\frac{E}{F} = \frac{M \times 22}{T \times T}$
 $\frac{E}{F} = M$



72. Filters with the characteristic are useful when a rapid roll-off is required because it provides a roll-off rate greater than -20 dB/decade/pole.
 (A) Butterworth
 (B) Chebyshev
 (C) Bessel
 (D) [NIL]
73. In a series RLC circuit that is operating above the resonant frequency, the current
 (A) lags the applied voltage
 (B) leads the applied voltage
 (C) is in phase with the applied voltage
 (D) is zero
74. If the value of C in a series RLC circuit is decreased, the resonant frequency
 (A) is not affected
 (B) increases
 (C) is reduced to zero
 (D) decreases

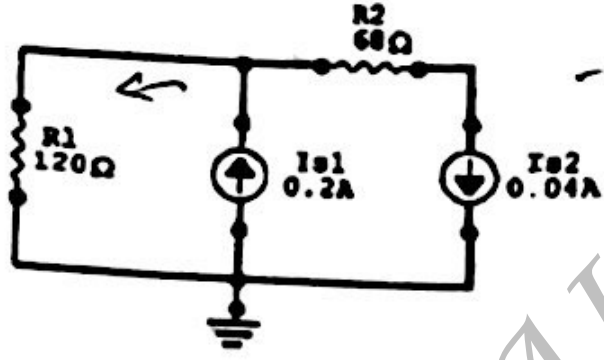
75. A resistor is connected across a 50 V source. What is the current in the resistor if the color code is red, orange, orange, silver?

- (A) 2 mA (B) 2.2 mA (C) 214 mA (D) 21.4 mA

76. The critical frequency is defined as the point at which the response drops from the passband.

- (A) -20 dB (B) -40 dB (C) -2 dB (D) -3 dB

77. Find the current through R, in the given circuit.



$-0.04 + 0.2$

- (A) 0.16 A (B) 0.24 A (C) 0.2 A (D) 0.04 A

78. A filter passes all frequencies within a band between a lower and an upper critical frequency and rejects all others outside this band.

- (A) low-pass (B) high-pass (C) band-pass (D) band-stop

79. The number of kilowatts in 135 milliwatts is :

- (A) 1.35×10^{-4} kW (B) 135×10^{-3} kW (C) 0.0135 kW (D) $\frac{0.00135}{10^3}$ kW

80. What causes the depletion region?

- (A) doping (B) diffusion (C) barrier potential (D) ions

81. In "p" type material, minority carriers would be :

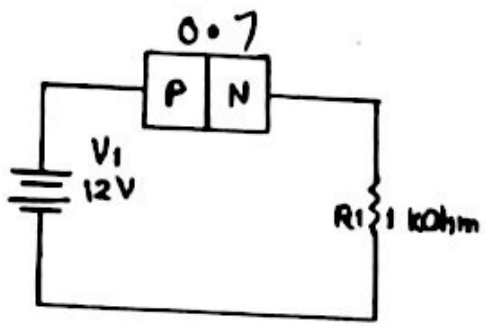
- (A) holes (B) dopants (C) slower (D) electrons

82. Solid state devices were first manufactured during

- (A) World War II (B) 1904 (C) 1924 (D) 1960

83. What is the voltage across R1 if the P-N junction is made of silicon?

1.35×10^{-6}



- (A) 12 V (B) 11.7 V (C) 1.3 V (D) 0V

1.35×10^{-6}

84. Which of the following cannot actually move?

- (A) majority carriers (B) holes (C) ions (D) free electrons

85. The primary winding of a power transformer should always be

- (A) shorted (B) open (C) switched (D) fused

86. Which is not an analog-to-digital (ADC) conversion error?

- (A) differential nonlinearity (B) missing code
(C) incorrect code (D) offset

87. How many flip-flops are required to make a MOD-32 binary counter?

- (A) 3 (B) 5 (C) 6 (D) 45

88. What is the difference between combinational logic and sequential logic?

- (A) Combinational circuits are not triggered by timing pulses, sequential circuits are triggered by timing pulses.
(B) Combinational and sequential circuits are both triggered by timing pulses.
(C) Neither circuit is triggered by timing pulses.
(D) There is no difference

