परीक्षेचे नांव : सहायक प्राध्यापक, अणुविद्युत व दुरसंदेशवहन अभियांत्रिकी,   **परीक्षेचा दिनांक :** 27 जुलै, 2014

अस्वायत्त शासकीय अभियांत्रिकी महाविद्यालय, महाराष्ट्र अभियांत्रिकी महाविद्यालयीन शिक्षक सेवा, गट -अ,

चाळणी परीक्षा-2014

विषय : अणुविद्युत व दुरसंदेशवहन अभियांत्रिकी

महाराष्ट्र लोकसेवा आयोगामार्फत सहायक प्राध्यापक, अणुविद्युत व दुरसंदेशवहन अभियांत्रिकी, अस्वायत्त शासकीय अभियांत्रिकी महाविद्यालय, महाराष्ट्र अभियांत्रिकी महाविद्यालयीन शिक्षक सेवा, गट -अ, चाळणी परीक्षा-२०१४ या परीक्षेच्या प्रश्नपत्रिकेची उत्तरतालिका उमेदवारांच्या माहितीसाठी संकेतस्थळावर प्रसिद्ध करण्यात आली आहे. सदर उत्तरतालिकेतील प्रश्न-उत्तरांसंबंधी उमेदवारांना निवेदन करावयाचे असल्यास त्यांनी अधिप्रमाणीत स्पष्टीकरण / संदर्भ देऊन तसेच विषय, परीक्षेचे नाव, प्रश्नसंच, प्रश्नक्रमांक यांच्या उल्लेखासह आपले लेखी निवेदन उपसचिव (गोपनीय), महाराष्ट्र लोकसेवा आयोग, बँक ऑफ इंडिया बिल्डिंग, ३ रा मजला, हुतात्मा चौक, मुंबई ४०० ००१ या पत्त्यावर टपालाने पाठवावे. यासंदर्भात दि. ०८ ऑगस्ट, २०१४ पर्यंत आयोगाकडे प्राप्त झालेल्या निवेदनांचीच दखल घेतली जाईल. तद्नंतर आलेली निवेदने विचारात घेतली जाणार नाहीत, याची कृपया नोंद घ्यावी

उत्तरतालिका - **KEY**

MPSC 27th July 2014 Shift 1

Notations :

1. Options shown in green color and with ✔ icon are correct.

2. Options shown in red color and with ✖ icon are incorrect.

Question Paper Name:	Assistant Professor Electronics and Telecommunication Engineering ACTUAL
Subject Name:	Assistant Professor Electronics and Telecommunication Engineering
Duration:	60

Group 1	
Group Maximum Duration :	0
Group Minimum Duration :	60
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Revisit allowed for edit? :	No

Assistant Professor Electronics and Telecommunication Engineering	
Mandatory or Optional:	Mandatory

Question Number : 1 Question Type : MCQ
Correct : 2 Wrong : 0

Inverse Laplace transform of the function $\dfrac{2s+5}{s^2+5s+6}$ is

Options :

1. ✖ exp(-2t) – exp(-3t)

2. ✔ 2 exp(-2.5t) cosh 0.5t

3. ✖ 2 exp(-2.5t) cos 0.5t

4. ✖ 2 exp(-2.5t) sinh 0.5t

Question Number : 2 Question Type : MCQ
Correct : 2 Wrong : 0

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

Options :

1. ✔ 16 Kbytes

2. ✗ 32 Kbytes

3. ✗ 64 Kbytes

4. ✗ 48 Kbytes

Question Number : 3 Question Type : MCQ
Correct : 2 Wrong : 0

PAL consists of

Options :

1. ✗ Fixed AND, programmable OR array

2. ✗ Programmable AND, programmable OR array

3. ✔ Programmable AND, fixed OR array

4. ✗ Fixed AND, fixed OR array

Question Number : 4 Question Type : MCQ
Correct : 2 Wrong : 0

A bit stored in a FAMOS device can be erased by

Options :

1. ✗ Gamma Light

2. ✗ X-ray Light

3. ✗ Infra-red

4. ✔ U-V light

Question Number : 5 Question Type : MCQ
Correct : 2 Wrong : 0

Without any additional circuit, an 8×1 multiplexer can be used to obtain

Options :

1. ✗ Some function of 3 variables

2. ✔ All functions of 3 variables but some function of 4 variables

3. ✘ All functions of 3 variables but none of 4 variables

4. ✘ All function of 4 variables

Question Number : 6 Question Type : MCQ

Correct : 2 Wrong : 0

In a function of n variable consider a possible sub-cube of 2^m cells, is represented with how many number of literals

Options :

