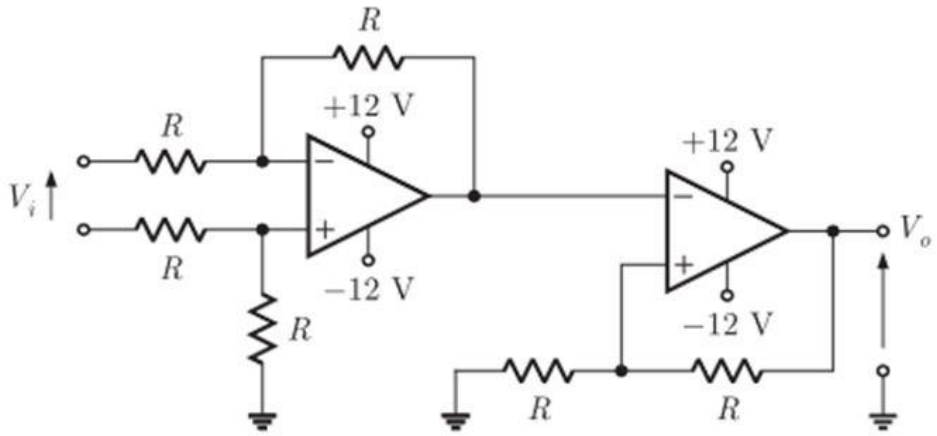
Examination: **M.Tech. Electronics and Communication Engineering**

Section 1 - Section 1

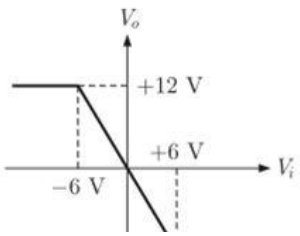
Question No.1 4.00

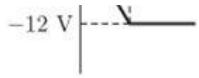
Bookmark

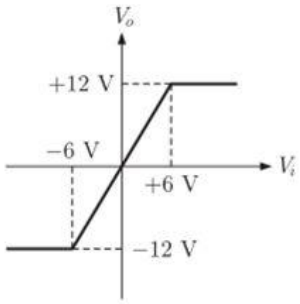


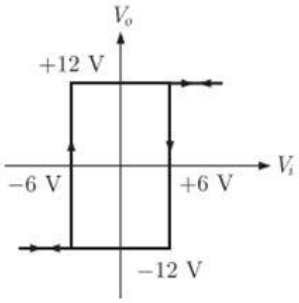
The correct transfer characteristics is

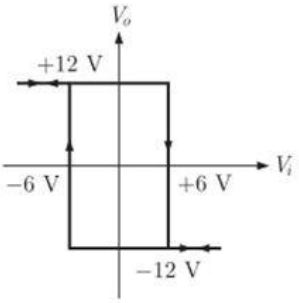
C











Question No.2 4.00

Bookmark

Two coils have self inductances of 0.09H and 0.01H and a mutual inductance of 0.015H. The coefficient of coupling between the coils is

- 0.05
- 1
- 0.5
- 0.06

Question No.3 4.00

Bookmark

A man makes 150 pots per minute. If 30 pots are packed in a case how many cases will be made ready by the Man in one hour?

- 250
- 300
- 1000
- 200

Question No.4 4.00

Bookmark

A parallel plate air-filled capacitor has plate area of 10^{-4} m^2 and plate separation of 10^{-3} m. It is connected to a 0.5 V, 3.6 GHz source. The magnitude of the displacement current is ($\varepsilon_0 = 1/36\pi \times 10^{-9} F/m$)

- 10 mA
- 1.59 mA
- 100 mA
- 10 A

Question No.5 4.00

Bookmark

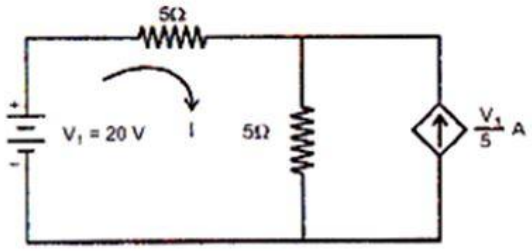
How many registers can be utilized to write the programs by an effective selection of register bank in program status word (PSW)?

