

O- Course Outcomes,

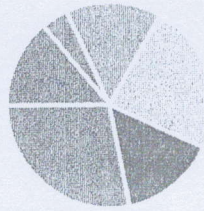
KL- Knowledge Level,

PO – Program Outcome

CO1	Recognize the concepts of magnetic circuits.
CO2	Understand the operation of dc machines.
CO3	Analyse single phase and three phase transformer circuits.
CO4	Compare the differences in operation of different dc machine configurations.
CO5	Evaluate performance parameters for transformer.

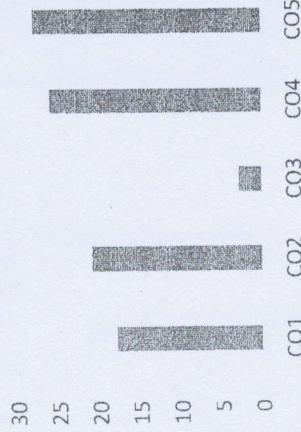
GRAPHICAL REPRESENTATION

Bloom's Level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome Wise Marks Distribution

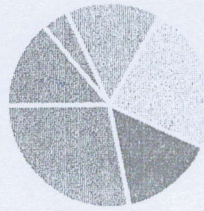


PO – Program Outcome

CO1	Recognize the concepts of magnetic circuits.
CO2	Understand the operation of dc machines.
CO3	Analyse single phase and three phase transformer circuits.
CO4	Compare the differences in operation of different dc machine configurations.
CO5	Evaluate performance parameters for transformer.

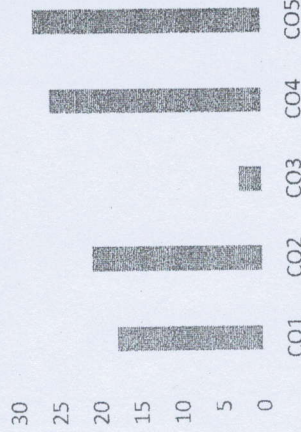
GRAPHICAL REPRESENTATION

Bloom's Level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome Wise Marks Distribution



ARKAJAIN University
Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	Electrical & Electronics Engineering	Program	B.Tech
Subject Name	Electrical Machine-I	Semester	3rd
		Year	2023/Odd

• 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 Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will come under Unfair Means and will Result in the Cancellation of the Papers.

Time: 3 Hour
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 Q1-x) – 20 Marks					
Q. N1	QUESTIONS	Marks	COs	KL	PO
i	Define: a) Magnetic flux b) Relative Permeability	2	CO1	K1	PO2
ii	Mention the properties of magnetic lines of forces.	2	CO3	K2	PO1
iii	Write a brief note on Auto Transformer.	2	CO5	K2	PO3
iv	A 100 kVA, 60 Hz single phase transformer has 100 turns on the primary & 10 turns on the secondary winding. The maximum flux in the magnetic core is 30 mWb. Calculate the primary & secondary emfs.	2	CO4	K6	PO2
v	A 220/25 V single phase transformer takes 0.8 A at p.f. of 0.432 on open circuit. Find the magnetising & working components of no load primary current.	2	CO4	K3	PO4
vi	Briefly describe open circuit test on a single phase transformer.	2	CO3	K1	PO2
vii	Draw the equivalent circuit of single-phase transformer.	2	CO5	K6	PO5
viii	A shunt generator delivers 5000 A at 220 V and the resistance of the shunt field & armature are 50 Ω & 0.03 Ω respectively. Calculate the generated emf.	2	CO1	K5	PO6
ix	Briefly describe the losses occurring in a transformer.	2	CO1	K1	PO12
x	Draw the phasor diagram for a transformer with winding resistances & magnetic leakage operating in load condition (lagging p.f.).	2	CO2	K2	PO11

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

(Each question 5 Marks)

