

16/01/25



ARKA JAIN University
Jharkhand



END SEM EXAMINATION
School of Engineering & IT

Branch	Electrical & Electronics Engineering	Program	Diploma
Subject Name	Electric Motors and Transformers	Semester	III
		Year	January, 2025
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't Write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will come under Unfair Means and will Result in the Cancellation of the Paper(s). 		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)			
Q. N	QUESTIONS	Marks	COs
1			KL
i	Can DC be applied to transformers?	2	CO1 K1
ii	What do you mean by "Three Phase Transformers"?	2	CO5 K3
iii	Define All day Efficiency of a transformer.	2	CO2 K2
iv	What do you mean by "Oil Natural Cooling" of transformers?	2	CO1 K2
v	Define the term "Autotransformer".	2	CO2 K3
vi	What is the role of a commutator?	2	CO5 K2
vii	What is the function of brushes?	2	CO5 K6
viii	What are the different types of generators?	2	CO3 K3
ix	What are the types of DC motors?	2	CO5 K2
x	Define the term starter.	2	CO1 K1

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Explain the delta-delta connection of three phase transformers. State its advantages and disadvantages.	05	CO1	K1
3	Explain the construction of an autotransformer.	05	CO5	K3
4	How do you define the self and separately excited of DC Machine?	05	CO2	K2
5	Write down the applications of various three phase transformer connections.	05	CO1	K2
6	A DC shunt motor runs at a speed of 1000 rpm on no load taking a current of 6 A from the supply, when connected to 220 V dc supply. Its full load current is 50 A. Calculate its speed on full load. Assume $R_a = 0.3$ ohm, and $R_{sh} = 110$ ohm.	05	CO2	K3
7	Explain that the copper saving in autotransformer.	05	CO5	K2

Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	A three-phase transformer has delta connected primary and a star connected secondary working on 50 Hz three phase supply. The line voltages of primary and secondary are 3300 V and 400 V respectively. The line current on the primary side is 12 A and secondary has a balanced load at 0.8 lagging power factor. Determine the secondary phase voltage, line current and the output	10	CO1	K1
9	Derive the expression for emf equation of a transformer and explain the transformation ratio of a transformer.	10	CO5	K3
10	Derive the expression for back emf and its significance in the d.c. motor.	10	CO1	K1
11	A 15 kVA, 2200/110 V transformer has $R_1=1.75$ ohm, $R_2=0.0045$ ohm. The leakage reactances are $X_1=2.6$ ohm, and $X_2=0.0075$ ohm. Calculate, (i) Equivalent resistance referred to primary. (ii) Equivalent resistance referred to secondary. (iii) Equivalent reactance referred to primary.	10	CO1	K1

(iv) Equivalent reactance referred to secondary.
(v) Total copper loss.

Write down the difference between core type and shell type transformer.

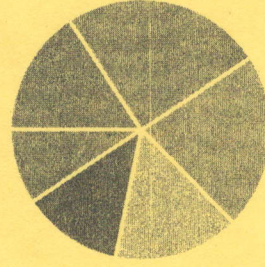
12	10	CO5	K3
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CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

Course Outcomes	CO1	CO2	CO3	CO4	CO5	CO6
	Recall the fundamental principles and classification of electromagnetic machines.	Relate the working of dc machines as generators and motors.	Explain the efficiency and voltage regulations of dc machines.	Analyze the performance characteristics of different DC machines using different equivalent circuit.	Compare the different types of testing methods used to determine the performance characteristics of DC machines and Transformers.	Predict the equivalent circuit and phasor diagram of DC different machines.