89. A BCD counter is a

- (A) binary counter (B) full-modulus counter
(C) decade counter (D) divide-by-10 counter

90. A single transistor can be used to build which of the following digital logic gates?

- (A) AND (B) NAND (C) OR (D) NOT

B 0

B 1

R 2 ✓

O 3 ✓✓

Y 4

G 5

$$\frac{23 \times 10^3}{50}$$

$$\begin{array}{r} 1000 \text{ W} - 1 \text{ kW} \\ 135 \times 10^3 \text{ W} - \\ \hline 50 \end{array}$$

$$\frac{135 \times 10^3}{10^4}$$

$$135 \times 10^3 \text{ W} \quad 0.135$$

$$0.01$$

PART - III
SPECIALISATION

Max. Marks : 90

1. The unit of $\nabla \times H$ is :
 (A) A (B) A/m (C) A-m (D) A/m^2
2. In a Y-connected circuit, the magnitude of each line current is :
 (A) one-third the phase current (B) three times the corresponding phase current
 (C) equal to the corresponding phase current (D) zero
3. Which bus is bidirectional ?
 (A) data bus (B) control bus (C) address bus (D) multiplexed bus
4. The software used to drive microprocessor-based systems is called :
 (A) firmware (B) BASIC interpreter instructions
 (C) assembly language programs (D) flowchart instructions
5. In a Δ -connected generator, all of the phase voltages are :
 (A) zero (B) equal in magnitude
 (C) one-third of total (D) one-sixth of total
6. How many buses are connected as part of the 8085 microprocessor ?
 (A) 2 (B) 3 (C) 5 (D) 8
7. How many bits are used in the address bus ?
 (A) 7 (B) 8 (C) 9 (D) 16
8. Which of the following is not an enhancement to the Pentium that was unavailable in the 8086/8088 ?
 (A) "Pipelined" architecture (B) Expansion of cache memory
 (C) Inclusion of an internal math coprocessor (D) Data/address line multiplexing
 16 Bi
9. DMA is particularly suited for data transfer between the
 (A) disk drive and CPU (B) disk drive and RAM
 (C) disk drive and ROM (D) disk drive and I/O
10. Which is not part of the execution unit (EU) ?
 (A) Clock (B) Arithmetic logic unit (ALU)
 (C) General registers (D) Flags
11. A 20-bit address bus can locate
 (A) 1,048,576 locations (B) 2,097,152 locations
 (C) 4,194,304 locations (D) 8,388,608 locations
12. A phasor represents :
 (A) the width of a quantity (B) the magnitude and a quantity direction
 (C) the phase angle (D) the magnitude of a quantity
13. What is occurring when two or more sources of data attempt to use the same bus ?
 (A) Bus interruption (B) Direct memory access
 (C) Bus contention (D) PPI

