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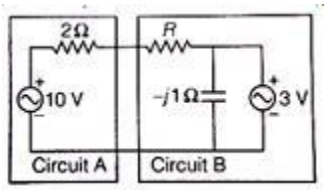
TS Southern Junior Lineman Exam 1

Electrical Engineering

Question: Assuming both the voltage sources are in phase, the value of R for which maximum power is transferred from circuit A to circuit B is



0.8 Ω

1.4 Ω

2 Ω

2.8 Ω

Solution: 1

Question: For the intrinsic gallium-arsenide, the conductivity at room temperature 25°C is 10^{-6} (ohm-m)$^{-1}$, the electron and hole nobilities are 0.85 m^2/V-s and 0.04 m^2/V-s respectively. What is the intrinsic carrier concentration at the room temperature?

1. 7.0×10^{12} m^{-3}
2. 7.0×10^{-12} m^{-3}
3. 7.0×10^{-12} m^{3}
4. 7.0×10^{12} m^{3}

Solution: 1

Question: The resistivity of intrinsic germanium at 30°C is 0.46 –m. What is the intrinsic carrier density at 30°C if the electron mobility is 0.38 m^2/V-s and the hole mobility is 0.18 m^2/V-s?

1. 9.2×10^{5}/m^3
2. 2.77×10^{3}/m^3
3. 2.43×10^{19}/m^3
4. 8.9×10^{12}/m^3

Solution: 3

Question: Heat conduction in a semiconductor takes place

1. By the mobility of the carriers
2. Due to energy gap between conduction band and valency band
3. By the holes and thermal vibrations of atoms
4. By the electrons and thermal vibrations of atoms

Solution: 4

Question: Brewster angle is the angle when a wave is incident on the surface of a perfect dielectric at which there is no reflected wave and the incident wave is

1. Parallel polarized
2. Perpendicularly polarized
3. Normally polarized
4. None of the above

Solution: 1

Question: An electrical breakdown of a p-n junction occurs if

1. Forward voltage increases up to the rating
2. Reverse voltage increases beyond the rating
3. Forward voltage decreases below the rating
4. Reverse voltage decreases below the rating

Solution: 2

Question: Consider the following standard symbols for two-port parameters:
1.h_{12} and h_{21} are dimensionless.
2.h_{11} ohms and B have dimensions of ohms.
3.BC is dimensionless.
4.C is dimensionless.
Which of the above are correct?

1. 1, 2 and 3 only
2. 1, 2 and 4 only
3. 3 and 4 only
4. 1, 2, 3 and 4

Solution: 1

Question: An iron-cored choke coil has an equivalent resistance of 5Ω. It draws 10 A when the applied voltage is 240V, 50Hz. Its inductance and power factor respectively are

1. 7.5 mH and 0.1 (lag)
2. 74.7 mH and 0.1 (lag)
3. 74.7 mH and 0.208 (lag)
4. 7.5 mH and 0.208 (lag)

Solution: 3

Question:A voltage of 100 V is applied to an impedance of Z = (3 + j4) Ω. What are the values of active power, reactive power and volt-amperes respectively?

1. 1200 W, 1220 VAR and 2000 VA
2. 1600 W, 1600 VAR and 2200 VA
3. 1200 W, 1600 VAR and 2000 VA
4. 1600 W, 1200 VAR and 2200 VA

Solution: 3

Question: The voltage across an impedance Z is 100∠15° V and the current through Z is 20∠-45° A. The active and the reactive powers in Z respectively are

1. 1000 W and 1732 VAR
2. 500 W and 1732 VAR
3. 1000 W and 6000 VAR

4. 500 W and 6000 VAR

Solution: 1

Question: An a.c. source of 200 V r.m.s. supplies an active power of 1200 W and a reactive power of 1600 VAR to a load. The r.m.s. current and the power factor of the load respectively are

1. 10 A and 0.6
2. 8 A and 0.8
3. 10 A and 0.8
4. 8 A and 0.6

Solution: 1

Question:A shunt capacitor used for reactive power compensation is operated at 98% of its rated frequency and 95% of its rated voltage. The reactive power supplied by this capacitor (as compared to its rated capacity) is