1. ✘ n

2. ✘ m

3. ✘ $n + m$

4. ✔ $n - m$

Question Number : 7 Question Type : MCQ

Correct : 2 Wrong : 0

The characteristic equation of 'T' flip flop is

Options :

1. ✘ $Q_{n+1} = T \text{ XOR } Q_n$

2. ✘ $Q_{n+1} = \overline{T} \, \overline{Q_n} + TQ_n$

3. ✘ $Q_{n \times 1} = \overline{T}Q_n + T\overline{Q_n}$

4. ✔ Both (1) and (3)

Question Number : 8 Question Type : MCQ

Correct : 2 Wrong : 0

Consider the two statements

S1: If essential prime implicants covering all the minterms, then the function will be having unique minimal form.

S2 : If the function is having unique minimal form then the prime implicants which are present in the minimal expression must be essential prime implicant

Options :

1. ✔ S_1 is true, S_2 is false

2. ✘ S_1 and S_2 both are true

3. ✘ S_1 and S_2 both are false

4. ✘ S_1 is false, S_2 is true

Question Number : 9 Question Type : MCQ

Correct : 2 Wrong : 0

Which of the following Gate is also known as coincidence logic gate

Options :

1. ✘ EX-OR gate

2. ✔ EX-NOR gate

3. ✘ NOR gate

4. ✘ OR gate

Question Number : 10 Question Type : MCQ

Correct : 2 Wrong : 0

The MOD value of 6 bit Moebious counter is

Options :

1. ✘ 4

2. ✘ 3

3. ✘ 6

4. ✔ 12

Question Number : 11 Question Type : MCQ

Correct : 2 Wrong : 0

Resistance offered by a human body is

Options :

1. ✘ $10 \, \Omega$

2. ✘ $100 \, \Omega$

3. ✔ $1 \, K \, \Omega$

4. ✗ $1\ \Omega$

Question Number : 12 Question Type : MCQ
Correct : 2 Wrong : 0

Four terminal resistor is used to measure

Options :

1. ✗ High value of resistor

2. ✗ Medium value of resistor

3. ✗ Very high value of resistor

4. ✓ Low value of resistor

Question Number : 13 Question Type : MCQ
Correct : 2 Wrong : 0

Which of the following technique is used for multiple voltage source with multiple frequency

Options :

1. ✓ Superposition theorem

2. ✗ Compensation theorem

3. ✗ Reciprocity theorem

4. ✗ Substitution theorem

Question Number : 14 Question Type : MCQ
Correct : 2 Wrong : 0

For a given signal $x[n] - 3^n\ u[n]$, compute the DTFT $X(\Omega)$ of the given signal

Options :

1. ✗ $X(\Omega) = \dfrac{1}{1-3e^{-j\Omega}}$

2. ✗ $X(\Omega) = 1 + 3e^{-j\Omega} + (3e^{-j\Omega})^2 + \ldots\ldots$

3. ✗ $X(\Omega) = 1 + 3e^{-j\Omega} - 3e^{-j\Omega}$

4. ✓ DTFT of the given signal is not possible.

Question Number : 15 Question Type : MCQ

Correct : 2 Wrong : 0

The rank of a tie set matrix is

(Where N = no. of nodes, b = no. of branches)

Options :

1. ✖ N-1

2. ✔ b-N+1

3. ✖ b+N-1

4. ✖ N-b+1

Question Number : 16 Question Type : MCQ
Correct : 2 Wrong : 0

Time constant of a capacitance circuit may be defined as the time during which voltage

Options :

1. ✔ Rises to 63.2% of its final steady value

2. ✖ Falls to 38.6% of its final steady value

3. ✖ Rises to 38.6% of its final steady value

4. ✖ Both (2) and (3)

Question Number : 17 Question Type : MCQ
Correct : 2 Wrong : 0

The V-I characteristics of an element is shown in the figure given below. The element is
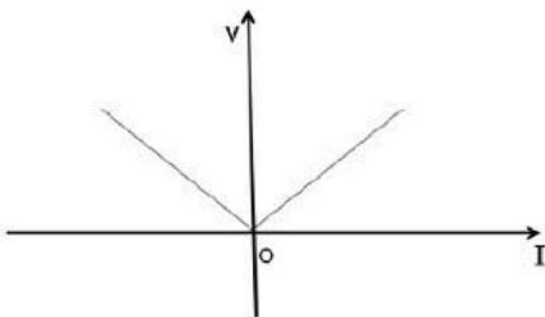
Options :

1. ✖ Non linear, active, bilateral

2. ✖ Linear, active, bilateral

3. ✔ Non linear, active, unilateral

4. ✖ Non Linear, passive, unilateral

Question Number : 18 Question Type : MCQ

Correct : 2 Wrong : 0

The dual of parallel R-C circuit is a

Options :

1. ✖ Series R-C circuit

2. ✔ Series R-L circuit

3. ✖ Parallel R-C circuit

4. ✖ Parallel R-L circuit

Question Number : 19 Question Type : MCQ

Correct : 2 Wrong : 0

With respect to transmission parameters, which one of the following is correct?