- 16
- 64
- 32
- 8

Question No.6 4.00

Bookmark

The dependent current source shown in figure:



- Absorbs 40 W
- Delivers 80 W
- Delivers 40 W

- Absorbs 80 W

Question No.7 4.00

Bookmark

A four variable Karnaugh map has

- 32 min terms
- 16 min terms
- 24 min terms
- 8 min terms

Question No.8 4.00

Bookmark

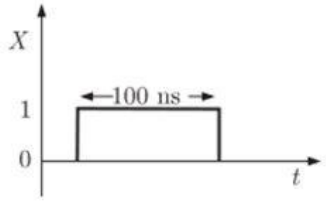
General solution of the differential equation $(D^2 - m^2)y = 0$ is

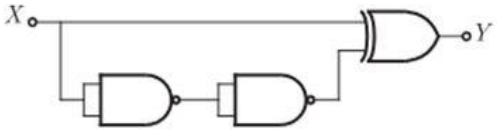
- $y = (C_1 + C_2 x)e^{mx}$
- $y = C_1 \cosh x + C_2 x \sinh x$
- $y = C_1 \sin x + C_2 \cos x$
- $y = C_1 \cosh x + C_2 \sinh x$

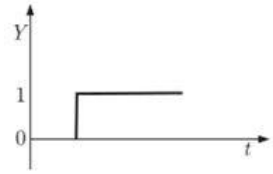
Question No.9 4.00

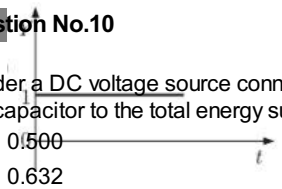
Bookmark

The TTL circuit shown in the figure is fed with the waveform X (also shown). All gates have equal propagation delay of 10 ns. The output Y of the circuit is









Question No.10 4.00

Bookmark ☐

Consider a DC voltage source connected to a series R–C circuit. When the steady state reaches, the ratio of the energy stored in the capacitor to the total energy supplied by the voltage source is equal to:

- 0.500
- 0.632
- 1.000
- 0.144

Question No.11 4.00

Bookmark ☐

A material has conductivity of 10^{-2} mho/m and a relative permittivity of 4. The frequency at which the conduction current in the medium is equal to the displacement current is

- 90 MHz
- 900 MHz
- 45 MHz
- 450 MHz

Question No.12 4.00

Bookmark ☐

Find the odd one out?

- Bees : Apiculture
- Fish : Pisiculture
- Silkworm: Serculture
- Birds : Horticulture

Question No.13 4.00

Bookmark

Twelve $1\,\Omega$ resistances are used as edges to form a cube. The resistance between two diagonally opposite corners of the cube is

- $1\,\Omega$
- $\frac{3}{2}\Omega$
- $\frac{5}{6}\Omega$
- $\frac{6}{5}\Omega$

Question No.14 4.00

Bookmark

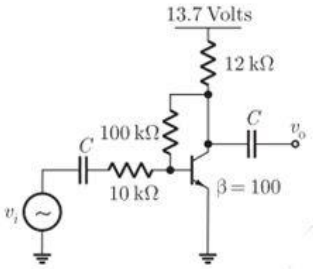
The incoming solar radiation at a place on the surface of the earth is 1.2 KW/m^2. The amplitude of the electric field corresponding to this incident power is nearly equal to

- 2.5 V / m
- 950 V / m
- 80 mV / m
- 30 V /m

Question No.15 4.00

Bookmark ☐

The voltage gain Av of the circuit shown below is

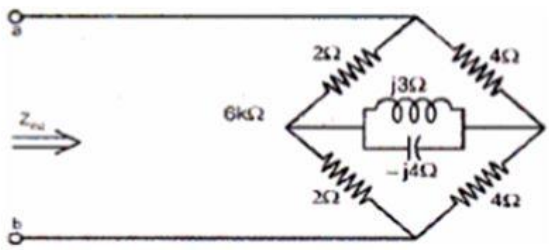


- $|A_V|=20$
- $|A_V|=10$
- $|A_V|=100$
- $|A_V|=200$

Question No.16 4.00

Bookmark ☐

In the given circuit, the equivalent impedance seen across terminals a, b is:



- 8/3+12j
- 8/3-12j
- 16/3
- 8/3

Question No.17 4.00

Bookmark ☐

Statement: The Company has recently announced a series of incentives to the employees who are punctual and sincere.
Assumptions:
I.Those who are punctual will get motivated.
II. The Productivity of the company may increase.