1. 7.9% lowe
2. 11.5% lower
3. 11.5% higher
4. 7.9% higher

Solution: 2

Question: The reliability of an instrument refers to

1. The measurement of changes due to temperature variation
2. The degree to which repeatability continues to remain within specified limits
3. The life of an instrument
4. The extent to which the characteristics remain linear

Solution:2

Question: Phase lead compensation

1. Increases bandwidth and increases steady-state error
2. decreases bandwidth and decreases steady-state error
3. will not affect bandwidth decreases steady-state error
4. Increases bandwidth but will not affect steady-state error

Solution: 4

Question: Frequency counter can be used to measure
1.Fundamental frequency of input signal
2.Fundamental and harmonic frequencies of input signal
3.Time interval between two pulses
4.Pulse width
Which of the above statements are correct?

1. 1, 2, 3 and 4
2. 1, 2 and 3 only
3. 2, 3 and 4 only
4. 1, 3 and 4 only

Solution:4

Question:A 1mA galvanometer with internal resistance of 50 Ω is to be converted to measure 5 A (full-scale). What is the value of the shunt resistance required for this conversion?

1. 1 Ω
2. 0.01 Ω
3. 1 kΩ
4. 10 Ω

Solution:2

Question:A 50μA basic d'Arsonval movement with an internal resistance of 500 Ω is to be used as a voltmeter. The value of the multiplier resistance required to measure a full-scale voltage range of 0-5 volts is

1. 999.5 kΩ
2. 99.5 kΩ
3. 9.99 kΩ
4. 0.99 kΩ

Solution:2

Question: The maximum power demand of a consumer is 2 kW and the corresponding daily energy consumption is 30 units. What is the corresponding load factor?

1. 0.25
2. 0.5
3. 0.625
4. 0.75

Solution:3

Question: When a program is being executed in an 8085 microprocessor, its program counter contains

1. The memory address as the instruction that is to be executed next
2. The memory address of the instruction that is being currently matched
3. The total number of instructions in the program being executed
4. The number of instructions in the current program that have already been executed

Solution:1

Question:A 'DADH' instruction is the same as shifting each bit by one position to the

1. Left
2. Right
3. Left with a zero inserted in LSB position
4. Right with a zero inserted in LSB position

Solution:3

Question: Which one of the following statements is correct about 8086?

1. It is 46 PM IC and uses 5V dc supply
2. It uses 20 lines for data bus
3. It multiplexes status signals with address bus
4. It is manufactured using CMOS technology

Solution:3

Question: During which T-state, contents of OP code from memory are loaded into IR(Instruction Register)?

1. T_1 OP code Fetch
2. T_2 OP code Fetch
3. T_3 OP code Fetch
4. T_4 OP code Fetch

Solution:3

Question: In 8085 microproccessor, the address for 'TRAP' interrupt is

1. 0024H
2. 002CH
3. 0034H
4. 003CH

Solution:1

Question: Assuming LSB is at position 0 and MSB at position 7, which bit positions are not used (undefined) in Flag Register of an 8085 microprocessor?

1. 1, 3, 5
2. 2, 3, 5
3. 1, 2, 5
4. 1, 3, 4

Solution:1

Question: At temperature of 298 Kelvin, Silicon is not suitable for most-electronic applications, due to small amount of conductivity. This can be altered by

1. Gettering
2. Doping
3. Squeezing
4. Sintering

Solution:2

Question: By doping Germanium with Gallium, the types of semi-conductors formed are:
1.N type

2.P type
3.Intrinsic
4.Extrinsic
Which of the above are correct?

1. 1 and 4
2. 2 and 4
3. 1 and 3
4. 2 and 3

Solution:2

Question: An n-type of silicon can be formed by adding impurity of:
1.Phosphorous
2.Arsenic
3.Boron
4.Aluminum
Which of the above are correct?