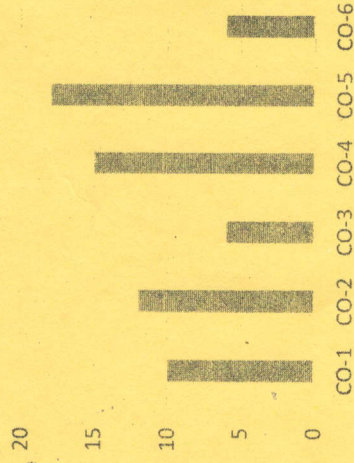
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome wise Marks Distribution



■ CO-1 ■ CO-2 ■ CO-3 ■ CO-4 ■ CO-5 ■ CO-6

18/01/25



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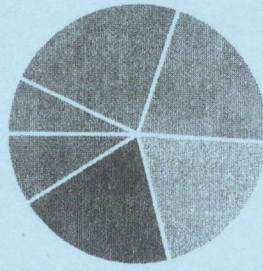
Branch	Electrical & Electronics Engineering	Program	Diploma
Subject Name	Electrical and Electronic Measurements	Semester	III
		Year	January, 2025
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't Write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will come under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Paper(s)</u>. 		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)			
Q. N	QUESTIONS	Marks	COs
1			KL
i	What are the major characteristics of an electrical instrument?	02	CO1 K1
ii	Define Accuracy and Sensitivity of instrument.	02	CO2 K2
iii	Explain the term Measurement.	02	CO2 K1
iv	Name the effects by which deflecting torque is produced.	02	CO1 K2
v	Name the various damping method of an instrument.	02	CO3 K1
vi	Explain the process of calibration.	02	CO3 K2
vii	Explain the applications of CT and PT	02	CO1 K5
viii	By which method we can measure high resistance?	02	CO4 K1
ix	Explain the functions of digital multi-meter.	02	CO5 K1
x	What is LCR meter?	02	CO5 K2

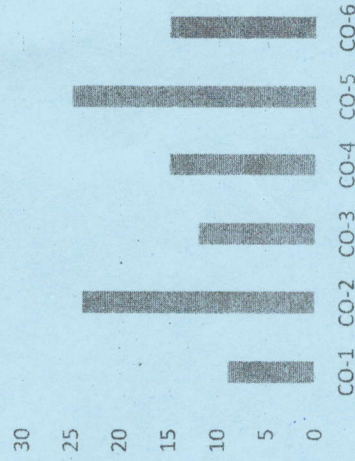
CO1	Recall the evolution and history of units and standards in Measurements
CO2	Understand the various parameters that are measurable in electrical and electronic instrumentation
CO3	Use the complete knowledge of various electronics instruments/transducers to measure the physical quantities in the field of science, engineering and technology.
CO4	Inspect the performance characteristics of electrical and electronic instruments
CO5	Assess the basic meters such as voltmeters and ammeters
CO6	Generate novel electronic and electrical products and solutions for real life problems

GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



Course Outcome wise Marks Distribution



Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Access eddy current damping with diagram.	05	CO2	K4
3	Explain the different types of errors occurs in measurement.	05	CO1	K4
4	Explain the working principle of three phase dynamometer type watt-meter with diagram.	05	CO2	K2
5	Explain the calibration process of an energy meter.	05	CO3	K2
6	A moving coil galvanometer of 5 ohm resistance gives a full scale deflection when a current of 50mA passes through the instrument. Explain how it can be used to read voltage upto 250 volt.	05	CO4	K5
7	Explain the process of magnetic effect by which deflecting torque is produce with diagram.	05	CO6	K1

Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the MI instrument working principle include a detailed diagram and discuss its advantages and disadvantages.	10	CO3	K2
9	Critically evaluate the process for measuring three-phase power with diagram.	10	CO4	K4
10	Analyse the working principles of the three-phase energy meter with diagram.	10	CO2	K4
11	Short note on i. Current Transformer ii. Potential Transformer	10	CO6	K5
12	Evaluate the effectiveness of Wheatstone bridge method for measuring medium resistance.	10	CO6	K4

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Branch	Electrical & Electronics Engineering	Program	Diploma
Subject Name	Electrical and Electronic Measurements	Semester	III
		Year	January, 2025
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't Write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will come under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Paper(s)</u>. 		
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Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)			
Q. N	QUESTIONS	Marks	COs
1			
i	What are the major characteristics of an electrical instrument?	02	CO1 K1
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iii	Explain the term Measurement.	02	CO2 K1
iv	Name the effects by which deflecting torque is produced.	02	CO1 K2
v	Name the various damping method of an instrument.	02	CO3 K1
vi	Explain the process of calibration.	02	CO3 K2
vii	Explain the applications of CT and PT	02	CO1 K5
viii	By which method we can measure high resistance?	02	CO4 K1
ix	Explain the functions of digital multi-meter.	02	CO5 K1
x	What is LCR meter?	02	CO5 K2