- If neither I nor II is implicit
- If only assumption I is implicit
- If only assumption II is implicit
- If both I and II are implicit

Question No.18 4.00

Bookmark

Exhausted: Tired

- Arrogant: Docile
- Progressive: Regressive
- Considerate: Rude
- Depressed : Sad

Question No.19 4.00

Bookmark

In an experiment, a coin is tossed 4 times. What is the size of the sample space?

- 16
- 12
- 14
- 20

Question No.20 4.00

Bookmark

ROC for the signal $x[n] = -(0.5)^n u(n-1)$ is

- $|z| > -0.5$
- $|z| > 0.5$
- $|z| < 1$
- $|z| < 0.5$

Question No.21 4.00

Bookmark

The upper 128 bytes of an internal data memory from 80H through FFH usually represent _____.

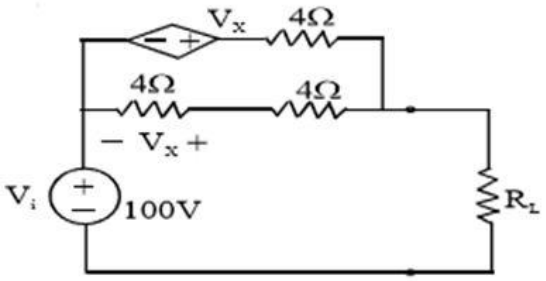
- stack pointers
- program counters
- special function registers
- general-purpose registers

Question No.22 4.00

Bookmark

In the circuit shown, what value of RL maximizes the power delivered to RL (in ohms)?

ohms)?



- 6
- 8/3
- 2.4
- 4

Question No.23 4.00

Bookmark

A 8kHz communication channel has an SNR of 30dB. If the channel bandwidth is doubled, keeping the signal power constant, the SNR for the modified channel will be (in dB)

- 27
- 60
- 33
- 30

Question No.24 4.00

Bookmark

Study the following information carefully and answer the question below it:

P, Q, R, S T went on a picnic. P is son of Q but Q is not the father of P. R is the son of S, who is the brother of P. T is the wife of S.

How is P related to S?

- Brother
- Father
- Nephew
- None of these

Question No.25 4.00

Bookmark ☐

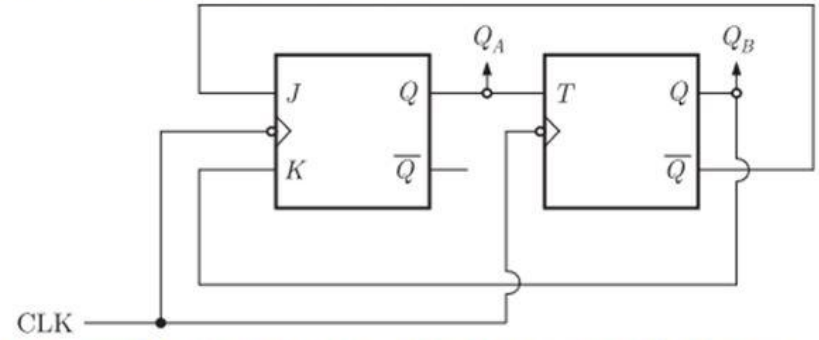
Which timer is attributed to the register pair of RCAP2H & RCAP2L for capture mode operation?

- Timer 1
- Timer 2
- Timer 0
- Timer 3

Question No.26 4.00

Bookmark ☐

A two bit counter circuit is shown below



It the state QQ AB of the counter at the clock time t_n is '10' then the state QQ AB of the counter at t_n+ 3 (after three clock cycles) will be

- 00
- 01
- 10
- 11

Question No.27 4.00

Bookmark ☐

What will be output of the following program?