1. 1 and 2
2. 2 and 3
3. 3 and 4
4. 1 and 4

Solution:1

Question: According to Einstein's relationship for a semiconductor, the ratio of diffusion constant to the mobility of the charge carriers is

1. Variable and is twice the volt equivalent of the temperature
2. Constant and is equal to the volt equivalent of the temperature
3. Equal to two and is twice the volt equivalent of the temperature
4. Equal to one and is equal to the volt equivalent of the temperature

Solution:2

Question: Swept-out voltage in PIN diode happens when PIN diode is

1. Forward biased and the thickness of the depletion layer decreases till I-region becomes free of mobile carriers
2. Reverse biased and the thickness of the depletion layer increases till I-region becomes free of mobile carriers
3. Forward biased and the thickness of the depletion layer increases till I-region becomes free of mobile carriers
4. Reverse biased and the thickness of the depletion layer decreases till I-region becomes free of mobile carriers

Solution:2

Question: The number of holes in an N-type silicon with intrinsic value $1.5 \times 10^{10}/cm^3$ and doping concentration of $10^{17}/cm^3$, by using mass-action law is

1. $6.67 \times 10^6/cc$
2. $4.44 \times 10^{-25}/cc$
3. $1.5\times 10^{-24}/cc$
4. $2.25 \times 10^3/cc$

Solution:4

Question: In an L-section filter, a bleeder resistance connected across the load

1. Provides good regulation for all values of load
2. Ensures lower PIV of the diodes
3. Ensures lower values of capacitance in the filter
4. Reduces ripple current

Solution:1

Question: In case of single line to ground fault

1. All sequence networks are connected in parallel
2. All sequence networks are connected in series
3. Positive and negative sequence networks are connected in parallel
4. Zero and negative sequence networks are connected in series

Solution:2

Question: Which of the following circuit breakers has the lowest voltage range?

1. SF^6 circuit breaker
2. Air-blast circuit-breaker
3. Tank type oil circuit breaker
4. Air-break circuit breaker

Solution:4

Question: In a *P-N* junction diode under reverse bias, the magnitude of electric field is maximum at

1. The edge of the depletion region on the P side
2. The edge of the depletion region on the N side
3. The center of the depletion region on the N side
4. The *P-N* junction

Solution:4

Question:A silicon diode is preferred to a germanium diode because of its

1. Higher reverse current
2. Lower reverse current and higher reverse breakdown voltage
3. higher reverse current and lower reverse breakdown voltage
4. none of the above

Solution:2

Question: Compared to an ordinary semiconductor diode, a Schottky diode has

1. Higher reverse saturation current and zero cut-in voltage
2. Higher reverse saturation current and higher cut-in voltage
3. Higher reverse saturation current and lower cut-in voltage
4. lower reverse saturation current and lower cut-in voltage

Solution:3

Question: The discrete LTI system is represented by impulse responseh(n) =$\left(\frac{1}{2}\right)^n u(n),$, then the system is

1. Causal and stable
2. Causal and unstable
3. Non causal and stable
4. Non causal and unstable

Solution:1

Question: Consider a complex exponential sequence $e^{j\omega_0 n}$ with frequency ω_0 . Suppose $\omega_0 = 1$, then

1. Such a sequence is periodic
2. Such a sequence is not periodic at all
3. Periodic for some value of period 'N'
4. Some definite range $N_0 < n < N$ exists for a periodic sequence

Solution:2

Question: Which of the following circuits is used for converting a sine wave into a square wave?

1. Monostable multivibrator
2. Bistable multivibrator
3. Schmitt trigger circuit
4. Darlington complementary pair

Solution:3

Question:1.For a random signal (continuous time) x(t) defined for $t \geq 0$, its probability density function (pdf) at $t = t_0$ is such that

1. It is non-negative and its integral equals 1
2. Need not be non-negative but integral equals 1
3. It is non-negative but integral is n 1
4. None of the above

Solution:1

Question: The response of a system to a complex input $x(t) = e^{j2t}$ is specified as $y(t) = t.e^{j2t} + e^{-j2t}$. The system

1. Is definitely LTI
2. Is definitely not LTI
3. May be LTI
4. Information is insufficient

Solution:2

Question: The rise time of the output response of low pass filter circuit when a step input is applied will be

1. Proportional to the band width
2. Inversely proportional to the band width
3. Half the value of the bandwidth
4. $\frac{1}{\sqrt{2}}$ of the bandwidth

Solution:2

Question: The function which has its Fourier transform, Laplace transform and Z- transform unity is

1. Gaussian
2. Impulse
3. Sinc
4. Pulse

Solution:2

Question: When the sending end voltage and current are numerically equal to the receiving end voltage and current respectively, then the line is called

1. A tuned line
2. A transposed line
3. A long line
4. A short line

Solution:1

Question: The derivative of a parabolic function becomes

1. A unit-impulse function
2. A ramp function
3. A gate function
4. A triangular function

Solution:2

The vector $\begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$ is an eigenvalue of

$A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$

Question: One of the eigenvalues of A is

1. 1
2. 2
3. 5
4. 7

Solution:3

Question: The open-loop transfer function of a feedback control system is given by

$$G(s)H(s) = \frac{K(s+8)}{s(s+4)(s^2+4s+8)}$$

In the root locus diagram of the system, the asymptotes of the root loci for large values of K meet at a point in the s-plane. Which one of the following is the set of coordinates of that point?