14. Which of the following is not an arithmetic instruction?
 (A) INC (increment) ✓
 (B) ~~CMP (compare)~~ ✓
 (C) DEC (decrement) ✓
 (D) ~~ROL (rotate left)~~ ✓
15. Which of the following is not a computer functional block?
 (A) ~~Analog-to-digital converter~~ ✓
 (B) Central-processing unit
 (C) Input/output ports
 (D) Memory
16. The Pentium microprocessor has a data bus of
 (A) 128 bits
 (B) ~~64 bits~~ ✓
 (C) 32 bits
 (D) 16 bits
17. How long is an IPv6 address?
 (A) 32 bits
 (B) 64 bits
 (C) ~~128 bits~~ ✓
 (D) ~~128 bytes~~ ✓
18. Which protocol does DHCP use at the Transport layer?
 (A) IP
 (B) UDP
 (C) ~~TCP~~ ✓
 (D) ARP
19. What is a stub network?
 (A) A network with more than one exit point.
 (B) A network with more than one exit and entry point.
 (C) A network with only one entry and no exit point.
 (D) A network that has only one entry and exit point.
20. A PMMC voltmeter is connected across a series combination of a DC voltage source $V_1 = 2V$ and an AC voltage source $V_2(t) = 3\sin(4t)V$. The meter reads
 (A) ~~2V~~ ✓
 (B) 5V
 (C) $(2 + \sqrt{3}/2)V$
 (D) $\sqrt{17}/2)V$
21. The 8085 assembly language instruction that stores the content of H and L registers into the memory locations 2050H and 2051H respectively is
 (A) SPHL 2050H
 (B) SPHL 2051H
 (C) SHLD 2050H
 (D) STAX 2050H
22. A unity feedback system, having an open loop gain $G(s)H(s) = \frac{K(1-s)}{1+s}$, becomes stable when
 (A) $|K| > 1$ ✓
 (B) $K > 1$ X
 (C) $|K| < 1$ ✓
 (D) $|K| < -1$
23. If $R = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 4 & 5 \end{bmatrix}$, then the top row of R^{-1} is
 (A) [5 6 4]
 (B) ~~[5 -3 1]~~ ✓
 (C) [2 0 -1]
 (D) [2 -1 1]
24. A practical current source is usually represented by:
 (A) A resistance in series with an ideal current source
 (B) ~~A resistance in parallel with an ideal current source~~ ✓
 (C) A resistance in parallel with an ideal voltage source
 (D) None of the above
25. What does a VLAN do?
 (A) Acts as the fastest port to all servers.
 (B) Provides multiple collision domains on one switch port.
 (C) Breaks up broadcast domains in a layer 2 switch internetwork.
 (D) Provides multiple broadcast domains within a single collision domain.

80186 → 1
 80286 → 1
 80386 → 3
 80486 → 6
 80586 → 6
 64

$(1+s) + K(1-s)$
 $(1+K) + s(1-K)$
 $\delta = -$
 $K > 1$ X
 $|K| < 1$ ✓
 $|K| < -1$

$H = (5 - 1)(4) = 1$
 $\begin{bmatrix} 5 & -6 & 4 \\ -5 & & \\ 0 & & \end{bmatrix}$

$\delta = - \frac{(1+K)}{1-K}$
 $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$
 $\begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}$
 $\frac{K}{K+1}$

26. The modulation normally used with the digital data is

- (A) FM (B) AM (C) SSB (D) QPSK

27. Which of the following logic families has the highest maximum clock frequency?

- (A) S-TTL (B) AS-TTL (C) HS-TTL (D) HCMOS

28. In context of C programming, What is (void*) 0?

- (A) Representation of NULL pointer (B) Representation of void pointer
(C) Error (D) None of these

29. The operator used to get value at address stored in a pointer variable is

- (A) * (B) & (C) && (D) ||

30. Whenever a totem-pole TTL output goes from LOW to HIGH, a high-amplitude current spike is drawn from the V_{cc} supply. How is this effect corrected to a digital circuit?

- (A) By connecting a radio-frequency capacitor from V_{cc} to ground.
(B) By using a switching power supply
(C) By connecting a capacitor from V_{out} to ground
(D) By connecting a large resistor from V_{cc} to V_{out}

31. How many times "BSNL TTA" gets printed?

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

- (A) Infinite times (B) 11 times (C) 0 times (D) 10 times

32. Which of the following is not logical operator?

- (A) & (B) && (C) || (D) !

33. Which of the following are unary operators in C?

1. ! 2. Size of 3. ~ 4. &&
(A) 1, 2 (B) 1, 3 (C) 2, 4 (D) 1, 2, 3

34. How will you print \n on the screen?

- (A) printf("\n"); (B) echo "\\n"; (C) printf('\n'); (D) printf("\\n");

35. A transducer is a device that

- (A) converts a physical variable to an electrical variable
(B) converts analog data to meaningful data
(C) controls a physical variable
(D) stores digital data and then processes that data according to a set of specified instructions

35. Declare the following statement ?

"An array of three pointers to chars".

