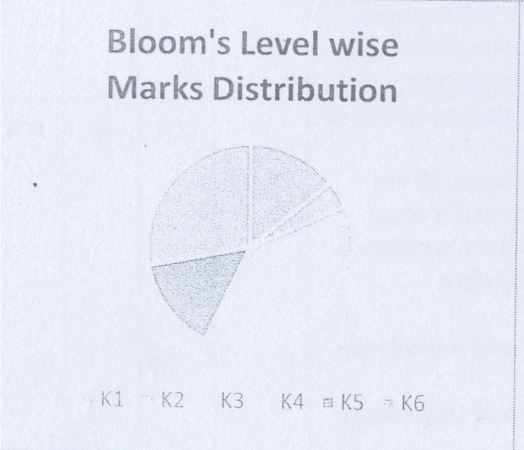
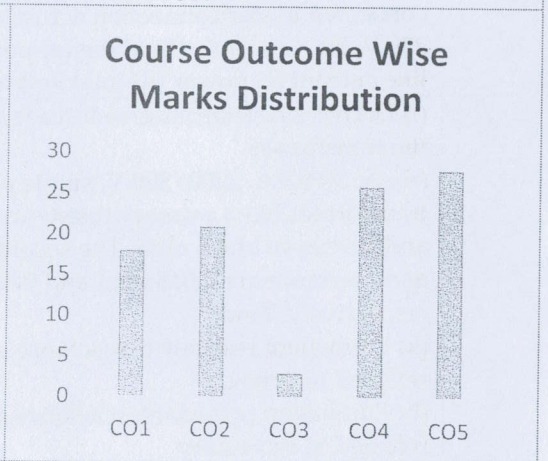
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Understand the basic D.C. electric circuits and applications.
	CO2	Understand the basic A.C. electric circuits and applications
	CO3	Analyze magnetic circuits and Realize the requirement of transformers in transmission and distribution of electric power and other applications.
	CO4	Study the working principles of electrical machines.
	CO5	Analysis of different types the types of switchgear and earthing

GRAFICAL REPRESENTATION





ARKAJAIN University Jharkhand

END TERM EXAMINATION
School of Engineering & IT

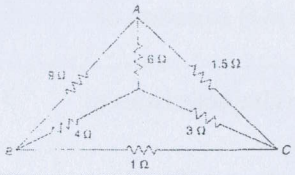
Branch	**ME ,CSE , EEE & CL**	**Program**	**B.Tech**
Subject Name	**Basic Electrical Engineering**	**Semester**	**1st**
		Year	**2023/ Odd**

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 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**.

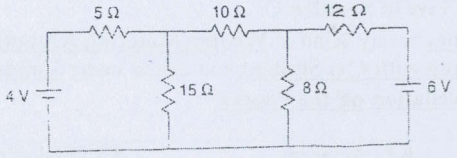
Knowledge Level (KL)	**K1 :** Remembering	**K3 :** Applying	**K5 :** Evaluating
	K2 : Understanding	**K4 :** Analysing	**K6 :** Creating

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

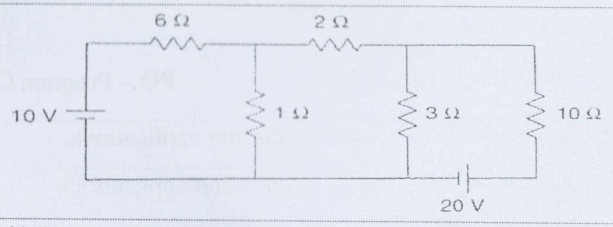
Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Define superposition and Nortons's Theorem	2	CO1	K1	PO2
ii	Find an equivalent resistance between A and B using star-delta transformation 	2	CO1	K3	PO1
iii	What do you mean by power and impedance triangle	2	CO2	K3	PO3
iv	A series circuit consumes 2000 W at 0.5 leading power factor, when connected to 230 V, 50 Hz alternating current supply. Calculate (a) Active power (b) Reactive power.	2	CO2	K5	PO4
v	Enlist the types of magnetic material	2	CO3	K1	PO3
vi	Define mutual-inductance	2	CO3	K2	PO2
vii	What do you mean by slip?	2	CO4	K1	PO4
viii	Enlist the types of single phase induction motor	2	CO4	K2	PO4

ix	What do you mean by switch gear?	2	CO5	K4	PO6
x	Enlist the type of batteries	2	CO5	K6	PO6