1. (-1, 0)
2. (-2, 0)
3. (1, 0)
4. (2, 0)

Solution:3

Question: A speed of a dc motor is

1. Directly proportional to back emf and inversely proportional to flux
2. Inversely proportional to back emf and directly proportional to flux
3. Directly proportional to back emf as well as to flux
4. Inversely proportional to back emf as well as to flux

Solution:1

Question:A 2000/200 V, 50 Hz single-phase transformer has an exciting current of 0.5A and a core-loss of 600 W. When H.V. side is energized by the rated voltage and frequency, the magnetizing current

1. 0.1 A
2. 0.2 A
3. 0.3 A
4. 0.4 A

Solution:2

Question: In a normal operation of 400V, 50 Hz transformer, the total iron loss is 2500 W. When the supply voltage and frequency are reduced to 200V and 25 Hz respectively, the corresponding loss is 850W. The eddy-current loss at normal voltage and frequency is

1. 400 W
2. 800 W
3. 1600 W
4. 200 W

Solution:3

Question:A magnetic circuit has 150 turns-coil, the cross-sectional area 5×10^{-4} m^2 and the length of the magnetic circuit 25×10^{-2} m. What are the values of magnetic field intensity and relative permeability when the current is 2 A and the total flux is 0.3×10^{-3} Wb?

1. 1200 AT/m and 397.9
2. 300 AT/m and 500×10^{-6}
3. 300 AT/m and 397.9
4. 1200 AT/m and 500×10^{-6}

Solution:4

Question:A 240V/120V, 12 kVA auto-transformer has 96.2% efficiency at full-load and unity power-factor. The full-load efficiency at 0.85 pf lagging when connected to a load across 360 V would be

1. 89.5%
2. 92.8%
3. 98.5%

4. 88.9%

Solution:3

Question: The percentage resistance and reactance of a transformer are 2% and 4$ respectively. The approximate regulation on full load at 0.8 pf lag is

1. 12%
2. 8%
3. 6%
4. 4%

Solution:4

Question:A 3-phase transformer has 420 and 36 turns on the primary and secondary windings respectively. The supply voltage is 3300 V. The secondary line voltage on no-load when the winding are connected in star-delta is nearly

1. 22260 V
2. 1908 V
3. 164 V
4. 490 V

Solution:3

Question: Compared to turbines in the conventional coal-fired thermal stations, nuclear power plant turbines use steam at

1. Higher pressure and higher temperature
2. lower pressure and lower temperature
3. Higher pressure and lower temperature
4. lower pressure and higher temperature

Solution:2

Question: What is the type of breakdown that occurs in a Zener diode having breakdown voltage (bV)?

1. Avalanche breakdown only
2. Zener breakdown only

3. Avalanche breakdown where breakdown voltage is below 6V and Zener breakdown otherwise
4. Zener breakdown where breakdown voltage is below 6V and Avalanche breakdown otherwise

Solution:4

Question:A power station has a maximum demand of 200 kW and number of kWh generated per year is 45×10^5. The load factor is

1. 10.25%
2. 0.256%
3. 41%
4. 82%

Solution:2

Question:A long overhead lossless power transmission line is terminated with its characteristic impedance. While the line is in operation

1. A resonance of reactive powers occur in the line
2. The line becomes purely inductive
3. The line becomes purely capacitive
4. There is no reflected wave on the line

Solution:4

Question: For exact compensation of voltage drop in the feeder, the booster must

1. Be earthed
2. Work on line voltage
3. Work on its linear portion of V-I characteristics
4. Work on its non-linear portion of V-I characteristics

Solution:2

Question: Which of the following will be provided to reduce the harmonics on the ac side of an HVDC transmission line?