- (A) A char *ptr[3](); (B) char *ptr[3]; (C) char (*ptr[3])(); (D) char **ptr[3];

36. The purpose of the Cassegrain feed in a parabolic reflector antennas to :

- (A) Achieve higher antenna gain
 (B) Reduce the antenna size
 (C) Reduce the beamwidth
 (D) Ease of locating the feed at the convenient point along with the associated waveguides and front end electronics

38. The quantization error in an analog-to-digital converter can be reduced by :



- (A) decreasing the number of bits in the counter and increasing the number of bits in the DAC.
 (B) increasing the number of bits in the counter and decreasing the number of bits in the DAC.
 (C) increasing the number of bits in the counter and DAC.
 (D) decreasing the number of bits in the counter and DAC.

39. What does the following declaration signify ?

int *f();

- (A) f is a pointer variable of function type. (B) f is a function returning pointer to an int.
 (C) f is a function pointer. (D) f is a simple declaration of pointer variable.

Handwritten notes and formulas:
 $\frac{V_o}{V_i} = \frac{3 \cdot 2^{2n}}{2}$
 $R_{in} = \frac{V_o}{2^{2n} - 1}$

40. The process by which a computer acquires digitized analog data is referred to as

- (A) monotonicity (B) data acquisition
 (C) analog resolution (D) systematic digital conversion

41. are the most linear of all the temperature transducers.

- (A) Thermistors (B) Thermocouples
 (C) IC temperature sensors (D) Resistance temperature detectors

42. An AM demodulator can be implemented with a linear multiplier followed by a filter

- (A) low-pass (B) high-pass (C) band-pass (D) band-stop

43. The intermediate frequency in a standard AM receiver is

- (A) 455 Hz (B) 455 kHz (C) 4.55 MHz (D) None of these

44. What does VCO stand for ?

- (A) Visually-Controlled Organization (B) Voltage-Centered Oscilloscope
 (C) Voltage-Controlled Oscillator (D) Voltage-controlled Oscilloscope

45. In a DC machine if P is the number of poles, N is the armature speed in rpm, then the frequency of the magnetic reversal will be :

- (A) PN/180 (B) PN/120 (C) PN/60 (D) PN/30

46. In a communication system, noise is most likely to affect the signal :

- (A) at the transmitter (B) in the information source
 (C) at the destination (D) in the channel

47. Traffic in telecommunications systems is specified in terms of :

- (A) Average waiting time (B) Peak waiting time
 (C) Erlangs (D) Grade of service

48. In commercial FM broadcasting, the maximum frequency deviation is normally :

- (A) 5 kHz (B) 15 kHz (C) 75 kHz (D) 200 kHz

49 The most common device used for detection in radio receiver is :
 (A) amplifier (B) triode (C) transistor (D) diode

50 An analog-to-digital converter has a four-bit output. How many analog values can it represent ?
 (A) 16 (B) 4 (C) 1/4 (D) 0.0625

51 Which of the following characterizes an analog quantity ?
 (A) Discrete levels represent changes in a quantity.
 (B) Its values follow a logarithmic curve.
 (C) It can be described with a finite number of steps.
 (D) It has a continuous set of values over a given range.

~~AD~~ $\frac{0}{15}$

52 What is the purpose of a sample-and-hold circuit ?
 (A) To keep temporary memory
 (B) To hold a voltage constant so an ADC has time to produce an output
 (C) To hold a voltage constant so a DAC has time to produce an output
 (D) To hold data after a multiplexer has selected an output

53 Which statement(s) about IPv6 addresses are true ?
 (P) Leading zeros are required.
 (Q) Two colons (::) are used to represent successive hexadecimal fields of zeros.
 (R) Two colons (::) are used to separate fields.
 (S) A single interface will have multiple IPv6 addresses of different types.
 (A) P and R (B) Q and S (C) P, R and S (D) All of these

54 A control system is defined by the following mathematical relationship:
 $\frac{d^2x}{dt^2} + 6 \frac{dx}{dt} + 5x = 12(1 - e^{-t})$ $(x^2 + 6x + 5) \cdot (D^2 + 6D + 5)x = 12$

The response of the system as $t \rightarrow \infty$ is
 (A) $x = 6$ (B) $x = 2$ (C) $x = 2.4$ (D) $x = -2$

55 The following program is written for an 8085 microprocessor to add two bytes located at memory address 1FFE and 1FFF

```

LXI H, 1FFE
MOV B, M
INR L
MOV A, M
ADD B
INR L
MOV M, A
XOR A
    
```