#include int main() {int a=2, b=7, c=10; c=a==b; printf("%d",c); return 0;}

- 0
- 10
- 7
- 2

Question No.28 4.00

Bookmark ☐

The system function $H(z)$ for the difference equation

$y[n] = -\frac{1}{2}y[n-1] + x[n]$ is

- $\frac{1}{1 + \frac{1}{2}z^{-1}}$

$1+z^{-1}$

- $\frac{1}{1+z^{1}}$
- $-\frac{1}{1+z^{-1}}$
- $\frac{1}{1-z^{-1}}$

Question No.29 4.00

Bookmark ☐

A channel has SNR of 63 and bandwidth of 1.2kHz. The maximum data rate that can be sent through the channel with arbitrary low probability of error is (In bps)

- 7200
- 600
- 1200
- 4800

Question No.30 4.00

Bookmark ☐

If the reflection co efficient of a 2 port network is 0.5 then the return loss in the network is:

- 0.15 dB
- 6.020 dB
- 6.5 dB
- 10 dB

Question No.31 4.00

Bookmark ☐

Eigen vectors of a real symmetric matrix corresponding to different Eigen values are

- Non-orthogonal
- Non-singular
- Orthogonal
- Singular

Question No.32 4.00

Bookmark ☐

The Fourier Transform of a Gaussian time pulse is

- Rayleigh
- A pair of impulse
- Uniform
- Gaussian

Question No.33 4.00

Bookmark ☐

When the bus was at full speed, its brakes failed and an accident was _____

- essential
- undeniable
- inevitable

- infallible

Question No.34 4.00

Bookmark

This pup is very naughty. It is always _____some mischief or the other.

- in for
- out for
- up at
- up to

Question No.35 4.00

Bookmark

The channel capacity under the Gaussian noise environment of a discrete memoryless channel with a bandwidth of 4MHz and SNR of 31 is

- 4 Kbps
- 8 Kbps
- 20Mbps
- 4 Mbps

Question No.36 4.00

Bookmark

A source of angular frequency 1 rad/sec has source impedance consisting of 1 Ω resistance in series with 1H inductance. The load that will obtain the maximum power transfer is

- 1 Ω resistance in parallel with 1 F capacitor
- 1 Ω resistance in parallel with 1H inductance
- 1 Ω resistance in series with 1 F capacitor
- 1 Ω resistance

Question No.37 4.00

Bookmark

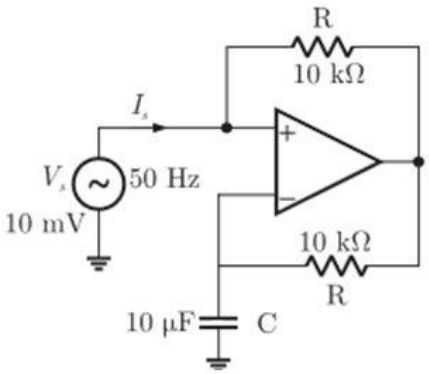
The range of values of a and b for which the linear time invariant systemwith impuse response $h(n) = \begin{cases} a^n, & n \geq \\ b^n & n < 0 \end{cases}$ is stable

- $|a| < 1, |b| > 1$
- $|a| < 1, |b| < 1$
- $|a| > 1, |b| > 1$
- $|a| > 1, |b| < 1$

Question No.38 4.00

Bookmark ☐

The following circuit has R=10 kΩ ,C=10μF. The input voltage is a sinusoidal at 50 Hz with an rms value of 10 V. Under ideal conditions, the current Is from the source is



- 10π mA lagging by 90%
- 20π mA leading by 90%
- 10π mA leading by 90%
- 20π mA lagging by 90%

Question No.39 4.00

Bookmark ☐

For designing a multirate LPF with passband 0 to 50 Hz, stopband 60 to 280 Hz, stopband deviation 0.001, passband deviation 0.01 and sampling frequency (f_S) = 400 Hz, what would be the value of normalized transition width?