Options :

1. ✔ A and D are dimensionless

2. ✖ B and D are dimensionless

3. ✖ A and B are dimensionless

4. ✖ B and C are dimensionless

Question Number : 20 Question Type : MCQ

Correct : 2 Wrong : 0

Consider

$$\dot{X}(t) = \begin{bmatrix} 0 & 2 \\ -2 & 0 \end{bmatrix} X(t)$$

find e^{At}

Options :

1. ✖ $\begin{bmatrix} 0 & e^{2t} \\ e^{-2t} & 0 \end{bmatrix}$

2. ✖ $\begin{bmatrix} e^{2t} & 0 \\ 0 & e^{-2t} \end{bmatrix}$

3. ✔ $\begin{bmatrix} cos2t & sin2t \\ -sin2t & cos2t \end{bmatrix}$

4. ✖ $\begin{bmatrix} sin2t & cos2t \\ -cos2t & sin2t \end{bmatrix}$

Question Number : 21 Question Type : MCQ

Correct : 2 Wrong : 0

Thermal runaway will take place if the quiescent point is such that

Options :

1. ✖ $V_{CE} < V_{CC}/2$

2. ✔ $V_{CE} > V_{CC}/2$

3. ✖ $V_{CE} < V_{CC}$

4. ✖ $V_{CE} < 2 V_{CC}$

Question Number : 22 Question Type : MCQ

Correct : 2 Wrong : 0

A 1ms pulse can be stretched to 1s pulse by using

Options :

1. ✖ Bistable multivibrator

2. ✖ An astable multivibrator

3. ✖ Schmitt trigger circuit

4. ✔ A monostable multivibrator

Question Number : 23 Question Type : MCQ

Correct : 2 Wrong : 0

The 3-dB cut-off frequency of a d.c. amplifier is 5MHz. Determine the rise time?

Options :

1. ✗ 35 nsec

2. ✗ 200nsec.

3. ✗ 350nsec.

4. ✓ 70nsec.

Question Number : 24 Question Type : MCQ

Correct : 2 Wrong : 0

The rectification efficiency of a half wave rectifier is

Options :

1. ✓ 40.6%

2. ✗ 20.3%

3. ✗ 45%

4. ✗ 81.2%

Question Number : 25 Question Type : MCQ

Correct : 2 Wrong : 0

Which of the following power amplifier is used to overcome cross-over distortion?

Options :

1. ✗ Class A

2. ✗ Class C

3. ✓ Class AB

4. ✗ Class B

Question Number : 26 Question Type : MCQ

Correct : 2 Wrong : 0

The cascode amplifier is a multistage configuration of

Options :

1. ✗ CC – CB
2. ✓ CE – CB
3. ✗ CB – CC
4. ✗ CE – CC

Question Number : 27 Question Type : MCQ
Correct : 2 Wrong : 0

An ideal op-amp is an ideal

Options :

1. ✗ Current controlled current source

2. ✗ Current controlled voltage source

3. ✓ Voltage controlled voltage source

4. ✗ Voltage controlled current source

Question Number : 28 Question Type : MCQ
Correct : 2 Wrong : 0

For a given op-amp, CMRR $= 10^5$ and differential gain $= 10^5$. What is common mode gain of the op-amp?

Options :

1. ✗ 10^{10}

2. ✗ 10^5

3. ✗ 2×10^5

4. ✓ 1

Question Number : 29 Question Type : MCQ
Correct : 2 Wrong : 0

The Ebers-Moll model is applicable to

Options :

1. ✗ NMOS transistors

2. ✗ Unipolar junction transistors

3. ✓ Bipolar junction transistor

4. ✗ Junction field effect transistor

Question Number : 30 Question Type : MCQ
Correct : 2 Wrong : 0
The essential blocks of a phase lock loop (PLL) are phase detector, amplifier
Options :
1. ✗ High pass filter and crystal controlled oscillator

2. ✗ Low pass filter and crystal controlled oscillator

3. ✗ High pass filter and voltage controlled oscillator

4. ✓ Low pass filter and voltage controlled oscillator

Question Number : 31 Question Type : MCQ
Correct : 2 Wrong : 0
Group of 4 bits is known as
Options :
1. ✗ Bytes