$-1, -5 =$
 $9e^{-t} + 6e^{-5t}$
 $+ \frac{12e^{0x}}{0^2 + 6D + 5} \approx 12$

On completion of execution of the program, the result of addition is found :

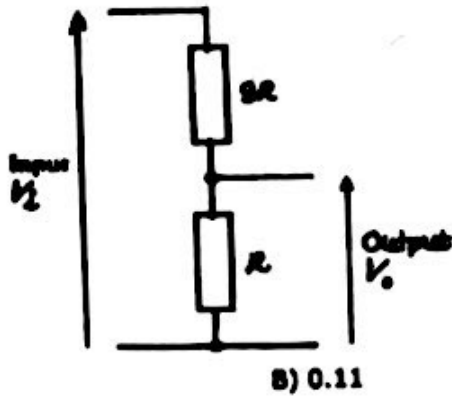
(A) in the register A (B) at the memory address 1000
 (C) at the memory address 1F00 (D) at the memory address 2000

56 A computer program that converts assembly language to machine language is :
 (A) Compiler (B) Assembler (C) Interpreter (D) Comparator

57 Which access method is used for obtaining a record from a cassette tape ?
 (A) Sequential (B) Random (C) Direct (D) All of these

Semi-Ra

58. What is the gain of the following passive attenuator :



$R \times V_i$
 $10R \times V_i$

B) 0.11

(A) 0.1

(B) 0.11

(C) 9

(D) 10

59. In a temperature control system, what represents the output of the system ?

- (A) The actual temperature achieved
- (C) The required temperature

- (B) The heat produced by the system
- (D) The heating element

Latu

60. Which type of error detection uses binary division ?

- (A) Parity
- (C) Checksum checking

- (B) Longitudinal redundancy checking
- (D) Cyclic redundancy checking

61. is a technique which transforms an analogue telephone circuit into a digital signal, and involves three consecutive processes : sampling, quantization and encoding.

- (A) Amplitude Modulation (AM)
- (C) Pulse Code Modulation (PCM)

- (B) Frequency Modulation (FM)
- (D) Phase Modulation (PM)

62. Rather than sending the absolute value of each sample, it is possible to achieve a smaller transmission bit-rate by sending the difference between consecutive samples. This is known as

- (A) delta-sigma modulation
- (C) adaptive delta modulation

- (B) delta modulation
- (D) differential PCM

Latu

63. The electron beam in the cathode ray tube (CRT) inside the TV set is made to scan the whole visible surface of the screen in a zigzag pattern. This is known as

- (A) picture line
- (B) frame
- (C) raster
- (D) broadcast

Latu

64. One of the compression techniques in communication uses the fact that in most pictures, there is considerable correlation between neighbouring areas that is high degree of redundancy in the data to compress. This type of compression is known as

- (A) temporal compression
- (C) random compression
- (B) dynamic compression
- (D) spatial compression

Latu

65. The error represented by the difference between the original and quantized signals set a fundamental limitation to the performance of PCM systems known as

- (A) dynamic range
- (B) detection error
- (C) quantization noise
- (D) correction error

66. Telnet, FTP, SMTP, DNS, HTTP are examples of protocols that are used in

- (A) application layer of OSI reference layer
- (C) session layer of OSI reference layer
- (B) presentation layer of OSI reference layer
- (D) data link layer of OSI reference layer

67. For a periodic signal $v(t) = 30 \sin 100t + 10 \cos 300t + 6 \sin (500t + \pi/4)$, the fundamental frequency in rad/s is :

- (A) 300
- (B) 100
- (C) 500

$\omega = 1500$
 $\omega = \frac{100}{\cos(15)}$

$\frac{2\pi}{100}, \frac{2\pi}{300}, \frac{2\pi}{500}$

$\omega_1 = 100, 300, \omega_3 = 500$

$\frac{\omega_1}{\omega_2}, \frac{\omega_2}{\omega_3}, \frac{\omega_1}{\omega_3}$

Scanned by CamScanner
 $(100 \times 300 \times 500) \text{ Hz}$
 $100 \times 300 \times 500 \text{ LCM}$