- 1.50 Hz
- 0.025 Hz
- 1.25 Hz
- 2.6 Hz

Question No.40 4.00

Bookmark ☐

The maximum symmetrical output voltage swing from a common emitter circuit depends upon

- Input capacitor
- The Q point portion on dc load line
- The characteristics of CE
- Input signal

Question No.41 4.00

Bookmark

The value of the integral of the function $g(x,y) = 4x^3 + 10\ y^4$ along the straight line segment from the point (0,0) to the point (1,2) in the x-y plane is

- 40
- 33
- 35
- 56

Question No.42 4.00

Bookmark

The computational procedure for Decimation in frequency algorithm takes

- $Log_2 N^2$ stages
- $Log_2 N$ Stages
- $Log_2 N/2$ stages
- $2Log_2 N$ stages

Question No.43 4.00

Bookmark

A video transmission system transmits 625 picture frames per second. Each frame consists of a 400x400 pixel grid with 64 intensity levels per pixel. The data rate of the system is (in Mbps)

- 600
- 16
- 100
- 6400

Question No.44 4.00

Bookmark

The gain of a MOSFET amplifier reduces at high frequency due to

- Parasitic capacitor
- Oxide capacitor
- Bypass capacitor
- Coupling capacitor

Question No.45 4.00

Bookmark

If Road is coded as WTFI, what is the code for BEAT

- HIGZ
- DEFG
- GJFY
- ABCD

Question No.46 4.00

Bookmark

The period of the function $\cos \frac{\pi}{4}(t-1)$ is

- 8
- 1/4
- 4
- 1/8

Question No.47 4.00

Bookmark ☐

$\overline{A}\overline{B}\overline{C}\overline{D} + B\overline{C}D + \overline{A}\overline{C} + A$ is equivalent to

- $A + \overline{C}$
- $\overline{A} + C$
- $\overline{C}$
- 1

Question No.48 4.00

Bookmark ☐

MOV A, @ R1 will:

- copy the accumulator to R1
- copy the accumulator to the contents of memory whose address is in R1
- copy the contents of memory whose address is in R1 to the accumulator
- copy R1 to the accumulator

Question No.49 4.00

Bookmark ☐

A 10MHz clock frequency is applied to a cascaded counter consisting of a MOD-5 Counter, a MOD-8 Counter and two MOD-10 counters. The lowest output frequency possible is

- 2.5 kHz
- 25 kHz
- 10 kHz
- 5 kHz

Question No.50 4.00

Bookmark ☐

The order of error is the Simpson's rule for numerical integration with a step size, h is

- h^3
- h^2
- h
- h^4

Question No.51 4.00

Bookmark ☐

Evaluate

$\lim_{x\to\infty}\left[\frac{x-1}{x-2}\right]^x$

- 1/4
- 1/2
- 1
- 1/3

Question No.52 4.00

Bookmark ☐

Why is the speed accessibility of external data memory slower than internal on-chip RAM?

- Due to multiplexing of lower order byte of address-data bus
- Due to multiplexing of higher order byte of address-data bus
- Due to demultiplexing of higher order byte of address-data bus
- Due to demultiplexing of lower order byte of address-data bus

Question No.53 4.00

Bookmark

Given the z-transforms

$X(z)=\frac{z(8z-7)}{4z^2-7z+3}$, Then its final value is

- 7/3
- 0
- Unbounded
- 1

Question No.54 4.00

Bookmark

Residue of the function $\frac{1-e^{2z}}{z^4}$ at its poles is

- $-2/3$
- $4/3$
- $-4/3$
- $2/3$

Question No.55 4.00

Bookmark

What will be the output of the program?

```
# include int main() {int a[5]={5,1,15,20,25}; int i, j, m; i=++a[1]; j=a[1]++;
m=a[i++]; printf("%d, %d, %d", i,j,m); return0;}
```

- 3, 2, 15
- 1, 2, 5
- 2, 1, 15
- 2, 3, 20

Question No.56 4.00

Bookmark

The input to a matched filter is given by

$S(t)=\begin{cases}10sin(2\pi*10^6t & 0<1<10^{-4} \\ 0 & otherwise\end{cases}$

The peak amplitude of the filter output is

- 10mV
- 10V

- 10V
- 5V
- 5mV

Question No.57 4.00

Bookmark

We must always try to adapt ourselves _____ our circumstances.

- with
- by
- to
- in

Question No.58 4.00

Bookmark

The internal RAM memory of the 8051 is:

- 256 bytes
- 128 bytes
- 64 bytes
- 32 bytes

Question No.59 4.00

Bookmark

A multipath fading channel has a multipath spread of 1 msec and the signal bandwidth is 10 kHz. Compute the number of taps that can be used in the RAKE receiver

- 10
- 11
- 110
- 111

Question No.60 4.00

Bookmark

Vector potential is a vector

- whose curl is equal to the electric field intensity
- which is equal to the vector product E x H
- whose curl is equal to the magnetic flux density
- whose divergence is equal to the electric potential

Question No.61 4.00

Bookmark

For a fast communication, which of the following requirements have to be met

- Large bandwidth
- High SNR
- High channel capacity
- None of these

Question No.62 4.00

Bookmark

Choose the best antonym of the italicized word.
There has always been a feeling of *rancour* between the two families.

