(T) Roll No. .....

PAPER ID—10712

Bachelor of Technology (Electrical Engineering), Bachelor of Technology (Electrical and Electronics Engineering), Bachelor of Technology (Electronics and Communication Engineering), Bachelor of Technology (Electronics and Computer Engineering)

EXAMINATION, 2025

(Second Semester)

BASIC OF ELECTRICAL ENGINEERING

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks. Assume suitable parameters if not given. Use of non-programmable scientific calculator is allowed.

(Compulsory Question)

1. (a) Define electric current.

(b) How ammeter is connected in circuit ?

(c) What is absolute permittivity ? Give its equation.

(d) Give importance of Phasor diagram.

(e) How R.M.S value of current calculated ?

(f) What is Admittance ?

(g) Which material(s) used for making fuse ?

2×7=14

Unit I

2. (a) Define and explain the interrelationship between electric field, charge, voltage, current and energy. 7

(b) In the circuit shown in Fig. 1 determine all branch currents and the voltage across the 5 Ω resistor by loop current analysis. 7

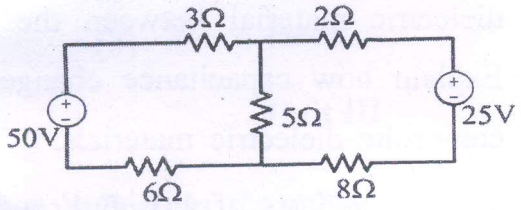

Fig. 1

3. (a) State and explain Ohm's Law and Kirchhoff's Current and Voltage Laws with their limitations. 7

(b) Using Millman's theorem find current through RL for the circuit shown in Fig. 2. 7

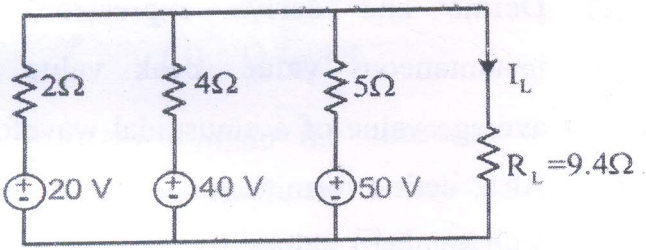

Fig. 2

Unit II

4. (a) Derive the formula for the capacitance of a parallel-plate capacitor with a dielectric material between the plates. Explain how capacitance changes with composite dielectric materials. 7

   (b) Three capacitors of 4μF, 6μF and 12μF are connected in series across a 100 V supply. 7

   Find :

   (i) The total capacitance

   (ii) The total energy stored in the system.

5. (a) Define and derive expressions for instantaneous value, peak value and average value of a sinusoidal waveform. Also, define form factor and peak factor with standard values for pure sine wave. 7

(b) A sinusoidal current is represented by $i(t) = 10 \sin (314\, t)$. 7

Calculate :

(i) Peak and Average value

(ii) Form factor.

Unit III

6. (a) Discuss the concept of resonance in a series R-L-C circuit. Derive the condition for resonance and expressions for resonant frequency, Q-factor and bandwidth. 7

(b) A series RLC circuit consists of $R = 10\ \Omega$, $L = 100$ mH and $C = 100\ \mu F$.

Find :

(i) Resonant frequency

(ii) Q-factor. 7

7. (a) Explain the construction and working principle of a single-phase transformer. Derive the EMF equation and explain the meaning of each term. 7

(b) A single-phase transformer has 1000 turns on the primary and 200 turns on the secondary. The primary is connected to a 230V, 50Hz supply. 7

Calculate :

(i) Secondary voltage

(ii) Maximum flux in the core.

Unit IV

8. (a) Explain the principle of rotating magnetic field in three-phase systems. How is it produced in a three-phase induction motor ? Illustrate with phasor diagrams. 7

(b) A three-phase supply of 400V, 50Hz is applied to a 4-pole stator. 7

Calculate :

(i) Synchronous speed of the rotating magnetic field.

(ii) Frequency of rotor current when the slip is 5%.

9. (a) Define earthing and explain its importance in electrical installations. Describe different types of earthing systems (e.g., plate, pipe, rod, strip earthing) with diagrams. 7

(b) Explain the working principles of Fuse and MCB. Compare their advantages and applications. What is the difference between overload and short-circuit protection ? 7

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(T) Roll No. .....