2. ✗ Word

3. ✓ Nibble

4. ✗ Bit

Question Number : 32 Question Type : MCQ
Correct : 2 Wrong : 0
Which of the following is not a linear data structure?
Options :
1. ✗ Linked list

2. ✓ Tree

3. ✗ Array

4. ✗ Stack

Question Number : 33 Question Type : MCQ

Correct : 2 Wrong : 0

The principle of locality of reference justifies the use of

Options :

1. ✔ Cache memory

2. ✘ DMA

3. ✘ Interrupts

4. ✘ Virtual memory

Question Number : 34 Question Type : MCQ

Correct : 2 Wrong : 0

The wrapping of data and functions into a single unit is called as

Options :

1. ✘ Polymorphism

2. ✘ Abstraction

3. ✘ Modularity

4. ✔ Encapsulation

Question Number : 35 Question Type : MCQ

Correct : 2 Wrong : 0

In 'C' language, f = -9 is equivalent to

Options :

1. ✘ $f = -9$

2. ✔ $f = f - 9$

3. ✘ $-f = 9$

4. ✘ $f = 9 - 1$

Question Number : 36 Question Type : MCQ

Correct : 2 Wrong : 0

Which of the following interrupts has the lowest priority?

Options :

1. ✘ RST 7.5

2. ✖ RST 5.5

3. ✖ TRAP

4. ✔ INTR

Question Number : 37 Question Type : MCQ

Correct : 2 Wrong : 0

What is the direction of data bus?

Options :

1. ✖ unidirectional into microprocessor

2. ✖ unidirectional out of microprocessor

3. ✔ bidirectional

4. ✖ both (1) and (3)

Question Number : 38 Question Type : MCQ

Correct : 2 Wrong : 0

In microprocessor, the register which holds the address of the next instruction to be fetched is

Options :

1. ✔ Program counter

2. ✖ Instruction register

3. ✖ Stack pointer

4. ✖ Accumulator

Question Number : 39 Question Type : MCQ

Correct : 2 Wrong : 0

The number of output pins of a 8085 microprocessor are

Options :

1. ✖ 21

2. ✖ 40

3. ✖ 19

4. ✔ 27

Question Number : 40 Question Type : MCQ

Correct : 2 Wrong : 0

A typical cell, for a dynamic RAM can be implemented by using how many MOS transistors?

Options :

1. ✖ Six

2. ✔ One

3. ✖ Two

4. ✖ Five

Question Number : 41 Question Type : MCQ

Correct : 2 Wrong : 0

In NMOS if drain current I_D = 1mA without channel length modulation effect. If due to channel length modulation, channel length is decreased by 25% . What is the new value of drain current?

Options :

1. ✖ 0.75mA

2. ✖ 0.25mA

3. ✔ 1.25mA

4. ✖ 25mA

Question Number : 42 Question Type : MCQ

Correct : 2 Wrong : 0

For an SCR dv/dt protection is achieved through the use of

Options :

1. ✖ RC in series with SCR

2. ✔ RC across SCR

3. ✖ RL in series with SCR

4. ✖ L in series with SCR

Question Number : 43 Question Type : MCQ

Correct : 2 Wrong : 0

The most suitable device for high frequency inversion in switch mode power supply is

Options :

1. ✔ MOSFET

2. ✘ BJT

3. ✘ GTO

4. ✘ Both (2) and (3)

Question Number : 44 Question Type : MCQ
Correct : 2 Wrong : 0

A DC line chopper as compared to AC link is

Options :

1. ✘ Efficient

2. ✘ Less costly

3. ✘ Bulky

4. ✔ Both (1) and (2)

Question Number : 45 Question Type : MCQ
Correct : 2 Wrong : 0

SCR turn-off from conducting state to blocking state on

Options :

1. ✘ Applying AC to gate

2. ✘ Reversing gate voltage

3. ✘ Reducing gate current

4. ✔ Reducing anode current below holding current value

Question Number : 46 Question Type : MCQ
Correct : 2 Wrong : 0

Microwave link repeaters are typically 50Km apart

Options :

1. ✘ because of atmospheric attenuation

2. ✘ because of output tube power limitations

3. ✔ because of the earth's curvature

4. ✘ to ensure that applied dc voltage is not excessive

Question Number : 47 Question Type : MCQ

Correct : 2 Wrong : 0

Responsivity of a photodiode is given by

(Where I_P = photocurrent generated, P_0 = incident optical power)

Options :

1. ✔ I_P/P_0

2. ✘ P_0/I_P

3. ✘ $I_P \times P_0$

4. ✘ $1/I_P\,P_0$

Question Number : 48 Question Type : MCQ

Correct : 2 Wrong : 0

Refractive index of glass is 1.5. Find the wavelength of a beam of light with frequency of 10^{14} Hz in glass. Assume velocity of light is 3×10^8 m/sec in vacuum.