- rivalry
- suspicion
- competition
- friendliness

Question No.63 4.00

Bookmark

An energy meter connected to an immersion heater (resistive) operating on an AC 230 V,50Hz, AC single phase source reads 2.3 units(kWh) in 1 hour. The heater is removed from the supply and now connected to a 400V peak to peak square wave source of 150Hz. The power in KW dissipated by the heater will be

- 1.739
- 0.87
- 1.54
- 3.478

Question No.64 4.00

Bookmark

IC (instruction cycle), FC (fetch cycle) and EC (execution cycle) are related as

- IC = FC - EC
- EC = IC + EC
- IC = FC + 2EC
- IC = FC + EC

Question No.65 4.00

Bookmark

In the following question, the first two words (given in italics) have a definite relationship. Choose one word out of the given four alternatives which will fill the blank space and showthe same relationship with the third word as between the first two.

Hear is to *Deafas* as *Speak* is to ……?…….

- Talkative
- Dumb
- Silent
- Listen

Question No.66 4.00

Bookmark

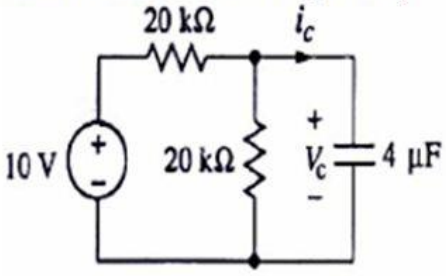
Correct the error in the italicized part of the sentence by choosing the most appropriate option.
Leaving aside little room for misinterpretation, the senior politician offered clarifications about his role in the party elections.

- Leaving less room for
- Having left less room for
- Leaving for little room to
- Leaving little room for

Question No.67 4.00

Bookmark

In the circuit shown, Vc is 0 volts at t = 0 sec. For t > 0, the capacitor current $i_c(t)$ where t is in seconds, is given by



- 0.50 exp (–12.5 t) mA
- 0.25 exp (–25 t) mA
- 0.25 exp (–6.25 t) mA
- 0.50 exp (–25 t) mA

Question No.68 4.00

Bookmark

People in the age group of 40 to 50 years are more likely to purchase ice cream and are more likely to purchase it in large amounts than are members of any other age group. The general perception that teenagers eat more ice cream than adults must, therefore, be incorrect.

The argument is flawed primarily because the author

The argument is flawed primarily because the author

- depends on popular belief rather than on documented research findings
- does not specify the precise amount of ice cream purchased by any demographic group
- discusses ice cream rather than more nutritious and healthful foods
- fails to distinguish between purchasing and consuming

Question No.69 4.00

Bookmark

Which register usually store the output generated by ALU in several arithmetic and logical operations?

- Stack Pointer
- Special Function Register
- Accumulator
- Timer Register

Question No.70 4.00

Bookmark

The cascade amplifier is a multistage configuration of

- CC-CB
- CE-CC
- CB-CC
- CE-CB

Question No.71 4.00

Bookmark

Choose the synonym of the italicized word. Many cities were *incinerated* during the war.

- bombed
- burnt
- destroyed
- attacked

Question No.72 4.00

Bookmark

A 20 m antenna gives a certain uplink gain at frequencies of 4/6 GHz. For getting same gain in the 20/30 GHz band, antenna size required is metre.