PAPER ID—10703

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Technology Including Block Chain technology), Bachelor of Technology (Computer Science and Engineering), Bachelor of Technology in Electronics Engineering (VLSI Design Technology)

EXAMINATION, 2025

(Second Semester)

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Time : 3 Hours *Maximum Marks : 70*

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting any *four* questions from Unit II. Q. No. 1 (Unit I) is compulsory. All questions carry equal marks.

Unit I

1. (a) What are the active and passive elements of an electric circuit ?

   (b) State and explain Ohm's law.

   (c) What is meant by complex power ?

   (d) Define power factor and its significance.

   (e) Draw the V-I characteristics of a practical *p-n* diode.

   (f) Write a note on MOS capacitance.

   (g) What is pinch off voltage. ? **7×2=14**

Unit II

2. (a) State and explain superposition theorem and mention its applications. 7

(b) Three resistances of 3, 4 and 5 Ω are connected in parallel and this combination is put with 2 Ω resistor. Find (i) Total equivalent resistance of whole combination, (ii) Current supplied by the battery having a capacity of 10 V with its internal resistance of 0.1 Ω. 7

3. (a) Explain the conversion of current source into equivalent voltage source for solving a problem. 7

(b) State and explain mesh method of analysis. 7

4. (a) An inductive coil having a resistance of 15 Ω takes a current of 4 A, when connected to a 100 V, 60 Hz supply. If the coil connected to a 100 V, 50 Hz supply. Calculate (i) current, (ii) power, (iii) power factor. 7

(b) What is polyphase system ? Discuss the advantages of 3-phase over 1-phase system. 7

5. (a) What is *p-n* junction diode ? Explain its forward mode of operation. 7

(b) Write notes on the following : 7

(i) Varactor diode

(ii) Voltage regulator.

6. (a) Give the expression for transistor power dissipation and switching time. 7

(b) Draw drain and transfer characteristics of JFET. 7

7. (a) What are the various types of amplifiers ? Describe amplification factor in a transistor. 7

(b) Draw the symbol and discuss basic structure and main feature of MOSFET. 7

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(220-EL-211731) Roll No. .....

PAPER ID—10712

B.Tech. EXAMINATION, 2024

(Second Semester)

ELECTRICAL AND ELECTRONICS ENGINEERING

Code : EEE-103

Basics of Electrical Engineering

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory in Unit I. Attempt *four* more questions from Unit II. All questions carry equal marks.

Unit I

1. (a) Define electrical potential and potential difference.

   (b) State and explain Kirchhoff's current law.

   (c) Define inductor and inductance.

   (d) Derive the expression for energy stored in a charged capacitor.

   (e) A transformer has $N_1 = 1500$ turns and $N_2 = 500$ turns. Calculate TR of transformer.

   (f) What is RCCB and what are its functions ?

   (g) Distinguish between fuse and RCB.

$7 \times 2 = 14$

Unit II

2. (a) State and explain superposition theorem and mention its application.

(b) Three resistors of values 3, 8 and 24 Ω are connected in parallel across 12 V DC supply.

Calculate : 7×2=14

(i) Total resistance

(ii) Current in each branch

(iii) Total current.

3. (a) What do you mean by rectangular and polar representation of phasors ? Describe the conversion from polar to rectangular phasors.

(b) The equation for an alternating current is given by $i = 77 \sin 314t$.

Find : 7×2=14

(i) Peak value of current

(ii) Frequency

(iii) Time-period

(iv) Instantaneous value of current at $t = 2$ ms.

4. (a) Describe power factor and its types. What are the disadvantages of poor power factor ?

(b) A 240 V, 50 Hz AC supply is applied a coil of 0.08 H inductance and 4 Ω resistance connected in series with a capacitor of 8 μF.

Calculate : **7×2=14**

(i) Impedance

(ii) Circuit current

(iii) Phase angle

(iv) Power factor.

5. (a) Describe single-phase and three-phase electrical power supply system. What are the advantages of a three-phase system over single-phase system ?

(b) Describe the construction and working of autotransformer and discuss its advantages and applications. **7×2=14**

6. (a) Explain the working principles and main features of synchronous generator.

(b) Name the different types of dc motors and state their applications. Also write back emf equation for a dc motor.

7×2=14

7. (a) Draw the circuit diagram of capacitor start capacitor run induction motor and mention its applications.