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

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6	A moving coil galvanometer of 5 ohm resistance gives a full scale deflection when a current of 50mA passes through the instrument. Explain how it can be used to read voltage upto 250 volt.	05	CO4	K5
7	Explain the process of magnetic effect by which deflecting torque is produce with diagram.	05	CO6	K1

Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

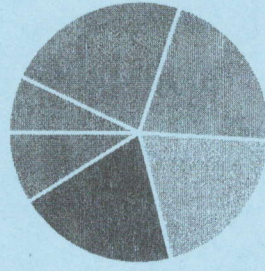
Q. No.	QUESTIONS	Marks	COs	KL
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10	Analyse the working principles of the three-phase energy meter with diagram.	10	CO2	K4
11	Short note on i. Current Transformer ii. Potential Transformer	10	CO6	K5
12	Evaluate the effectiveness of Wheatstone bridge method for measuring medium resistance.	10	CO6	K4

CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

CO1	Recall the evolution and history of units and standards in Measurements
CO2	Understand the various parameters that are measurable in electrical and electronic instrumentation
CO3	Use the complete knowledge of various electronics instruments/transducers to measure the physical quantities in the field of science, engineering and technology.
CO4	Inspect the performance characteristics of electrical and electronic instruments
CO5	Assess the basic meters such as voltmeters and ammeters
CO6	Generate novel electronic and electrical products and solutions for real life problems

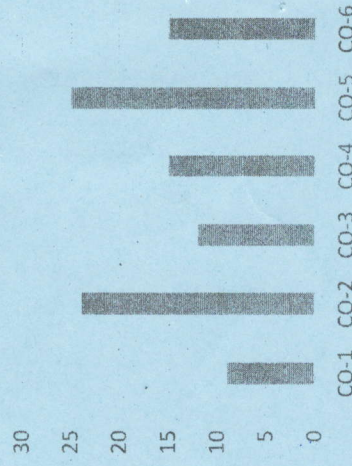
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome wise Marks Distribution



CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

CO1	Recognize basic electrical DC concepts and theorems.
CO2	Extend the concepts of mathematics, science, and engineering to the analysis and design of electrical circuits.
CO3	Utilize the techniques, skills, and modern engineering tools such as pspace, workbench, necessary for engineering practice.
CO4	Analyze function on multi-disciplinary teams through the electric circuits experiments and projects.
CO5	Interpret engineering problems in the area circuits and systems.
CO6	Design an electric system, components or process to meet desired needs within realistic constraints.

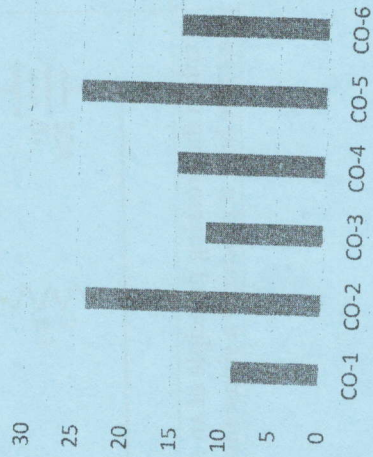
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome wise Marks Distribution



21/01/25

ARKA JAIN University
Jharkhand

NAAC GRADE A
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School of Engineering & IT

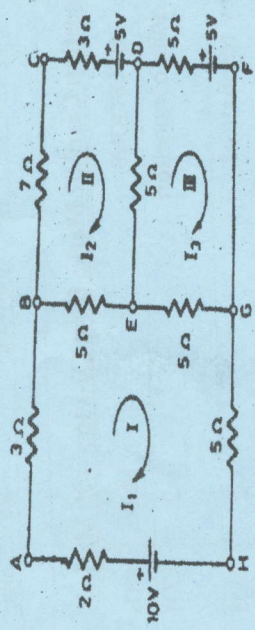
Branch	Electrical & Electronics Engineering	Program	Diploma
Subject Name	Electrical Circuits	Semester	III
		Year	January, 2025
Time: 3 Hour	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will come under Unfair Means and will result in the Cancellation of the Paper(s). 		
Max. Marks : 70			
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