68. In the generation of modulated signal, a varactor diode can be used for:

- (A) AM generation only
- (B) PM generation only
- (C) FM generation only
- (D) All of these

69. Decibel is a unit of:

- (A) power
- (B) impedance
- (C) frequency
- (D) power ratio

70. As a rule of thumb the width of the waveguide needs to be of the:

- (A) same order of magnitude as the frequency of the guided wave
- (B) same order of magnitude as the wavelength of the guided wave
- (C) very small magnitude
- (D) same magnitude as the breadth of the waveguide

$$h_c = \frac{2a}{m}$$

71. Range of the Voltage Standing Wave Ratio (VSWR) is

- (A) 0 to 1
- (B) 1 to ∞
- (C) 0 to ∞
- (D) -1 to +1

72. Angstrom can be related to:

- (A) Energy
- (B) Speed
- (C) Distance
- (D) Intensity

73. A transmission line of characteristic impedance 50Ω is terminated by a 50Ω load. When excited by a sinusoidal voltage source at 10 GHz, the phase difference between two points spaced 2mm apart on the line is found to be $\pi/4$ radians. The phase velocity of the wave along the line is:

- (A) 0.8×10^8 m/s
- (B) 1.2×10^8 m/s
- (C) 1.6×10^8 m/s
- (D) 3×10^8 m/s

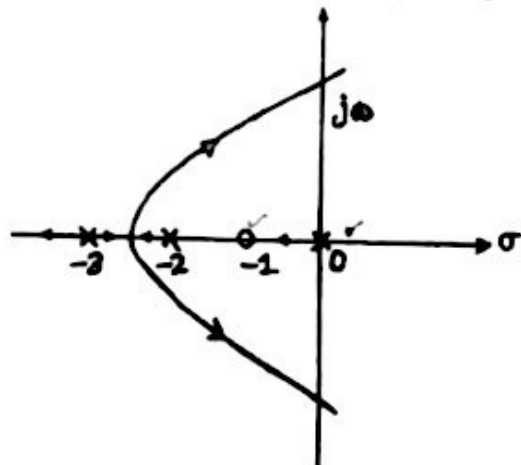
74. The modes in a rectangular waveguide are denoted by $\frac{TE_{mn}}{TM_{mn}}$ where m and n are the eigen numbers along the larger and smaller dimensions of the waveguide respectively. Which one of the following statements is true?

- (A) The TM_{10} mode of the wave does not exist
- (B) The TE_{10} mode of the wave does not exist
- (C) The TM_{10} and the TE_{10} modes both exist and have the same cut-off frequencies
- (D) The TM_{10} and the TM_{01} modes both exist and have the same cut-off frequencies



75. The root locus plot for a system is given below. The open loop transfer function corresponding to this plot is given by:

- (A) $G(s)H(s) = k \frac{s(s+1)}{(s+2)(s+3)}$
- (B) $G(s)H(s) = k \frac{(s+1)}{s(s+2)(s+3)^2}$
- (C) $G(s)H(s) = k \frac{1}{s(s-1)(s+2)(s+3)}$
- (D) $G(s)H(s) = k \frac{(s+1)}{s(s+2)(s+3)}$



76. The primary reason for the widespread use of Silicon in semiconductor device technology is:

- (A) abundance of Silicon on the surface of the Earth
- (B) larger bandgap of Silicon in comparison to Germanium
- (C) favourable properties of Silicon-dioxide (SiO_2)
- (D) lower melting point

$$\frac{(s+1)}{s(s+2)(s+3)}$$

$$\frac{64}{2} + \frac{16}{2} = 32 + 8 = 40$$

77. The power in the signal $s(t) = 8 \cos\left(20\pi t - \frac{\pi}{2}\right) + 4 \sin(15\pi t)$ is

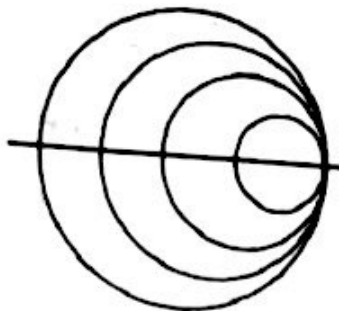
- (A) 82 (B) 42 (C) 41 (D) 40

78. Despite the presence of negative feedback, control systems still have problems of instability because the

- (A) components used have non-linearities
 (B) dynamic equations of the subsystems are not known exactly
 (C) mathematical analysis involves approximations
 (D) system has large negative phase angle at high frequencies