(b) What are the different types of earthing system ? Explain pipe earthing with the help of neat diagram. 7×2=14

PAPER ID—10703

B. Tech. EXAMINATION, 2024

(Second Semester)

ELECTRONICS AND COMPUTER ENGINEERING

Code : EEE-101

Basics of Electrical and Electronics Engineering

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all. Q. No. 1 (Unit I) is compulsory. All questions carry equal marks.

Unit I

1. (a) Define electrical power and electrical energy with their unit.

   (b) What are independent and dependent sources ?

   (c) Draw and explain impedance triangle.

   (d) What is resonance in an electric circuit ?

   (e) What is the difference between clipping and clamping a circuit ?

   (f) Compare *n*-channel and *p*-channel MOSFET.

   (g) Define the amplification factor in JFET.

7×2=14

Unit II

2. (a) Derive expressions for converting star circuit to delta circuit. 7

   (b) State and explain KVL and KCL with their significance. 7

3. (a) State and explain nodal method of analysis. 7

(b) A resistance of 4 Ω is connected in series with a combination of 12 Ω and 24 Ω in parallel. The whole circuit is connected across 120 volts supply. Find (i) the current taken from the supply. (ii) voltage across 4 Ω resistance. (iii) current flowing through 12 Ω and 24 Ω resistance. 7

4. (a) Define the following : 7

(i) Average value

(ii) RMS value

(iii) Peak value

(iv) Instantaneous value.

(b) A coil of resistance 20 Ω and inductance 100 mH is connected in series with a capacitance of 400 μF across 100 V, 50 Hz AC supply.

Calculate

(i) magnitude of current

(ii) phase angle

(iii) power factor

(iii) voltage across each element. 7

5. (a) Describe the working of a *p-n* junction diode and draw and explain V-I characteristics of it. 7

(b) Draw and explain the circuit diagram of half wave and full wave rectifier. 7

6. (a) Draw drain and transfer characteristics of JFET. 7

(b) Explain Transconductance (g_m) parameter of JFET. 7

7. (a) Draw the circuit diagram of MOSFET and discuss its configuration when it is used as switch. 7

(b) Explain *three* regions of operation of a MOSFET. 7

PAPER ID	**:15746**
Name of Programme /Course	**:B.Tech. _Electrical and Electronics Engineering**
Examination:	**: December- 2024**
Semester	**: 1st**
Name of Subject	**: Basics of Electrical Engineering**
Subject Code	**:EEE - 103**
Time: 03 Hours	**Maximum Marks: 70**

Instructions:

- Attempt five questions in all.
- The students have to attempt first common question which is compulsory and four questions from the remaining selecting at least one question from each unit.
- Assume suitable parameters if not given.

Q.No.	Questions	Marks
Q. 1	**Compulsory question:**	**2x7**
(a)	Define and give expression of electric charge.	2
(b)	Compare Node and Mesh analysis.	2
(c)	What is electric flux density? Give its equation.	2
(d)	Give importance of form factor.	2
(e)	Explain apparent power with suitable example.	2
(f)	What is principle of DC motor?	2
(g)	Explain role of earthing.	2

UNIT-I

Q.2 (a) Explain with examples: Series and Parallel circuits. 7

(b) Define thevenin's theorem. Evaluate the thevenin's equivalent voltage (Vth) and thevenin's resistance (Rth) across "ab" terminals in the circuit shown in Figure 2(b). 7

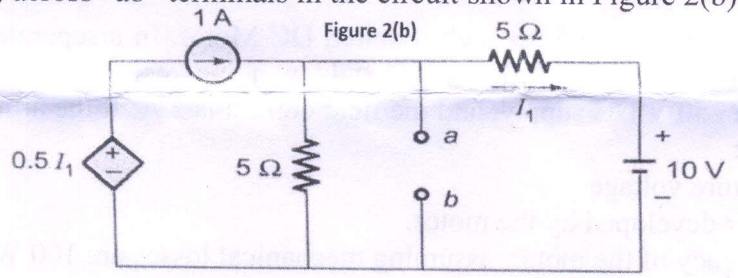

Figure 2(b)

OR

Q.3 (a) What are Kirchhoff's laws (KVL and KCL). Give their applications for network solutions. 7

(b)Find the maximum power that can be delivered to the load resistor R_L of the circuit shown in the Figure 3(b). 7