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Find the current through the 8 ohm resistor using superposition theorem 	5	CO3	K3	PO1
3	Derive an expression for root mean square value (R.M.S) of an alternating quantity.	5	CO3	K1	PO1
4	A series RLC circuit which resonates at 500 kHZ has R=25 Ω, L=100 μH and C=1000 pF. Determine the quality factor, new value of C required to resonate at 500kHz when the value of L is doubled, and the new quality factor.	5	CO5	K6	PO4
5	Derive the electro motive force (e.m.f) equation of direct current (D.C) generator	5	CO5	K4	PO2
6	Describe briefly about torque–slip characteristics of three phase induction motor	5	CO6	K1	PO5
7	What do you mean by fuse? Describe briefly about its type	5	CO4	K4	PO6

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

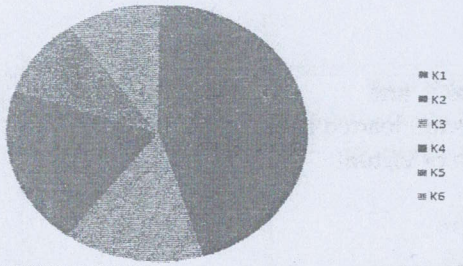
Q. No.	QUESTIONS	Marks	COs	KL	PO
1	(i) Define Thevenin's theorem and draw its equivalent circuit (ii) Find the current through 10 ohm resistor using Thevenin's theorem 	10	CO3	K3	PO1
2	(i) Derive the expression of voltage, current and power relations in a balanced star and delta connected load. (ii) Three coils, each having a resistance and an inductance of 8 ohm and 0.02 H respectively, are connected in star connection across a three phase, 230 V, 50 Hz supply. Find the (a) power factor, (b) line current (c) power (d) total volt-amperes.	10	CO2	K4	PO4
3	(i) Derive the electromotive force (e.m.f) equation of the transformer (ii) A, 30 KVA, 2000/200 V, single phase, 50 Hz transformer has a primary resistance of 3.5 ohm and reactance of 4.5 ohm. The secondary resistance and reactance are 0.015 ohm and 0.02 ohm respectively. Find: (a) Equivalent resistance, reactance and impedance referred to primary (b) Equivalent resistance, reactance and impedance referred to secondary	10	CO5	K3	PO4
4	(i) Explain briefly about the working principle and construction and of direct current (d.c.) machine. (ii) A 8-pole direct current (d.c.) shunt generator with 778 wave connected armature conductors and running at 500 r.p.m. supplies a load of 12.5 ohm resistance at terminal voltage of 50 V. The armature resistance is 0.24 ohm and field resistance is 250 ohm. Find the armature current, the induced e.m.f. and the flux.	10	CO6	K3	PO5
5	Write short notes on (i) Earth Leakage Circuit Breaker (ELCB) (ii) Electrical Earthing	10	CO4	K6	PO6

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

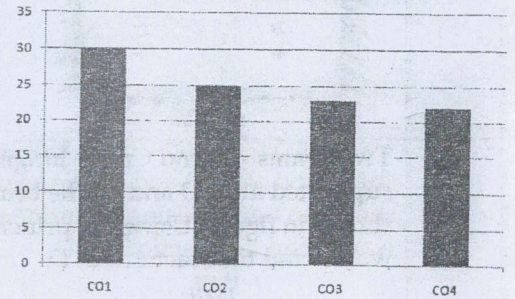
Course Outcomes	CO1	Classifying different types of motions in kinematics.
	CO2	Categorizing the bodies in kinetics as a particle, rigid body in translation and rotation.
	CO3	Choosing principle of impulse momentum and virtual work for equilibrium of ideal systems, stable and unstable equilibriums
	CO4	Appraising work and energy method for particle motion and plane motion.

GRAPHICAL REPRESENTATION

Blooms Level wise marks Distribution



Course Outcome Wise Marks Distribution



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ARKAJAIN University Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	CSE, ME , EEE & CL	Program	B. tech
Subject Name	Engineering Mechanics	Semester	1st
		Year	2023/ Odd

Time: 3 Hour
Max. Marks : 70

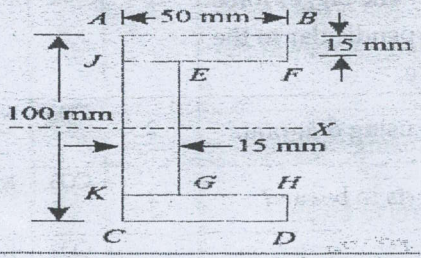
- Start writing from 2nd page onwards; don't Write on the 1st Page Backside
- Answer all Questions of Section A (Compulsory)
- Answer Any Four out of Six of Section B
- Answer Any Three out of Five of Section C
- Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfa Means and will Result in the Cancellation of the Papers.