Q.No.	QUESTIONS	Marks	COs	KL	PO
2	Mention the total losses occurring in a DC Generator.	5	CO2	K2	PO5
3	Explain Biot Savart Law. Derive the expression for it.	5	CO3	K1	PO4
4	An 8-pole DC generator has 500 armature conductors and a useful flux of 0.05 Wb. What will be the emf generated, if it is lap connected & runs at 1200 rpm? What must be the speed at which it is to be driven to produce the same emf, if it is wave wound.	5	CO5	K3	PO1
5	Explain the various constructional parts of a DC machine.	5	CO1	K4	PO5
6	A 220/25 V single phase transformer takes 0.5 A at p.f. of 0.3 on open circuit. Find the magnetising & working components of no load primary current.	5	CO5	K5	PO2
7	Draw the diagram for power stages of DC motor. Also mention the losses occurring in a DC Motor.	5	CO3	K2	PO3

Section C (Answer any THREE out of FIVE) – 30 Marks-

(Each question Carry 10 Marks)

Q.No.	QUESTIONS	Marks	COs	KL	PO
8	Derive the EMF expression of single phase transformer. A long shunt compound generator delivers a load current of 50 A at 500 V and has armature, series field & shunt field resistances of 0.05 Ω , 0.03 Ω and 250 Ω respectively. Calculate the generated voltage & the armature current. Allow 1 V per brush for contact drop.	10	CO2	K1	PO11
9	Explain the commutation process in DC Generator in detail.	10	CO1	K2	PO4
10	Discuss the significance of Back EMF in DC Motor. Also derive the Torque equation of DC Motor.	10	CO1	K3	PO5
11	Derive the EMF equation of a DC Generator. A 230/460 V single phase transformer has a primary resistance of 0.2 Ω & reactance of 0.5 Ω and the corresponding values for the secondary are 0.75 Ω & 1.8 Ω respectively. Find the secondary terminal voltage when supplying 10 A at 0.8 p.f. lagging. Also find the regulation in percentage.	10	CO4	K5	PO2
12	Draw the phasor diagrams for a single phase transformer with winding resistance & magnetic leakage on unity, lagging & leading power factor loading.	10	CO5	K4	PO12



ARKAJAIN
University
Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	Electrical & Electronic Engineering	Program	B-Tech
Subject Name	Electrical Circuit Analysis	Semester	3rd
		Year	2023/ Odd
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 comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Papers.</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 Q1-x) - 20 Marks

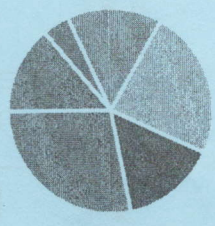
Q.N1	QUESTIONS	Marks	COs	KL	PO
i	What do you mean by maximum power transfer theorem? write its condition for alternating current application.	2	CO3	K1	PO2
ii	Define Superposition theorem	2	CO3	K3	PO1
iii	Define damping factor?	2	CO2	K3	PO3
iv	What do you mean by time constant	2	CO2	K1	PO4
v	Write the difference between single phase and three phase system	2	CO5	K1	PO3
vi	Define self and mutual-inductance in a circuit	2	CO5	K2	PO2
vii	What do you mean by quality factor in resonance	2	CO1	K1	PO4
viii	Find the Laplace transform of $(t+1)^2 e^t$	2	CO5	K5	PO4
ix	Enlist the interconnections of Two-port networks	2	CO4	K4	PO6
x	The Z parameters of the two port network are $Z_{11} = 20\Omega, Z_{22} = 30\Omega, Z_{12} = Z_{21} = 10\Omega$. Find the ABCD parameter.	2	CO4	K6	PO6

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

CO1	Identify the characteristics of circuit elements.
CO2	Demonstrate the resonance in R-L-C series circuit.
CO3	Apply network theorems for the analysis of electrical circuits.
CO4	Analyse two port circuit behaviour.
CO5	Evaluate circuit parameters in the sinusoidal steady state (single-phase and three-phase) condition.