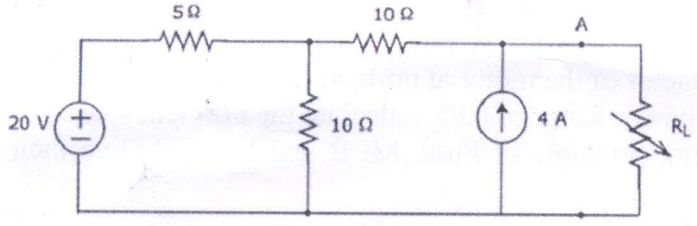

Figure 3 (b)

UNIT-II

Q.4 (a) How total capacitance is calculated in parallel and series connections. Three capacitors, C_1=2 μF, C_2=3 μF, and C_3=6 μF are connected in series. A potential difference of 12 V is applied across the combination. 7

Find: equivalent capacitance of the combination, charge on each capacitor, voltage across each capacitor.

(b) What is significance of RC time constant? Derive the expressions of the charging and discharging of a capacitor in an RC circuit. 7

OR

Q.5 (a) Define and write formulas of peak factor and form factor. For a sinusoidal current $(t) = 10\sin(2\pi 60t)$ **calculate** the peak factor and form factor. 7

(b) What is phasor diagram? A sinusoidal voltage is given by $v(t) = 10\sin 2\pi 60t + 45^0$. Write its phasor form in both rectangular and polar representations. 7

UNIT-III

Q.6 Define and write formulas of the active power (P), reactive power (Q), apparent power (S), and complex power (S) in the circuit. In a series RLC circuit, the resistance R=10 Ω, inductance L=0.1 H, and capacitance C=100 μF are connected to an AC voltage source with V_{rms}=100 V and a frequency f=50 Hz. 14

Calculate:

1. The total impedance of the circuit.
2. The current in the circuit.
3. The active power (P), reactive power (Q), apparent power (S), and complex power (S) in the circuit.
4. The power factor.

OR

Q.7 Explain Construction, working principle, and EMF Equation of a Transformer. A transformer is rated for a primary voltage of 220 V and a secondary voltage of 110 V. The transformer has 200 primary turns. The core is made of high-grade silicon steel, and the transformer operates at a frequency of 50 Hz. 14

Find:

1. The number of secondary turns.
2. The EMF equation of the transformer.
3. The voltage ratio and current ratio.
4. The losses and efficiency of the transformer when the transformer is loaded with 1.5 kW.

UNIT-IV

Q.8 (a) Give working principle of Separately Excited DC Motor. In a separately excited DC motor, the armature resistance R_a=1 Ω and the field winding resistance R_f=100 Ω. The motor is connected to a 250 V DC supply, and the field current is 2 A. If the armature current is 10 A. 7

Estimate:

1. The armature voltage
2. The power developed by the motor.
3. The efficiency of the motor, assuming mechanical losses are 100 W.

(b) What is Electric Shock? Give its Causes, Effects, and Prevention techniques. 7

OR

Q.9 (a) Explain construction of single-phase induction motor. A single-phase induction motor is designed for a 220 V supply with a frequency of 50 Hz. The motor has a pole count of 2. 7

Find:

1. The synchronous speed of the motor.
2. The power factor of the motor at no-load condition is 0.4. If the motor operates at full load with a power factor of 0.85, calculate the efficiency, assuming the losses are 200 W.

(b) What is working principle of Fuse, MCB and RCCB? Give their domestic and industrial applications. 7

(T) Roll No. .....

PAPER ID—16003

B. Tech. EXAMINATION, 2024

(First Semester)

COMPUTER SCIENCE AND ENGINEERING

(CYBER SECURITY)

Basics of Electrical and Electronics Engineering

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. (a) Define the terms 'current', 'voltage' and 'charge' in the context of an electrical circuit and explain their interrelationships.

(b) Describe the difference between ideal and controlled voltage/current sources. How do these sources behave in a circuit ?

(c) What is the difference between peak value, average value and RMS value of a sinusoidal waveform ? Provide formulas for each.

(d) Explain the concept of phasor representation of a sinusoidal waveform and how is it used to analyse AC circuits. How does it simplify the analysis compared to time-domain analysis ?

(e) Define a *p-n* junction diode and describe its basic operation. What are the primary applications of a *p-n* junction diode in electronic circuits ?