- 10
- 100
- 1
- 4

Question No.73 4.00

Bookmark

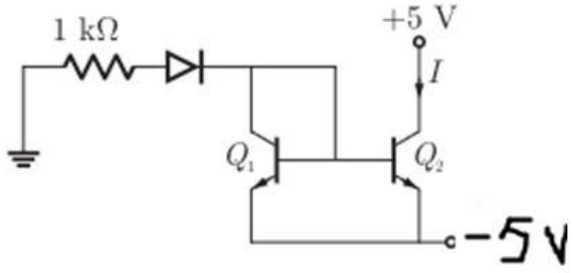
In a half adder having two inputs (A and B) and two outputs (Sum (S) and carry (C), the Boolean expression for S and C in terms of A and B are

- $S = \overline{A}\,\overline{B} + AB,$ $C = A + \overline{B}$
- $S = AB + \overline{A}B,$ $C = A + B$
- $S = \overline{A}B + A\overline{B},$ $C = AB$
- $S = \overline{A}B + A\overline{B},$ $C = \overline{A} + B$

Question No.74 4.00

Bookmark ☐

Two perfectly matched silicon transistor are connected as shown in the figure assuming the β of the transistors to be very high and the forward voltage drop in diodes to be 0.7 V, the value of current I is



- 3.6 mA
- 4.3 mA
- 5.7 mA
- 0 mA

Question No.75 4.00

Bookmark ☐

We're late again for the test, _____?

- are we?
- is it?
- aren't we?
- isn't it?

Question No.76 4.00

Bookmark ☐

A 3V DC supply with an internal resistance of 2 Ω supplies a passive non linear resistance characterized by the relation $V_{NL} = I_{NL}^{2}$ The power dissipated in the non linear resistance is

- 3.0W
- 1.0W
- 1.5W
- 2.5W

Question No.77 4.00

Bookmark ☐

Two small diameter 5g dielectric balls can slide freely on a vertical non conducting thread. Each ball carries a negative charge of $2\mu C$. If the lower ball is restrained from moving, then separation between the two balls will be

- 8.57mm
- 85.7mm
- 857mm
- 8570mm

Question No.78 4.00

Bookmark ☐

Statement: Warning: Cigarette smoking is injurious to Health
Assumptions:
I. Non-Smoking Promotes Health
II. This warning is not necessary

- If only assumption I is implicit
- If only assumption II is implicit
- If both I and II are implicit
- If neither I nor II is implicit

Question No.79 4.00

Bookmark ☐

The bit rate of a digital communication system is 34Mbps. The modulation scheme is QPSK. The baud rate is (in Mbps)

- 17
- 8.5
- 68
- 34

Question No.80 4.00

Bookmark ☐

In a broadcast superheterodyne receiver

- the local oscillator operates above the signal frequency
- local oscillator frequency is normally double the IF
- the local oscillator operates below the signal frequency
- RF amplifier normally works at kHz above the carrier frequency

Question No.81 4.00

Bookmark ☐

The Laplace transform of the square wave $x(t) = \begin{cases} 1 & for\ 0 < t < T \\ -1 & for\ T < t < 2T \end{cases}$ Is

- $\frac{1}{S}(1 - e^{-sT})^2$
- $\frac{1}{S}(1 + e^{-sT})^2$
- $\frac{1}{S^2}(1 - e^{-sT})^2$
- $(1 - e^{-sT})^2$

Question No.82 4.00

Bookmark ☐

The average DC power of Manchester coding is given by

- $A^2T/2$

- $A^2T/2$
- A^2T
- $A^2T/4$
- $2A^2T$

Question No.83 4.00

Bookmark

The number of bits in a binary PCM system is increased from n to n+1. As a result, the signal to quantization noise ratio will improve by a factor

- $2^{2(n+1)/n}$
- $(n+1)/n$
- Independent of n
- $2^{(n+1)/n}$

Question No.84 4.00

Bookmark

The electric field on the surface of a perfect conductor is 2 V/m. The conductor is immersed in water $\varepsilon = 80\ \varepsilon_0$. The surface charge density on the conductor is (in C/m^2)

- 1.8×10^{-11}
- 1.41×10^{-9}
- 2
- 0

Question No.85 4.00

Bookmark

Total number of words formed by 2 vowels and 3 consonants taken from 4 vowels and 5 consonants is equal to

- 60
- 1400
- 120
- 7200

Question No.86 4.00

Bookmark

Find the odd one out?