Q.N	QUESTIONS	Marks	COs	KL
i	Draw the circuit for delta connection	2	CO1	K1
ii	What do you mean by resonance?	2	CO5	K3
iii	Define the terms: mesh and loop.	2	CO2	K2
iv	What do you mean by resonance frequency?	2	CO1	K2
v	Explain KVL and KCL.	2	CO2	K3
vi	Explain mesh analysis with an example	2	CO5	K2
vii	What do you mean by RMS value?	2	CO5	K6
viii	What do you mean by average value?	2	CO3	K3
ix	In an R-L series circuit, if the resistor value is 5 ohms and the inductor value is 0.1 H, what is the formula for the total impedance?	2	CO5	K2
x	Draw the circuit diagram for star connection.	2	CO2	K3

Section B (Answer any FOUR out of SIX) - 20 Marks
(Each question Carry 05 Marks)

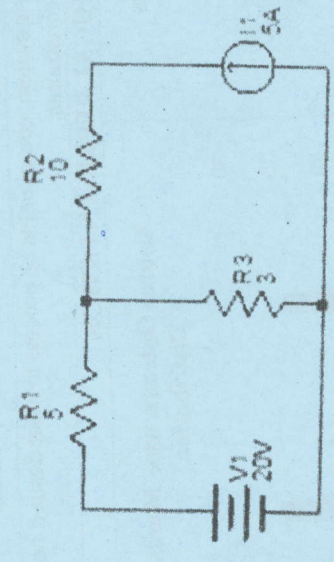
Q. No.	QUESTIONS	Marks	COs	KL
2	Derive relationship between voltage and current in a pure inductive circuit. Also obtain an expression for power	05	CO1	K1
3	Derive the r.m.s value of a sine wave alternating quantity	05	CO5	K3
4	Draw the power triangle and define active, reactive and apparent power.	05	CO2	K2
5	What is series resonant? Derive the expression for resonance frequency of a series RLC circuit.	05	CO1	K2
6	Determine the current i_1 , i_2 and i_3 using Kirchhoff's voltage law for the network shown given below	05	CO2	K3
7	3 resistances of 10, 20 and 25 ohms are connected in parallel to voltage source of 220V; Calculate the total current, power drawn from the source and voltage drop across each resistance.	05	CO5	K2



Section C (Answer any THREE out of FIVE) - 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Determine the average value, RMS value and peak factor of a pure sinusoidal Waveform?	10	CO1	K1
9	If a resistor of 15 Ω and capacitor of 150μf are connected in series across 230 volt, 50Hz supply to determine the impedance, current, power factor, phase angle, power consumed.	10	CO1	K1
10	A series RLC circuit consists of a pure inductor of 10 H, pure capacitor of 300μF and a pure resistor of 5 Ω connected in series across a voltage of 230sin314tFind (a) The impedance of the circuit,	10	CO5	K3



- (b) Current drawn from the supply,
 - (c) PF and the PF angle,
 - (d) The voltage drops across each element,
 - (e) Active and reactive powers drawn from the supply.
- State Superposition theorem. In the circuit shown, find the current through 3Ω resistor using Superposition theorem.