(f) Explain the difference between a half-wave rectifier and a full-wave rectifier. How do their output waveforms differ and which one is more efficient ?

(g) Explain the concept of pinch-off voltage in a FET. How does the channel's conductivity change as the drain-to-source voltage increases beyond the pinch-off voltage ? 7×2=14

Unit I

2. (a) Apply Thevenin's Theorem to a circuit with a voltage source and resistors to simplify the circuit. Evaluate the Thevenin equivalent voltage and resistance and explain its significance in practical circuit analysis. 6

(b) In a series circuit, a 10 Ω resistor, a 2 H inductor and a 5 μF capacitor are connected across a 100 V AC supply at 50 Hz : 8

(i) Calculate the total impedance of the circuit.

(ii) Determine the current flowing through the circuit.

(iii) Explain, how the impedance changes when the frequency is increased.

(iv) Discuss the significance of each circuit element (R, L, C) on the impedance of the circuit.

3. (a) A circuit consists of a 100 Ω resistor, a 20 μF capacitor and a 10 H inductor connected in series with an AC voltage source of 50 V at 60 Hz : 7

(i) Calculate the total impedance of the circuit and determine the phase angle.

(ii) Calculate the current flowing through the circuit.

(iii) Discuss the effects of increasing the frequency on the impedance and the phase angle of the circuit.

(b) Explain the role and importance of electrical circuits in engineering. Discuss the relationship between charges, current, voltage and energy in an electrical circuit. 7

Unit II

4. (a) In a three-phase AC system, compare the power delivered by a balanced system of 3-phase loads in both star and delta configurations. Discuss, how the power factor and energy efficiency might differ in each configuration. 7

   (b) Explain the basic concepts of sinusoidal waveforms. Describe the mathematical representation of a sinusoidal waveform and the significance of its parameters such as peak value, average value and RMS value. How do these parameters relate to each other in the context of AC circuits ? 7

5. (a) Explain the concepts of complex power, real power, reactive power, apparent power, and power factor in AC circuits : 7

   (i) Define each type of power and provide the formulas for their calculation.

(ii) Evaluate the significance of power factor in the efficiency of AC circuits and its impact on real-world applications such as power distribution and energy consumption.

(iii) Apply these concepts to a simple AC circuit with a resistor, inductor, and capacitor to calculate the total power and analyse the circuit's efficiency.

(b) In a series RLC circuit, a 120 V, 60 Hz AC supply is connected to a resistor ($R = 10\ \Omega$), inductor ($L = 50$ mH), and capacitor ($C = 10\ \mu F$) : 7

(i) Calculate the total impedance of the circuit using the complex representation of impedance.

(ii) Compute the current flowing through the circuit using phasor analysis.

(iii) Find the phase angle between the voltage and current.

(iv) Calculate the power factor of the circuit.

(v) If the supply voltage is sinusoidal, determine the real power, reactive power and apparent power delivered by the circuit.

Unit III

6. (a) Describe the operation of clipping and clamping circuits. How do they differ from each other in terms of their functionality and applications in signal processing ? 7

(b) Analyse the working of a Bipolar Junction Transistor (BJT) in a Common Emitter (CE) configuration. Compare the input and output characteristics of the CE configuration to those of the Common Base (CB) and Common Collector (CC) configurations. 7

7. (a) Give a circuit with a varactor diode and a varistor, explain how each component works and its application in voltage regulation and surge protection. Provide a practical example for both. 7

(b) Evaluate the significance of thermal stability in BJT circuits. Compare the advantages and disadvantages of different biasing techniques such as base bias, emitter feedback bias, and voltage divider bias in terms of thermal stability and performance. 7

Unit IV

8. (a) Explain the basic operation of a Junction Field Effect Transistor (JFET). Describe its structure and how the gate, source and drain are involved in the device's operation. What are the key characteristics of the JFET and how do they affect its behavior in electronic circuits ? 7

(b) For an N-channel MOSFET, the oxide capacitance per unit area is $C_{ox} = 10\ \mu F/m^2$ and the gate length is 1 μm : 7

(i) Calculate the total oxide capacitance if the gate width is 10 μm.

(ii) Explain, how the MOS capacitor contributes to the behavior of the MOSFET, particularly in terms of threshold voltage and channel formation.