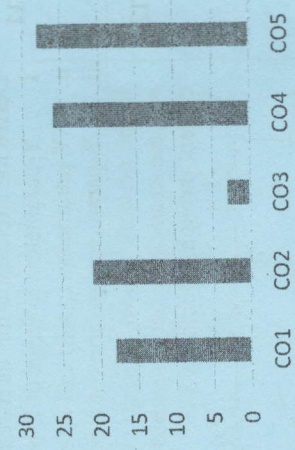
GRAFICAL REPRESENTATION

Bloom's Level wise Marks Distribution

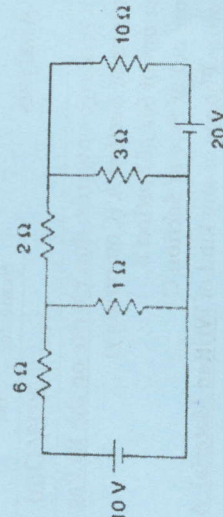
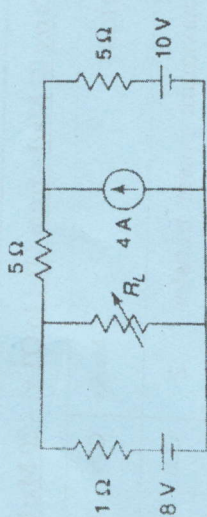
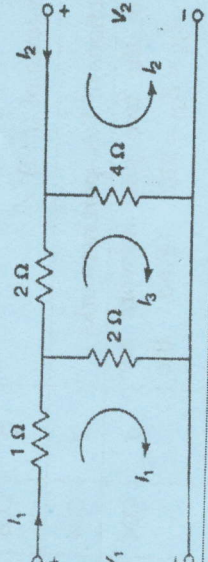


■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

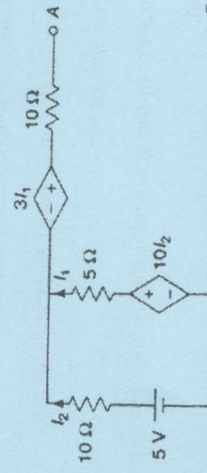
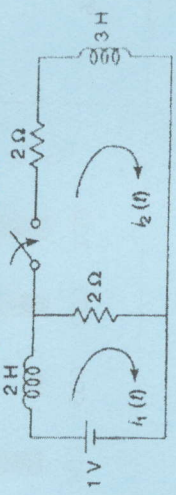
Course Outcome Wise Marks Distribution



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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Find the current through 10 ohm resistor using Thevenin's theorem 	5	CO3	K3	PO1
3	Find the value of resistance R_L in figure using maximum power transfer theorem and calculate maximum power 	5	CO3	K3	PO1
4	Derive the expression for root mean square value of an alternating quantity.	5	CO5	K4	PO4
5	Derive the expression for transient current for a series RL circuit with direct current excitation.	5	CO5	K5	PO2
6	A series RLC circuit has the following parameter values: $R=10 \text{ ohm}$, $L=0.01 \text{ H}$, $C=100 \text{ }\mu\text{F}$. Compute the resonant frequency, bandwidth and lower and upper frequencies of the bandwidth	5	CO6	K1	PO5
7	Determine hybrid parameters for the network and validate whether the network is reciprocal or not 	5	CO4	K6	PO6

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Find Norton's equivalent network across terminals A and B 	10	CO3	K3	PO1
9	Derive the expression for transient current for a series RLC circuit with direct current excitation.	10	CO2	K4	PO4
10	Derive the expression of voltage, current and power relations in a balanced star and delta connected load.	10	CO5	PO4	PO4
11	Derive the expression for inter-relationship between i. Y-parameters in terms of Z-parameters ii. Y-parameters in terms of ABCD-parameters iii. Y-parameters in terms of h-parameters	10	CO6	K3	PO5
12	In the network shown in figure, the switch is closed at $t=0$, the steady state being reached before $t=0$. Determine current through inductor of 3 H 	10	CO4	K6	PO6

Subject Name: Electromagnetic Fields

- 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 Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Means and will result in the Cancellation of the Papers.