Options :

1. ✘ 3mm

2. ✘ 3um

3. ✘ 2mm

4. ✔ 2um

Question Number : 49 Question Type : MCQ

Correct : 2 Wrong : 0

For a photodiode with a rise time of 2ns and a capacitance of 4pF, the bandwidth is

Options :

1. ✔ 175 MHz

2. ✘ 350 MHz

3. ✘ 500 MHz

4. ✖ **250 MHz**

Question Number : 50   Question Type : MCQ
Correct : 2   Wrong : 0

Numerical aperture of the fiber is given by –

(n_1 = refractive index of core, n_2 = refractive index of cladding)

Options :

1. ✖ $\sqrt{(n_2^2 - n_1^2)}$

2. ✔ $\sqrt{(n_1^2 - n_2^2)}$

3. ✖ $1/\sqrt{(n_1^2 - n_2^2)}$

4. ✖ $1/\sqrt{(n_2^2 - n_1^2)}$

Question Number : 51   Question Type : MCQ
Correct : 2   Wrong : 0

A voltage of 1.70 volts is measured by an indicating instrument having a scale rang of 0 to 4V, if the instrument reads 1.65 volts then absolute error in the measurement is :-

Options :

1. ✖ $+ 2.0V$

2. ✔ $+ 0.05V$

3. ✖ $- 2.0\ V$

4. ✖ $- 0.05V$

Question Number : 52   Question Type : MCQ
Correct : 2   Wrong : 0

Pirani Gauge is used to measure

Options :

1. ✖ Very high pressure

2. ✖ Vibration

3. ✗ Flow

4. ✓ Low pressure

Question Number : 53 Question Type : MCQ

Correct : 2 Wrong : 0

Which one of the following method is used to measure very low resistance value

Options :

1. ✓ Kelvins double bridge

2. ✗ Wheatstone bridge

3. ✗ Ohm meter

4. ✗ Megger Method

Question Number : 54 Question Type : MCQ

Correct : 2 Wrong : 0

Which one of the following bridge is used to measure high Q coils

Options :

1. ✗ Wein bridge

2. ✓ Hay's bridge

3. ✗ Anderson's bridge

4. ✗ Maxwell inductance bridge

Question Number : 55 Question Type : MCQ

Correct : 2 Wrong : 0

Gauge factor of strain gauge is given by

(where L = longitudinal strain, D = latitudinal strain, R = resistance)

Options :

1. ✗ $(\Delta L/L)/ (\Delta R/R)$

2. ✓ $(\Delta R/R)/ (\Delta L/L)$

3. ✗ $(\Delta R/R)/ (\Delta D/D)$

4. ✗ $(\Delta D/D)/(\Delta L/L)$

Question Number : 56 Question Type : MCQ

Correct : 2 Wrong : 0

What is the range of $2\frac{1}{2}$ digital meter?

Options :

1. ✗ 0 to 1999

2. ✔ 0 to 199

3. ✗ 0 to 990

4. ✗ 0 to 500

Question Number : 57 Question Type : MCQ

Correct : 2 Wrong : 0

Loading effect is due to

Options :

1. ✔ Low resistance

2. ✗ High resistance

3. ✗ High sensitivity

4. ✗ High range

Question Number : 58 Question Type : MCQ

Correct : 2 Wrong : 0

Which parameter is measured by Schering bridge –

Options :

1. ✔ Capacitance

2. ✗ Inductance

3. ✗ 'Q' of a coil

4. ✗ Very small resistance

Question Number : 59 Question Type : MCQ
Correct : 2 Wrong : 0

Indicating instruments are always designed to be

Options :

1. ✗ Critically damped

2. ✗ Over damped

3. ✗ Undamped

4. ✔ Slightly under-damped

Question Number : 60 Question Type : MCQ
Correct : 2 Wrong : 0

Spring control mechanism has _____ scale

Options :

1. ✗ Non – uniform

2. ✔ Uniform

3. ✗ Cramped

4. ✗ **Non-Uniform and cramped**

Question Number : 61 Question Type : MCQ
Correct : 2 Wrong : 0

In case of over-modulation, the output of an envelope detector for sinusoid input is

(i). full wave rectified version of envelope

(ii). half wave rectified version of envelope

Options :

1. ✗ Both are correct

2. ✔ (i) is correct (ii) is incorrect

3. ✗ **(i) is incorrect (ii) is correct**

4. ✗ **Both are incorrect**

Question Number : 62 Question Type : MCQ

Correct : 2 Wrong : 0

When modulation index changes from 0 to 1 in case of tone modulation, then % increase in total power is

Options :

1. ✗ 25%

2. ✗ 33.3%

3. ✔ 50%

4. ✗ 66.6%

Question Number : 63 Question Type : MCQ

Correct : 2 Wrong : 0

Quadrature Null effect is associated with which modulation scheme?