9. (a) Describe the basic operation of a Metal-Oxide-Semiconductor Field Effect Transistor (MOSFET). Explain the role of the gate, source, and drain in the operation of the device. What are the differences between an enhancement-mode and a depletion-mode MOSFET ? 7

(b) A Junction Field Effect Transistor (JFET) has a drain current of 10 mA when the gate-source voltage V_{GS} is 0 V and the pinch-off voltage is $V_P = -4V$: 7

(i) Calculate the drain current when $V_{GS} = -2V$.

(ii) Explain, how the drain current varies with V_{GS} for this JFET.

PAPER ID—10712

B.Tech. (VLSI/ECE/EEE all Elect)

EXAMINATION, 2023

(Second Semester)

BASICS OF ELECTRICAL ENGINEERING

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory.

1. (a) Define electric power and electric energy and write their units.

(b) State the terms electric current, and electric potential and give their units.

(c) What is Resistance ? Discuss various factors on which resistance of a conductor depends.

(d) Differentiate series and parallel circuit.

(e) Define impedance and admittance with their units.

(f) What is Q-factor of a parallel RLC circuit ?

(g) Write in brief the various safety precautions to be followed to avoid electric shock. $2\times7=7$

2. (a) (i) State and explain Ohm's law.

(ii) An aluminum conductor 200 mm long has diameter of 2.5 mm. If the resistivity of aluminum is 28.5 $\mu\Omega$-mm. Calculate the resistance of conductor.

(b) Describe in detail the current divider rule and voltage divider rule. $7\times2=14$

3. (a) State and explain Kirchhoff's laws for electric circuits.

(b) State and explain maximum power transfer theorem and prove that $P_{L(max)} = V_{th}^2 / 4R_{th}$. 7×2==14

4. (a) Define the following :

(i) Electric flux density

(ii) Composite Dielectric

(iii) Absolute permittivity

(iv) Relative permittivity.

(b) An alternating current is given by $i = 14.14 \sin 377t$. Find :

(i) RMS value of current

(ii) Frequency

(iii) Instantaneous value of current when t is 3 ms

(iv) Time taken for the current to reach 10 A for the first time after passing through zero values. 7×2=14

5. (a) Define the following :

(i) Instantaneous value

(ii) Peak value

(iii) Average value

(iv) RMS Value.

(b) A series circuit consists of a resistance of 4 Ω, an inductance of 500mH and a variable capacitance connected across a 100 V, 50 Hz supply. Calculate the capacitance require to produce a series resonance condition, and the voltages generated across both the inductor and the capacitor at the point of resonance.

7×2=14

6. (a) A series circuit is connected to a 200 V, 50 Hz supply has R = 40 Ω, L = 300 mH, and C = 200 μF. Find :

(i) Impedance

(ii) Current

(iii) Power

(iv) Power Factor

(v) Voltage drop across each element.

(b) Describe iron losses, copper losses and mechanical losses in a single-phase transformer. **7×2=14**

7. (a) With the help of neat diagram explain the construction and working of a DC motor.

(b) What is meant by earthing ? Discuss the importance of earthing system. **7×2=14**

PAPER ID—10703

B.Tech. (Civil Engg.)

EXAMINATION, 2023

(Second Semester)

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory.

1. (a) What are the active and passive elements of an electric circuit ?

(b) What are independent and dependent sources ?

(c) What is meant by Complex power ?

(d) What is resonance in an electric circuit ?

(e) Draw the V-I characteristics of a practical *p-n* diode.

(f) What is meant by thermal stability ?

(g) What is pinch off voltage ? 2×7=14

2. (a) Describe the concept of electric field and electric charge. Derive expression for electric field due to a point charge.

(b) Three resistors 30 Ω, 25 Ω, 45 Ω are connected in series across 200V.

Calculate :

(i) Total resistance

(ii) Current

(iii) Potential difference across each element. 7×2=14

3. (a) State and explain Thevenin's theorem and discuss its applications and limitations.

(b) Draw the power triangle and discuss real power, reactive power, and apparent power. 7×2=14

4. (a) Draw the circuit diagram and phasor diagram of a RLC series circuit and explain each component.

(b) Find the instantaneous value of alternating voltage for the given equation $v = 10 \sin (3\pi \times 10^4 t)$ volt at :

(i) 0 s

(ii) 50 μs

(iii) 75 μs. 7×2=14

5. (a) What is *p-n* junction diode ? Explain its forward mode of operation.