12 Explain the working principle of an AC generator and describe how it produces a sinusoidal voltage.

11		10	CO2	K2
12		10	CO1	K2

23/01/25

	ARKA JAIN University Jharkhand		END SEM EXAMINATION School of Engineering & IT
Branch Subject Name	Electrical and Electronics Engineering Introduction to Electric Generation System		Program Semester Year
Time: 3 Hour Max. Marks : 70	• Start writing from 2nd page onwards; don't Write on the 1st Page Backside • Answer all Questions of Section A (Compulsory) • Answer Any Four out of Six of Section B • Answer Any Three out of Five of Section C • Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will come under <u>Unfair Means</u> and will result in the <u>Cancellation of the Paper(s)</u> .		
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)				
Q. N1	QUESTIONS	Marks	COs	KL
i	Write down the primary function of the dam in a hydroelectric power station.	2	CO4	K1
ii	What is a power generating station? *	2	CO3	K3
iii	State any two advantages of Kaplan turbine over Francis turbine.	2	CO2	K1
iv	Define the term Biomass	2	CO4	K3
v	The values of demand factor and load factor always less than 1. Why?	2	CO2	K1
vi	Write down the working of Power tower in Solar power plant.	2	CO2	K2
vii	What are the Merits of Thermal Power station?	2	CO6	K2
viii	List different types of concentrating type solar collectors.	2	CO2	K4
ix	Define the term "connected load and maximum demand".	2	CO3	K4
x	How does a prime mover convert one form of energy into mechanical energy?	2	CO5	K1

Section B (Answer any FOUR out of SIX) - 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	List the merits & demerits of the hydro-electric power station	05	CO3	K4
3	Discuss about the construction & working of power tower, parabolic trough, parabolic dish on solar plant	05	CO2	K6
4	Discuss the functions of condenser, cooling towers and economizer in thermal power plant	05	CO2	K4
5	The maximum demand on a power station is 100MW. If the annual load factor is 40%. Calculate the total energy generated in a year	05	CO3	K3
6	Discuss the factors for the choice of site for a Thermal Power plant	05	CO1	K6
7	Write down the merits and demerits of Wind Power plant	05	CO1	K4

Section C (Answer any THREE out of FIVE) - 30 Marks
(Each question Carry 10 Marks)

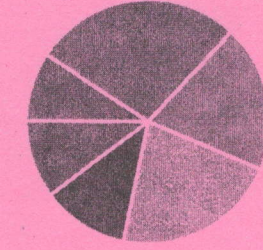
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain with schematic diagram the open cycle and closed cycle gas turbine power plants.	10	CO6	K6
9	Draw the schematic arrangement of a hydroelectric plant & explain	10	CO6	K3
10	a) Discuss about the bio-chemical based power plant with schematic diagram. b) Compare the difference between solar & biomass power plant.	10	CO4	K2
11	i) Explain the terms, load factor & diversity factor. How do these factors influence cost of generation ii) Define & explain a. Average demand b. Base load & peak load plants	10	CO4	K2
12	a) A generating station has a maximum demand of 25 MW, A load factor of 60%, a Plant capacity factor of 50% and a plant use factor of 72%. Find: i) The reserve capacity of the plant ii) The daily energy produced and iii) Maximum energy that could be produced daily if the plant while running as per schedule, were fully loaded.	10	CO5	K5

CO- Course Outcomes, KL- Knowledge Level, PO - Program Outcome

Course Outcomes	CO1	CO2	CO3	CO4	CO5	CO6
	Label the block diagrams of energy conversion process	Compare the basic abstractions of electrical power generations from conventional and nonconventional sources of energy	Use the knowledge of electrical power generation in other field of science, engineering and economics	Discover the impact of various systems on environment and economics aspects of energy generation.	Estimate generation control on a power system using simulation tools.	Design a Electric power generation system, components/process to meet desired needs within realistic constraints such as economic, environmental and safety

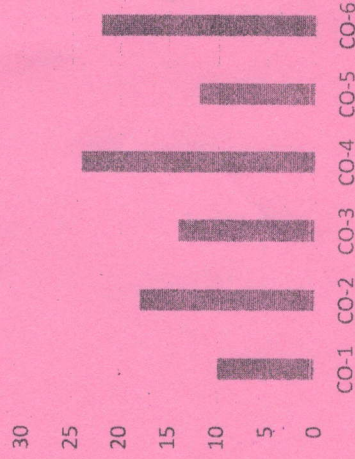
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome wise Marks Distribution