Options :

1. ✗ SSBSC

2. ✔ DSBSC

3. ✗ VSB

4. ✗ FM

Question Number : 64 Question Type : MCQ

Correct : 2 Wrong : 0

Find the output of Hilbert transform if modulating signal $m(t) = 3\ \delta(t-3)$

Options :

1. ✔ $3/\pi(t-3)$

2. ✗ $(t-3)/3\pi$

3. ✗ $3/\pi\ \delta\ (t-3)$

4. ✗ $3/\pi t$

Question Number : 65 Question Type : MCQ
Correct : 2 Wrong : 0

An angle modulated signal is given as

$$S(t) = 2 \cos [w_c t + 10 \sin 1000\pi t + 20 \sin 2000\pi t]$$

Find maximum phase deviation (φ_{max}) –

Options :

1. ✗ 10

2. ✗ 20

3. ✗ 15

4. ✓ 30

Question Number : 66 Question Type : MCQ
Correct : 2 Wrong : 0

A superheterodyne receiver is tuned at signal frequency of 1MHz, calculate the image frequency, if intermediate frequency is 455KHz –

Options :

1. ✗ 90 KHz

2. ✗ 910 KHz

3. ✓ 1910 KHz

4. ✗ 545 KHz

Question Number : 67 Question Type : MCQ
Correct : 2 Wrong : 0

For any suppressed carrier modulation system figure of merit (F) and output of receiver contains

Options :

1. ✗ F = 0 and quadrature phase component of narrow band noise

2. ✓ F = 1 and in-phase component of narrow band noise

3. ✗ $F = 1$ and quadrature phase component of narrow band noise

4. ✗ $F = 0$ and in-phase component of narrow band noise

Question Number : 68 Question Type : MCQ

Correct : 2 Wrong : 0

For a stationary ergodic process x(t), if correlation is $R_x(\tau) = (4 + \tau)/(8 + 9\tau)$

Find mean (u_x) and variance (σ_x^2)

Options :

1. ✔ $u_x = 1/3, \sigma_x^2 = 7/18$

2. ✗ $u_x = 1/9, \sigma_x^2 = 1/6$

3. ✗ $u_x = 1/3, \sigma_x^2 = 1/6$

4. ✗ $u_x = 1/9, \sigma_x^2 = 7/18$

Question Number : 69 Question Type : MCQ

Correct : 2 Wrong : 0

The bandwidth of a PCM system is –

Where n = no. of bits to be encoded, f_s = sampling frequency

Options :

1. ✗ nf_s

2. ✔ $nf_s/2$

3. ✗ f_s/n

4. ✗ $f_s/2n$

Question Number : 70 Question Type : MCQ

Correct : 2 Wrong : 0

Consider a source 'X' that produces 4 samples with equal probability. What will be the information rate, if baud rate is 25 Ksamples/sec.

Options :

1. ✗ 100Kbps

2. ✗ 75Kbps

3. ✔ 50Kbps

4. ✘ 25Kbps

Question Number : 71 Question Type : MCQ

Correct : 2 Wrong : 0

The correct sequence of "Electron transport Mechanism" in forward bias condition is

Options :

1. ✘ Diffusion, Recombination, drift

2. ✘ Drift, Recombination, drift – diffusion

3. ✔ Drift, Drift-Diffusion, Recombination

4. ✘ Recombination, Drift diffusion, Drift

Question Number : 72 Question Type : MCQ

Correct : 2 Wrong : 0

Which of the following statement is correct–

Options :

1. ✔ Pure semiconductors have negative temperature coefficient of halls constant

2. ✘ Pure semiconductors have positive temperature coefficient of halls constant

3. ✘ Extrinsic semiconductors have negative temperature coefficient of halls constant

4. ✘ Impure semiconductors have negative temperature coefficient of halls constant

Question Number : 73 Question Type : MCQ

Correct : 2 Wrong : 0

Match List –I with List-II and select the correct answer using the code given below the lists :

List – I

A. Drift current
B. Einstein's equation
C. Diffusion current
D. Continuity equation

List – II

(i). law of conservation of charge
(ii) electric field
(iii) Thermal voltage
(iv) concentration gradient

Options :