1. Synchronous motors in over excited condition
2. Shunt capacitor

3. Static compensator
4. Shunt filters

Solution:4

Question: An over-current relay is said to over reach when it operates at a current

1. Higher than its setting
2. Equal to its setting
3. Lower than its setting
4. 2/3rd of its setting

Solution:3

Question: What is the region of operation of a 3-phase inverter employing sinusoidal PWM when the peak-to-peak values of both the carrier and the modulating waves are made equal?

1. Linear modulation
2. Over modulation
3. Boundary of linear modulation and over modulation
4. Six-step operation

Solution:1

Question: When a very small amount of higher conducting metal is added to a conductor, its conductivity will

1. increase
2. decrease
3. remain the same
4. increase or decrease depending on the impurity

Solution:2

Question: An electrically balanced atom has 30 protons in its nucleus and 2 electrons in its outermost shell. The materials made of such atom is

1. a conductor
2. an insulator

3. a semiconductor
4. a superconductor

Solution:1

Question: The temperature coefficient of resistance of a doped semiconductor is

1. always positive
2. always negative
3. zero
4. positive or negative depending upon the level of doping

Solution:4

General Knowledge

Question: The word Hindu as reference to the people of Hind was first used bty

1. the Greeks
2. the Romans
3. the Chinense
4. the Arabs

Solution:4

Question: Who among the following was called as Father of Indian Renaissance

1. B.G.Tak
2. Gopal Krishna Gokhkle
3. Lala Lajpat Rai
4. Raja Ram Mohan Rai

Solution:4

Question: Who among the following was associate with Enlightenment philosophy?

1. Shakespeare
2. Voltaire
3. Erasmus
4. All the above

Solution:2

Question: The percentage of earth surface covered by India is

1. 2.4
2. 3,4
3. 4.4
4. 5.4

Solution:1

Question: Winds and air currents differ in the aspect that:

1. Air currents blow much faster than winds
2. Air currents are always moisture laden while the winds are usually dry
3. The winds blow on lands while air currents blow over seas and oceans
4. Winds are horizontal movements of air while air currents are the vertical movements of air

Solution:4

Question: Yojna a weekly journal

1. Ministry of Finance
2. Ministry of Information and Broadcastin
3. Ministry of Rural Development
4. Planning Commission

Solution:2

Question: Consider the following
1.Disputes with mobile cellular companies
2.Motor accident cases
3.Pension cases

For which of the above are Lok Adalats held?

1. Only 1
2. 1 and 2
3. Only 2
4. All of these

Solution:3

Question: The Scheme 'HRIDAY' is related to

1. Urban development
2. Rural development
3. Health improvement
4. Literacy improvement

Solution:1

Question:'Sabla' scheme is meant for empowerment of

1. Adolescent girls
2. physically challenged girls
3. Members of self help groups
4. Girls belonging to weaker sections

Solution:1

Question: What was the currency of Hyderabad State during the period of last Nizam ?

1. Ana
2. Nizamia Ana
3. Osmania Sikka
4. Nizamia Sikka

Solution:3

Question: In ruby laser, the stimulated emission is due to transition from

1. metastable state to any lower state
2. any higher state of lower state
3. metastable state to ground state
4. any higher state to ground state

Solution:3

Question:10^{-6} M NaOH is diluted 100 times. The pH of the diluted base is

1. between 7 and 8
2. between 5 and 6
3. between 6 and 7
4. between 10 and 11

Solution:1

Question: The respiratory quotient during cellular respiration would depend on

1. the nature of enzymes involved
2. the nature of the substrate
3. the amount of carbon dioxide released
4. the amount of oxygen utilised

Solution:2

Question: What is the theme of the ‘National Science Day 2022’?

1. Integrated Approach in Science and Technology for Sustainable Future
2. Science and Technology for Atmanirbhar Bharat
3. Vigyan Sarvatra Pujyate
4. Amrut Kaal Vigyan

Solution:1

Question:'Raising and Accelerating MSME Performance' (RAMP) is supported by which global institution ?

1. International Monetary Fund
2. World Bank
3. UNICEF
4. World Economic Forum

Solution:2

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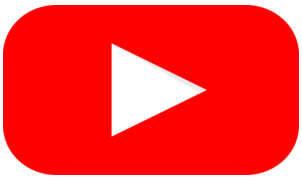

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