(b) Draw and explain the circuit diagram of half wave and full wave rectifier.

7×2=14

6. (a) Draw and explain CB characteristics of BJT.

(b) Explain Transconductance (gm) parameter of JFET. 7×2=14

7. (a) What is depletion and enhancement type MOSFET ?

(b) Explain three regions of operation of a MOS transistor. 7×2=14

PAPER ID—10712

B.Tech. (VLSI/ECE/EEE all Elect)

EXAMINATION, 2023

(Second Semester)

BASICS OF ELECTRICAL ENGINEERING

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory.

1. (a) Define electric power and electric energy and write their units.

(b) State the terms electric current, and electric potential and give their units.

(c) What is Resistance ? Discuss various factors on which resistance of a conductor depends.

(d) Differentiate series and parallel circuit.

(e) Define impedance and admittance with their units.

(f) What is Q-factor of a parallel RLC circuit ?

(g) Write in brief the various safety precautions to be followed to avoid electric shock. $2\times7=7$

2. (a) (i) State and explain Ohm's law.

(ii) An aluminum conductor 200 mm long has diameter of 2.5 mm. If the resistivity of aluminum is 28.5 $\mu\Omega$-mm. Calculate the resistance of conductor.

(b) Describe in detail the current divider rule and voltage divider rule. $7\times2=14$

3. (a) State and explain Kirchhoff's laws for electric circuits.

(b) State and explain maximum power transfer theorem and prove that $P_{L(max)} = V_{th}^2 / 4R_{th}$. 7×2==14

4. (a) Define the following :

(i) Electric flux density

(ii) Composite Dielectric

(iii) Absolute permittivity

(iv) Relative permittivity.

(b) An alternating current is given by $i = 14.14 \sin 377t$. Find :

(i) RMS value of current

(ii) Frequency

(iii) Instantaneous value of current when t is 3 ms

(iv) Time taken for the current to reach 10 A for the first time after passing through zero values. 7×2=14

5. (a) Define the following :

(i) Instantaneous value

(ii) Peak value

(iii) Average value

(iv) RMS Value.

(b) A series circuit consists of a resistance of 4 Ω, an inductance of 500mH and a variable capacitance connected across a 100 V, 50 Hz supply. Calculate the capacitance require to produce a series resonance condition, and the voltages generated across both the inductor and the capacitor at the point of resonance.

7×2=14

6. (a) A series circuit is connected to a 200 V, 50 Hz supply has R = 40 Ω, L = 300 mH, and C = 200 μF. Find :

(i) Impedance

(ii) Current

(iii) Power

(iv) Power Factor

(v) Voltage drop across each element.

(b) Describe iron losses, copper losses and mechanical losses in a single-phase transformer. **7×2=14**

7. (a) With the help of neat diagram explain the construction and working of a DC motor.

(b) What is meant by earthing ? Discuss the importance of earthing system. **7×2=14**

PAPER ID—10712

B.Tech. (VLSI/ECE/EEE all Elect)

EXAMINATION, 2023

(Second Semester)

BASICS OF ELECTRICAL ENGINEERING

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory.

1. (a) Define electric power and electric energy and write their units.

(b) State the terms electric current, and electric potential and give their units.

(c) What is Resistance ? Discuss various factors on which resistance of a conductor depends.

(d) Differentiate series and parallel circuit.

(e) Define impedance and admittance with their units.

(f) What is Q-factor of a parallel RLC circuit ?

(g) Write in brief the various safety precautions to be followed to avoid electric shock. $2\times7=7$

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7. (a) With the help of neat diagram explain the construction and working of a DC motor.

(b) What is meant by earthing ? Discuss the importance of earthing system. **7×2=14**

PAPER ID—16003

B. Tech. EXAMINATION, 2024

(First Semester)

COMPUTER SCIENCE AND ENGINEERING
(CYBER SECURITY)

Code : EEE-101

Basics of Electrical and Electronics Engineering

Time : 3 Hours *Maximum Marks : 70*

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

1. (a) Justify Electrical and electronics are different. 2

(b) State Kirchhoff's voltage and current law. 2

(c) Draw the symbols : 2

(i) PNP Transistor

(ii) MOSFET

(iii) Current source

(iv) Wattmeter.