1. ✗ A- (ii)   B-(i)   C- (iv)   D- (iii)

2. ✗ A- (iv)   B- (iii)   C- (ii)   D-(i)

3. ✗ A-(iv)   B- (i)   C- (ii)   D- (iii)

4. ✔ A- (ii)   B- (iii)   C- (iv)   D- (i)

Question Number : 74 Question Type : MCQ
Correct : 2 Wrong : 0

Gunn diode is a

Options :

1. ✗ Single junction device

2. ✔ Junction less device

3. ✗ Double junction device

4. ✗ Triple junction device

Question Number : 75 Question Type : MCQ
Correct : 2 Wrong : 0

The pinch off offered by V_{GS} causes the current

Options :

1. ✔ to become zero

2. ✗ to its maximum value

3. ✗ to saturate at constant value

4. ✗

Both (to its maximum value) and

(to saturate at constant value)

Question Number : 76 Question Type : MCQ
Correct : 2 Wrong : 0

MOSFET can be used as a

Options :

1. ✗ Current controlled capacitor

2. ✗ Voltage controlled inductor

3. ✔ Voltage controlled capacitor

4. ✗ Current controlled inductor

Question Number : 77 Question Type : MCQ
Correct : 2 Wrong : 0

In subthreshold region, the I_D - V_{DS} characteristics of a MOSFET are

Options :

1. ✗ Linear

2. ✗ Hyperbolic

3. ✗ Quadratic

4. ✔ Exponential

Question Number : 78 Question Type : MCQ
Correct : 2 Wrong : 0

Moor's law is applicable to

Options :

1. ✗ Power rating of device

Fan out of device

2. ✖

Speed of operation of MOS device

3. ✖

Level of integration of MOS device

4. ✔

Question Number : 79 Question Type : MCQ
Correct : 2 Wrong : 0

Which type of semiconductor is used in fabrication of light emitting diode?

Options :

Indirect band gap semiconductor

1. ✖

Direct band gap semiconductor

2. ✔

Individual type semiconductor

3. ✖

Elemental type semiconductor

4. ✖

Question Number : 80 Question Type : MCQ
Correct : 2 Wrong : 0

Which one of the following relationship is correct regarding emitter injection efficiency (γ), Base transport factor (B) and emitter current gain $(\propto)$

Options :

1. ✔ $\propto = B\gamma$

2. ✖ $B = \propto \gamma$

3. ✖ $\gamma = \propto B$

4. ✖ $\propto = B/\gamma$

Question Number : 81 Question Type : MCQ
Correct : 2 Wrong : 0

If vector field $\overline{B}$ is solenoidal, which one of these is correctType equation here.

Options :

1. ✖ $\nabla.\overline{B} \neq 0$

2. ✗ $\nabla \times \overline{B} = 0$

3. ✓ $\nabla \cdot \overline{B} = 0$

4. ✗ $\oint \overline{B} \cdot \overline{dl} = 0$

Question Number : 82 Question Type : MCQ
Correct : 2 Wrong : 0

Wave guide is analogous to

Options :

1. ✓ High pass filter

2. ✗ Low pass filter

3. ✗ All pass filter

4. ✗ Band pass filter

Question Number : 83 Question Type : MCQ
Correct : 2 Wrong : 0

Circuit representation of cavity resonator is similar to

Options :

1. ✗ RLC series circuit

2. ✓ LC circuit

3. ✗ RL circuit

4. ✗ RC circuit

Question Number : 84 Question Type : MCQ
Correct : 2 Wrong : 0
The dominant mode of rectangular waveguide where b > a

Options :

1. ✗ TE_{11}

$$TE_{10}$$
2. ✗

$$TE_{01}$$
3. ✓

$$TE_{00}$$
4. ✗

Question Number : 85 Question Type : MCQ

Correct : 2 Wrong : 0

Which one of the following antenna is frequency independent ?

Options :

Log periodic antenna
1. ✓

Helical antenna
2. ✗

Isotropic antenna
3. ✗

Omnidirectional antenna
4. ✗

Question Number : 86 Question Type : MCQ

Correct : 2 Wrong : 0

The microwave power is measured by using-

Options :

Circulator
1. ✗

Isolator
2. ✗

Bolometer
3. ✓

Attenuator
4. ✗

Question Number : 87 Question Type : MCQ

Correct : 2 Wrong : 0

The radiation resistance of a half wave dipole antenna is

Options :

1. ✗ $36.5 \, \Omega$

2. ✓ $73 \, \Omega$

3. ✳ 76 Ω

4. ✳ 100 Ω

Question Number : 88 Question Type : MCQ

Correct : 2 Wrong : 0

A rectangular waveguide has dimensions 1cm × 0.5cm. Its cut-off frequency is:

Options :

1. ✳ 5 GHz

2. ✳ 10 GHz

3. ✔ 15 GHz

4. ✳ 12 GHz

Question Number : 89 Question Type : MCQ

Correct : 2 Wrong : 0

A transmission line is said to be lossless when

Options :

1. ✔ wL >> R and wC >> G

2. ✳ LG = RC

3. ✳ C = 0 and R = 0

4. ✳ L = 0 and C = 0

Question Number : 90 Question Type : MCQ

Correct : 2 Wrong : 0

Which one of the following is an avalanche transit time device –

Options :

1. ✔ IMPATT

2. ✳ Gunn diode

3. ✳ Tunnel diode

4. ✗ Varactor diode

Question Number : 91 Question Type : MCQ

Correct : 2 Wrong : 0

The transfer function G(S) of a PID controller is

Options :

1. ✗ $K[1 + T_i s + T_d s]$

2. ✗ $K[1 + T_i S + 1/T_d s]$

3. ✗ $K[1 + 1/T_i s + 1/T_d s]$

4. ✓ $K[1 + 1/T_i s + T_d s]$

Question Number : 92 Question Type : MCQ

Correct : 2 Wrong : 0

The laplace transform of a transportation lag of 10 seconds is

Options :

1. ✓ 1/(s+10)

2. ✗ exp (-s/10)

3. ✗ exp (10s)

4. ✗ exp (-10s)

Question Number : 93 Question Type : MCQ

Correct : 2 Wrong : 0

What is the response of first order system when unit step input is applied –

Options :

1. ✗ $\frac{1}{\tau} e^{-t/\tau}$

2. ✓ $1 - e^{-t/\tau}$

3. ✗ $t - \tau e^{-t/\tau}$

4. $1 - \tau e^{-t/\tau}$

Question Number : 94 Question Type : MCQ

Correct : 2 Wrong : 0

The open loop transfer function of a unity feedback system is $G(S) = \frac{10(S+1)}{S^2(S+10)}$.

The steady state error for input $r(t) = 10 + 6t + 2t^2$

Options :

1. ✖ 0

2. ✔ 4

3. ✖ 8

4. ✖ ∞

Question Number : 95 Question Type : MCQ

Correct : 2 Wrong : 0

The root locus of the system $G(S) H(S) = \frac{K}{S(S+2)(S+3)}$ has the break-away point

located at

Options :

1. ✖ (-0.5, 0)

2. ✖ (-2.548, 0)

3. ✖ (-4, 0)

4. ✔ (-0.784, 0)

Question Number : 96 Question Type : MCQ

Correct : 2 Wrong : 0

The open loop transfer function of a unity feedback system is given by $\frac{K}{S(S+1)}$.

If the value of gain 'K' in such that the system is critically damped, the closed loop poles of the system will be at

Options :

1. ✖ $0.5 \pm j\, 0.5$

2. ✔ -0.5, -0.5

3. ✗ $\pm j\,0.5$

4. ✗ 0 and -1

Question Number : 97 Question Type : MCQ

Correct : 2 Wrong : 0

For standard 1st order system and 2nd order system the gain margin is

Options :

1. ✗ 1

2. ✔ ∞

3. ✗ 0

4. ✗ 0.5

Question Number : 98 Question Type : MCQ

Correct : 2 Wrong : 0

The open loop transfer function $G(S) = \frac{K(S-1)}{S^2}$ of a unity negative feedback system is given. Determine the number of encirclement in Nyquis plot for gain $K = 2$

Options :

1. ✗ 0

2. ✗ 1

3. ✔ -1

4. ✗ ∞

Question Number : 99 Question Type : MCQ

Correct : 2 Wrong : 0

The lead compensator transfer function $G_c(S) = \frac{S+1}{S+2}$ is given. Find the frequency (ω_m) at which this provides maximum phase shift

Options :

1. ✗ $1/\sqrt{2}$

2. ✗ 2

3. ✗ $1/2$

4. ✓ $\sqrt{2}$

Question Number : 100 Question Type : MCQ
Correct : 2 Wrong : 0

The unit step response of a 2nd order system is given by

$$C(t) = 1 - \frac{e^{-6t}\sin}{\sqrt{1-\varepsilon^2}}(8t + \theta),$$

damping ratio (ε) and undamped natural frequency (w_n) respectively are-

Options :

1. ✗ $0.1 \qquad 60$

2. ✓ $0.6 \qquad 10$

3. ✗ $0.6 \qquad 5$

4. ✗ $0.8 \qquad 10$