Knowledge Level (KL)			
	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

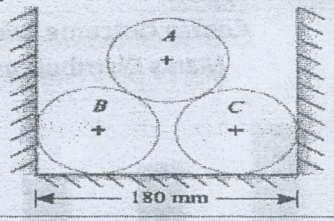
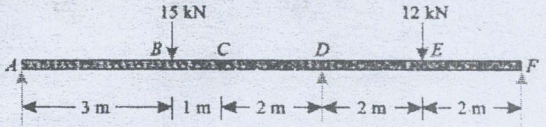
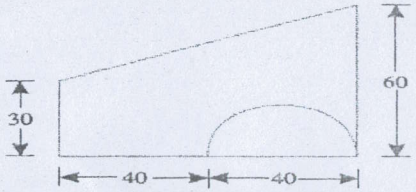
Section A (Each question Carry 02 Marks from Q1-i to Q1-x) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Define" the law of transmissibility of Forces".	2	CO1	K1	PO2
ii	Two forces act at an angle of 120°. The bigger force is of 40 N and the resultant is perpendicular to the smaller one. Find the smaller force.	2	CO1	K1	PO2
iii	Define Lami's theorem and show using diagram.	2	CO2	K4	PO3
iv	What are different types of supports in beams?	2	CO3	K2	PO3
v	Define coefficient of friction and angle of friction.	2	CO2	K4	PO4
vi	Define cone of friction.	2	CO3	K5	PO4
vii	Draw a semicircle and locate its centroid.	2	CO2	K2	PO3
viii	What is the location of Centre of gravity of a right circular cone.	2	CO3	K3	PO4
ix	Why the mechanical advantages of lifting machines is greater than one?	2	CO4	K4	PO3
x	Define the term velocity ratio.	2	Co4	K4	PO3

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
1	A Triangle ABC has its side AB = 40mm, along positive x-axis and side BC = 30 mm along positive y-Axis. Three forces of 40 N, 50N and 30N act along the sides AB, BC and CA respectively. Determine magnitude of the resultant of such a system of forces.	5	Co1	K2	PO3
2	A simply supported beam AB of length 9m, carries a uniformly distributed load of 10 kN/m for a distance of 5 m from the right end. Calculate the reactions at A and B.	5	Co1	K3	PO2
3	A force of 250 N pulls a body of weight 500 N up in an inclined plane, the force being applied parallel to the plane. If the angle of inclination of plane to the horizontal is 15°. Find the coefficient of friction.	5	Co2	K4	PO3
4	Find the centre of gravity of a channel section 100 mm × 50 mm × 15 mm. 	5	Co2	K4	PO4
5	Draw diagram of differential wheel and axle as lifting machine and find equation for velocity ratio.	5	Co3	K4	PO3
6	Explain working of Worm and worm Wheel with neat sketch.	5	Co4	K5	PO4

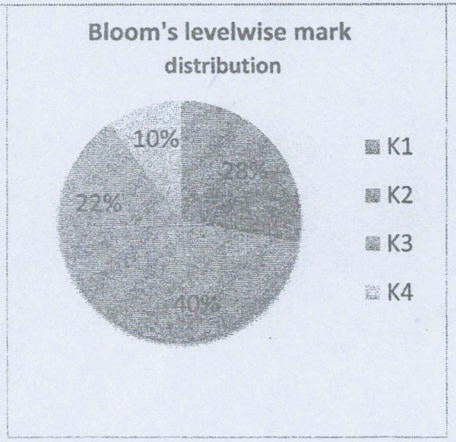
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