- Flourish
- Thrive
- Blossom
- Renovate

Question No.87 4.00

Bookmark

I don't care if she comes to my house or not.
The underlined word is a

- pronoun
- conjunction
- gerund
- verb

Question No.88 4.00

Bookmark

What will be the output of the following program?

```
main( ) { int i=5; printf("%d", i=++i==6); }
```

- 7
- 1
- 0
- 6

Question No.89 4.00

Bookmark

The Z-transform of the signal $x(n) = na^n u(n)$ is

- $\frac{az^{-1}}{(1-az^{-1})}$
- $\frac{z^{-1}}{(1-az^{-1})^2}$
- $\frac{az^{-1}}{(1-az^{-})^3}$
- $\frac{az^{-1}}{(1-az^{-1})^2}$

Question No.90 4.00

Bookmark

Select the Pair that best respresents the relationship that is given in the question:
Slapstick:Laughter

- Satire: Sarcasm
- Horror:Fear
- Mimicry:Laughter
- Clown: Comical

Question No.91 4.00

Bookmark

Let $x(t) = sin^3(27\ \pi t)$, the fundamental period of $x(t)$ is

- $1/27$
- $2/81$
- $2/27$
- $1/54$

Question No.92 4.00

Bookmark

A Series RLC circuit has a resonance frequency of 1kHz and a quality factor Q=100. If each of R,L and C is doubled from its original value, the new Q of the circuit is

- 25
- 100
- 200

○ 50

Question No.93 4.00

Bookmark ☐

Determine the order of a type I Low pass Chebyshev filter that has a 1 dB ripple in the passband, a cutoff frequency $\Omega_p = 1000\pi$, a stopband frequency of 2000π, and an attenuation of 40 dB.

○ 2
○ 5
○ 3
○ 4

Question No.94 4.00

Bookmark ☐

Study the following information carefully and answer the question below it

The Director of an MBA college has decided that six guest lectures on the topics of Motivation, Decision Making, Quality Circle, Assessment Centre, Leadership and Group Discussion are to be organised on each day from Monday to Sunday.
(i) One day there will be no lecture (Saturday is not that day), just before that day Group Discussion will be organised.
(ii) Motivation should be organised immediately after Assessment Centre.
(iii) Quality Circle should be organised on Wednesday and should not be followed by Group Discussion
(iv) Decision Making should be organised on Friday and there should be a gap of two days between Leadership and Group Discussion

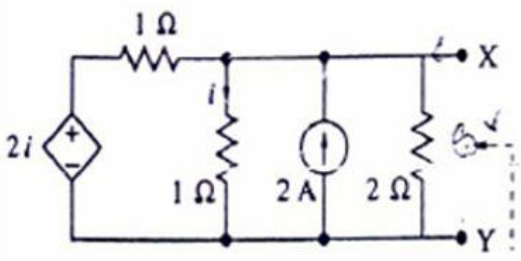
On which day the lecture on Leadership will be organised?

○ Saturday
○ Thursday
○ Tuesday
○ Monday

Question No.95 4.00

Bookmark ☐

For the circuit shown in the figure, the Thevenin voltage and resistance looking into X – Y are



- 4V, 2/3Ω
- 4/3 V, 2/3Ω
- 4/3 V, 2Ω
- 4 V, 2Ω

Question No.96 4.00

Bookmark

In Barlett window, the triangular function resembles the tapering of rectangular window sequence _____ from the middle to the ends.

- elliptically
- hyperbolically
- linearly
- parabolically

Question No.97 4.00

Bookmark

Determine the final value of x(t), if its Laplace transform is given by

$X(s)=\frac{2s^2+3}{s^2+5s+1}$

- 1/5
- 3
- 2
- 0

Question No.98 4.00

Bookmark

The Nyquist sampling frequency (in Hz) of a signal given by $6 \times 10^4 \, \mathrm{sinc}^2(400t) * 10^6 \, \mathrm{sinc}^3(100t)$ is

- 1000
- 200
- 1500
- 300

Question No.99 4.00

Bookmark

The system of linear equations

$(4d - 1)x + y + z = 0$

$-y + z = 0$

$(4d - 1)z = 0$

has a non-trivial solution, if d equals

- 1
- 2
- 0
- 3

Question No.100 4.00

Bookmark

An electrostatic is said to be conservative when

- The curl of the field is equal to zero
- The curl of the field is equal to $-\partial B/\partial t$
- The Laplacian of the field is equal to $\mu\varepsilon \, \partial^2 E/\partial t^2$
- The divergence of the field is equal to zero