Time: 3 Hour
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 Q1-x) - 20 Marks

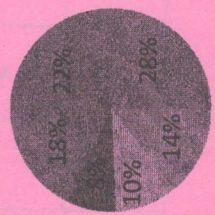
Q.N1	QUESTIONS	Marks	COs	KL	PO
i	if $U = xz - x^2y + y^2z^2$, Evaluate div grad U	2	CO1	K1	PO2
ii	Compute Gradient of Scalar Field?	2	CO1	K1	PO1
iii	Illustrate Coulomb's law in vector form?	2	CO2	K4	PO3
iv	Specify Electric field due to Volume charge distributions?	2	CO2	K2	PO2
v	Write Short notes on Current Density?	2	CO3	K3	PO4
vi	Explain Permittivity of dielectric materials	2	CO3	K6	PO3
vii	Give the importance of Force on a moving charge?	2	CO4	K2	PO5
viii	What do you understand by Mutual Induction	2	CO4	K2	PO3
ix	Write Nature of Magnetic Materials?	2	CO5	K6	PO3
x	Express Motional Electromotive forces?	2	CO6	K4	PO2

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

CO1	Recall the basic laws of electromagnetism.
CO2	Understand the propagation of EM waves
CO3	Interpret the electric and magnetic fields for simple configurations under static conditions
CO4	Design various devices that can work based on the forces generated by electric and magnetic fields
CO5	Analyze time varying electric and magnetic fields.
CO6	Apply Maxwell's equation in different forms and different media.

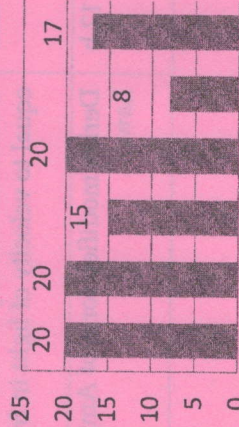
GRAFICAL REPRESENTATION

Bloom's Level Wise Marks Distribution



- Level 1
- Level 2
- Level 3
- Level 4
- Level 5
- Level 6

Course Outcome Wise Marks Distribution



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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2.a	State and prove Stoke's Theorem.	3	CO1	K2	PO2
2.b	Explain Physical Significance of Gradient of scalar Field?	2	CO1	K4	PO2
3.a	State and explain Gauss's law in Differential form?	3	CO2	K1	PO1
3.b	Find Electric Field Intensity due to Charge Sheet?	2	CO2	K3	PO3
4.a	Discuss Absolute Electric Potential for uniform Electric Field?	3	CO2	K4	PO4
4.b	For a given non-uniform electric field, find out the work done and electric potential in moving 10 charge from point P(0,0,1) to a point Q(1,1,1)	2	CO2	K6	PO5
5.a	Find the expression for ohm's law in point form	3	CO3	K5	PO2
5.b	Write Application of Laplace's and Poisson's equations	2	CO3	K4	PO5
6.a	Explain Magnetic Boundary Condition?	3	CO4	K6	PO3
6.b	Calculate the magnetic flux density at the Centre of current carrying loop when the loop radius is 5 cm, loop current is $25\mu\text{A}$, and the loop is placed in air.	2	CO4	K4	PO4
7.a	Write four Maxwell equations and explain their physical significance.	3	CO5	K3	PO3
7.b	Explain Skin Effect in Conductors?	2	CO6	K2	PO5

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
8a	Explain spherical coordinates system and relation with Cartesian co-ordinate System.	4	CO1	K2	PO2
8b.	Convert points P(1, 3, 5), T(0, -4, 3), and S(-3, -4, -10) from Cartesian to cylindrical and spherical coordinates?	6	CO1	K3	PO2
9a	Explain Electrostatic Energy and Energy density?	4	CO2	K1	PO2

9b	Two dipoles with dipole moments -5az nC/m and 9az nC/m are located at points (0, 0, -2) and (0, 0, 3), respectively. Find the potential at the origin?	6	CO2	K3	PO3
10a.	Discuss Continuity of current for electromagnetic field?	5	CO3	K2	PO2
10b.	Derive expression for Capacitance of a two wire line?	5	CO3	K3	PO4
11a.	State and prove Biot- Savart Law?	4	CO4	K2	PO2
11b	Explain Scalar and Vector Magnetic Potential.	4	CO4	K3	PO4
11c.	What is Magnetization and Permeability?	2	CO4	K4	PO4
12.a	Prove that velocity of electromagnetic wave is equal to velocity of light in free space.	5	CO5	K1	PO1
12.b	Derive modified form of Ampere's Circuital Law.	5	CO6	K3	PO1