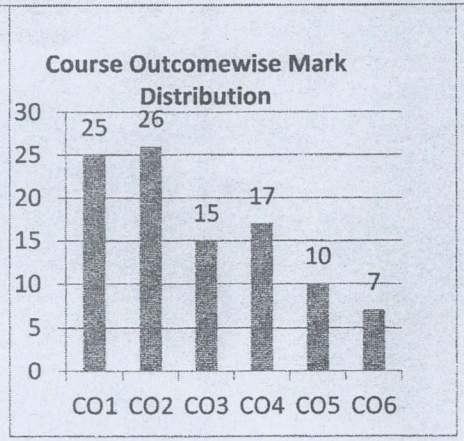
Q. No.	QUESTIONS	Marks	COs	KL	PO
1	The following forces act at a point : (i) 20 N inclined at 30° towards North of East. (ii) 25 N towards North. (iii) 30 N towards North West and (iv) 35 N inclined at 40° towards South of West. Find the magnitude and direction of the resultant force.	10	Co2	K5	PO3
2	Three cylinders weighting 100 N each and of 80 mm diameter are placed in a channel of 180 mm width as shown in figure. Determine the pressure exerted by (i) the cylinder A on B at the point of contact (ii) the cylinder B on the base and (iii) the cylinder B on the wall. 	10	Co1	K2	PO4
3	Two beams AC and CF are hinged at C and supported at A, D and F. The beams are loaded as shown in figure. Using the principle of virtual work, Find the reactions at D. 	10	Co3	K3	PO3
4	A semicircular area is removed from a trapezium as shown in figure (Dimensions in mm). Determine the centroid of the remaining area (shown hatched). 	10	Co4	K5	PO4
5	Explain any one system of pulleys as lifting machine. Find equation for velocity ratio for the same. There are three pulleys arranged in the third system of pulleys. Find the load that can be lifted by an effort of 50 N, if efficiency of the machine is 80%.	10	Co4	K1	PO5

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

Course Outcomes	CO1	To appreciate the need and importance of engineering chemistry for industrial and domestic use.
	CO2	To gain the knowledge on existing and future upcoming materials used in device fabrication.
	CO3	To impart basic knowledge related to material selection and the techniques for material analysis.
	CO4	To impart knowledge of green chemical technology and its applications.
	CO5	To provide an insight into latest (R&D oriented) topics, to enable the engineering student upgrade the existing technologies and pursue further research.
	CO6	To enhance the thinking capabilities in line with the modern trends in engineering and technology.

GRAFICAL REPRESENTATION





ARKAJAIN University
Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	CSE, ME, EEE & CL	Program	B.Tech
Subject Name	Engineering Chemistry	Semester	1st
		Year	2023/ Odd

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

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-xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Predict magnetic behaviour of N2, CO and B2.	2	CO1	K1	PO2
ii	Define entropy	2	CO1	K2	PO1
iii	Explain why size of cation is less than anion.	2	CO2	K2	PO1 0
iv	Find out chemically equivalent proton present in the following: a) 2,3 dimethyl butane-2 b) Ethyl alcohol	2	CO6	K2	PO1
v	Why Ne_2 molecule does not exist?	2	CO2	K2	PO2
vi	Write down bond angle and structure for sp, sp^2 and sp^3 hybridization.	2	CO1	K1	PO6
vii	Give reason causes air pollution.	2	CO1	K3	PO1
viii	Write electronic configuration of Mg, Cr and K.	2	CO1	K1	PO1
ix	What do you understand waterline corrosion?	2	CO4	K2	PO5
x	What do you understand by bond order	2	CO2	K1	PO6

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Explain semiconductor, conductor and insulator on the basis of band theory of solid	5	CO4	K3	PO5
3	Distinguish between the Addition and condensation polymerization	5	CO2	K1	PO1
4	What are the possible electronic transitions when energy is absorbed by a molecule in the UV region? Give all possible transitions for the following: a) CH_3Cl b) CH_3- CH =O	5	CO1	K1	PO2
5	State and explain first law of thermodynamics and gives its mathematical expression.	5	CO2	K2	PO5
6	Write down the basic postulates of crystal field theory. Explain CFT for octahedral complex.	5	CO3	K2	PO6
7a.	Define Electronegativity.	1	CO6	K3	PO10
7b.	Discuss the characteristics and importance of Electro negativity	4	CO6	K3	PO10

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Write the electronic configuration, energy level diagram, calculate the bond order and predict the magnetic behavior of : N_2, N_2^+, N_2^-, N_2^{2-}.	10	CO4	K2	PO5
9	What are the salient features of VSEPR theory? Discuss the geometry of the following using VSEPR theory: (a) NH_3 and (b) ClF_3	10	CO5	K2	PO6
10	Write short notes on a. Bakellite b. Nylon 6, c. PTFE (Teflon)	10	CO2	K2	PO1
11	Write the general outer electronic configuration of s, p, d and f block elements. Explain the general properties of elements belonging to these groups.	10	CO1	K3	PO2
12	Derive the Nernst equation for the potential of a single electrode from thermodynamic principle. What it is an application? Calculate the EMF of the following Zn-Ag cell at 22.3^{0}C if the concentration of $ZnSO_4$ and $AgNO_3$ are 0.191 M and 0.0289 M, respectively. Given that $E^0_{Zn^{2+}/Zn}$ =-0.76 V and $E_{Ag^+/Ag}$ = +0.8 V.	10	CO3	K4	PO5