(d) What is a balanced system ? 2

(e) Write Shockley equation. 2

Unit I

2. (a) Elaborate role and importance of circuits in Engineering.

(b) Calculate the total current in the circuit by applying suitable theorem. 15

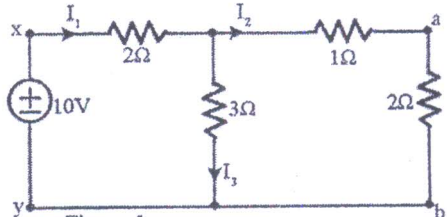


Figure: 1

3. (a) Derive star to delta conversion.

(b) Why source transformation is required ? State Thevenin and Norton theorem. 15

Unit II

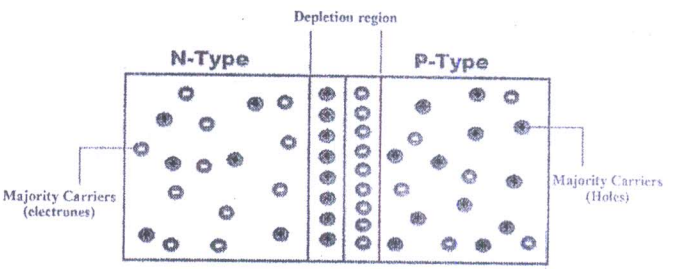
4. Explain in detail active, Reactive, apparent power, power factor and energy. 15

5. (a) With the help of sinusoidal waveform analyse all AC parameters.

(b) With the help of figure analyze the RLC series and parallel circuit. 15

Unit III

6.



Comment and critically analyse the above diagram. 15

7. (a) Draw the output characteristics of Common Emitter configuration. Write the effect of collector voltage on the collator current with reference to the characteristics. What is the effect of base current IB on collector current IC with reference to characteristics ?

(b) Draw the circuit diagram of voltage divider biasing method of BJT. How stability in operating point is obtained ? **15**

Unit IV

8. (a) With the help of neat diagram write construction of *n*-channel FET.

(b) Explain the working of *n*-channel D-MOSFET. **15**

9. Explain and draw the characteristics of field effect transistor. **15**

ID—220-EL-111622/111622-B6

B. Tech. EXAMINATION, 2023

(First Semester)

COMPUTER SCIENCE AND ENGINEERING
(CYBER SECURITY)

Code : EEE-101

Basics of Electical and Electronics Engineering

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Q. No. 1 will be compulsory. Q. No. 1 will have five parts of 2 marks each. Attempt *Five* questions in all, first being compulsory and selecting *one* from each Unit.

1. (a) Explain role and importance of circuits in engineering. 2

(b) Define Active power and Reactive power. 2

(c) What is a PN diode ? Write its applications. 2

(d) Differentiate between JFET and MOSFET. 2

(e) State the need of biasing. 2

Unit I

2. (a) State Milliman's theorem.

(b) State Thevenin theorem. Mention its advantages and limitations. 15

3. (a) Why there is need of network reduction ?

(b) Explain in detail star to delta conversion. 15

Unit II

4. (a) Explain with the help of diagram series resonance circuit.

(b) Two resistors are connected in parallel and a voltage of 200 V is applied to the terminals. The total current taken is 2.5 A, and the power dissipated in one of the resistor is 1500 W. What is the resistance of each element ? 15

5. Write short notes on the following : 15

(a) Average peak and RMS value of sinusoidal waveform.

(b) 3-phase AC circuits.

Unit III

6. (a) With appropriate circuit diagram explain the DC load line analysis of semiconductor diode.

(b) In a full wave rectifier, the input is from 30-0-30 V transformer. The load and diode forward resistances are 100 Ω and 10 Ω respectively. Calculate the average voltage, dc output power, ac input power, rectification efficiency and percentage regulation. 15

7. (a) Explain the working of positive clamping circuit.

(b) In a Common Emitter transistor circuit if $\beta = 100$ and $IB = 50\ \mu A$, compute the values of α, IE and IC. 15

Unit IV

8. (a) Draw and explain N-channel JFET construction.

(b) Define the following terms : 15
Dynamic Drain Resistance, Amplification Factor and Transconductance.

9. (a) Explain the Working Principle of Enhancement type MOSFET (n-channel).

(b) State the application of MOSFET. 15