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School of Engineering & IT

Branch	Electrical and Electronics Engineering	Program	Diploma
Subject Name	Applied Electronics	Semester	III
		Year	January, 2025
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> Start writing from 2nd page onwards; don't Write on the 1st Page Backside Answer all Questions of Section A (Compulsory) Answer Any Four out of Six of Section B Answer Any Three out of Five of Section C Possession of <u>Mobile Phones</u> or any kind of <u>Written Material, Arguments with the Invigilator or Discussing with Co-Student</u> will come under <u>Unfair Means</u> and will <u>Result in the Cancellation of the Papers.</u> 		
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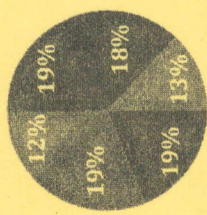
Section A (Each question Carry 02 Marks from Q1-i to Q1-xx) - 20 Marks

Q. N1	QUESTIONS	Marks	Cos	KL	PO
i	What is MOSFET? Mention its types.	2	CO1	K1	PO1
ii	Write some applications of JFETs. *	2	CO1	K1	PO1
iii	List the advantages of SCR.	2	CO2	K1	PO1
iv	What are semiconductors?	2	CO1	K3	PO1
v	Draw the VI Curve for DIAC.	2	CO3	K4	PO2
vi	Define a) Drift current b) Barrier Potential	2	CO1	K2	PO1
vii	Draw the circuit diagram of CE configuration.	2	CO1	K3	PO2
viii	Give the symbol of DIAC and TRIAC.	2	CO4	K1	PO1
ix	Why BJT is called current controlled device?	2	CO1	K2	PO2
x	The transistor has $I_E = 10 \text{ mA}$ and $\alpha = 0.98$. Find the value of base and collector currents.	2	CO5	K4	PO1

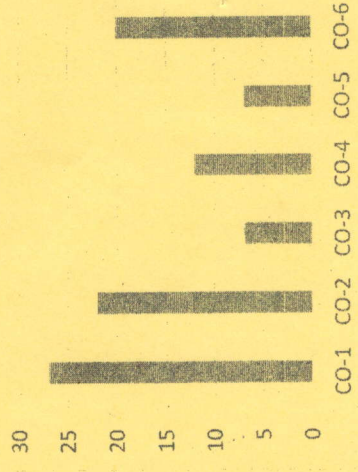
CO1	List the fundamental concepts of various electronic devices.
CO2	Classify various electronics components and their uses in practical circuits.
CO3	Apply the basic knowledge of different power amplifier circuits, their design and their use in electronics and communication circuits.
CO4	Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation.
CO5	Evaluate frequency response and understand behavior of Electronics circuits.
CO6	Create projects and models of different oscillator circuits for various frequencies.

GRAPHICAL REPRESENTATION

BLOOM'S LEVEL WISE MARKS DISTRIBUTION



Course Outcome wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question 5 Marks)

Q. No.	QUESTIONS	Marks	Cos	KL	PO
2	Draw the transfer characteristics curve for a JFET and explain the key regions.	5	CO3	K3	PO1
3	Explain the difference between current shunt and current series feedback.	5	CO3	K5	PO2
4	Explain the operation of a PN junction under forward bias condition with its characteristics.	5	CO2	K4	PO2
5	If a transistor has a α of 0.97 find the value of β . If $\beta=200$, find the value of α .	5	CO5	K6	PO2
6	Explain the input and output characteristics of a transistor in CC configuration.	5	CO1	K1	PO1
7	Compare N-channel MOSFETs with P-channel MOSFETs.	5	CO2	K2	PO1

Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	Cos	KL	PO
8	Explain the construction, operation, equivalent circuit V-I characteristics and application of TRIAC.	10	CO1	K1	PO1
9	Draw the circuit diagram of a NPN transistor CE configuration and the input and output characteristics. Also define its operating regions.	10	CO2	K3	PO2
10	Explain the fixed bias circuit in BJT. Derive the expression of input current, output current and output voltage.	10	CO4	K6	PO1
11	With neat diagram explain the operation of MOSFET in Depletion mode and Enhancement mode.	10	CO6	K5	PO2
12	Explain the construction, operation, equivalent circuit V-I characteristics and application of DIAC.	10	CO6	K2	PO1