79. Many circles are drawn in a Smith Chart used for transmission line calculations. The circles shown in figure represent

Zero } 50Ω



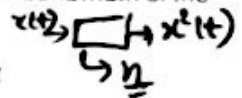
$$V_p = \frac{W}{\beta} = \frac{3 \times 10^8}{\sqrt{\epsilon_r}}$$

$\frac{3 \times 10^8}{\sqrt{\epsilon_r}}$
 $\epsilon_r = 2.25 \rightarrow \text{Non-mag}$
 $\epsilon_r = 2.25$
 $\epsilon_r = 2.25$
 $\epsilon_r = 2.25$

- (A) unit circles
 (B) constant resistance circles
 (C) constant reactance circles
 (D) constant reflection coefficient circles

80. A device with input $x(t)$ and output $y(t)$ is characterised by $y(t) = x^2(t)$. An FM signal with frequency deviation of 90 kHz and modulating signal bandwidth of 5 kHz is applied to this device. The bandwidth of the output signal is

- (A) 370 kHz (B) 190 kHz (C) 380 kHz (D) 95 kHz



81. In a microprocessor, the service routine for a certain interrupt starts from a fixed location of memory which cannot be externally set, but the interrupt can be delayed or rejected. Such an interrupt is

- (A) non-maskable and non-vectored
 (B) maskable and non-vectored
 (C) non-maskable and vectored
 (D) maskable and vectored

$$A_c \cos(2\pi f_c t + \beta \sin 2\pi f_m t)$$

82. Codes consisting of light and dark marks which may be optically read is known as

- (A) Mnemonics (B) Decoder (C) Bar code (D) All of these

83. SQL stands for

- (A) Structured Query Language
 (B) Sequential Query Language
 (C) Structured Question Language
 (D) Sequential Question Language

$$b_c \rightarrow n f_c$$

$$\beta \rightarrow n \beta$$

84. Where does a computer add and compare data?

- (A) Hard disk (B) CPU chip (C) Memory chip (D) RW-Disc

$$\Delta f = \beta f_m$$

85. An Enterprise Resource Planning application is an example of a(n)

- (A) single-user database application
 (B) multiuser database application
 (C) e-commerce database application
 (D) data mining database application

$$\Delta f \rightarrow n \Delta$$

86. Which of the following cannot be used for amplification of microwave energy

- (A) Travelling Wave Tube
 (B) Magnetron
 (C) Reflex Klystron
 (D) Gunn Diode

$$\beta = \frac{\Delta f}{f_m} = \frac{90 \text{ kHz}}{5 \text{ kHz}} = 18$$

$$B_w = 2(\beta + 1)f_m$$

$$= 2(19)f_m$$

87. The Routh criterion tells us the number of roots lying :

- (A) on the origin of the s-plane
 (B) in the left half of the s-plane
 (C) in the right half of the s-plane
 (D) none of these

88. Which disk interface standard includes support for up to eight peripheral devices ?

- (A) ST50G/412 (B) IDE (C) ESDI (D) SCSI

89. In the context of databases, which of the following is a group of one or more attributes that uniquely identifies a row ?

- (A) Key (B) Tuple (C) Determinant (D) Relation

90. An 8085 microprocessor based system uses a $4k \times 8$ -bit RAM whose starting address is AA00 Hex. The address of the last byte in this RAM is :

- (A) OFFF H (B) 1000 H (C) B9FF H (D) BA00 H

$$\frac{4k}{2} = 4mm$$

$$128 \times 10^3$$

$$C2FH \times 10^3$$

$$= 10 \times 10^9 \times 8 \times 10^3$$

$$= 80 \times 10^6$$

AA00 7

$$4K \times 8$$

$$2^2 \times 2^{10} \times 8$$

$$2^{12}$$

