M 25/06/24 215

ARKA JAIN University Jharkhand — NAAC GRADE A

END SEM EXAMINATION
School of Engineering & IT

Branch	ME , CSE , EEE	Program	B. Tech
Subject Name	Engineering Mathematics-II	Semester	II
		Year	June 2024

Time: 3 Hour
Max. Marks : 70

- Start writing from 2nd page onwards; <u>don't Write on the 1st Page Backside</u>
- **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 comes 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. No. 1	QUESTIONS	Marks	COs	KL
i	What do mean by double integration.	2	CO2	K2
ii	Evaluate $\int_0^1 \int_0^{1-x} dxdy$	2	CO5	K5
iii	Write the standard form of the Cauchy's homogeneous linear equation.	2	CO3	K1
iv	Define Green's theorem.	2	CO3	K1
v	Solve $yp^2+(x-y)p-x=0$.	2	CO6	K3
vi	Find the general solution of sin(px-y) =p.	2	CO4	K4
vii	Solve (D3-6D2+11D-6) y=0.	2	CO2	K5
viii	Check whether $f(Z)=\bar{Z}$ is analytic or not.	2	CO6	K3
ix	Write polar form of the C-R equation.	2	CO3	K1
x	Find Residue at its pole If $F(z) = \frac{z^2+2}{z+3}$.	2	CO4	K4

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Evalauate $\iint xydxdy$ over the positive Quadrant of the circle $x^2+y^2=a^2$	05	CO1	K5
3	Solve $x- yp = ap^2$.	05	CO2	K2
4	Solve by power series $\frac{dy}{dx}-y+x=0$.	05	CO6	K3
5	Find the bilinear Transformation which Maps the points $Z_1=2$, $Z_2=i$, $Z_3=-2$ into the Points $W_1=1$, $W_2=i$ and $W_3=-1$.respectively.	05	CO2	K2
6.	Evaluate $\int \frac{cos2\pi z}{(2z-1)(z-3)} dz$, C:$\|Z\|=1$.	05	CO5	K5
7	Find the Value of $\int_0^{1+i}(x^2+iy)dz$ along the path y=x .	05	CO4	K4

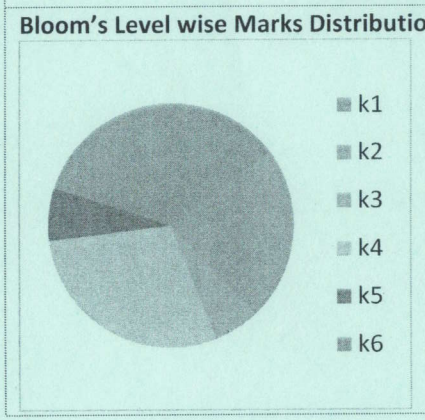
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

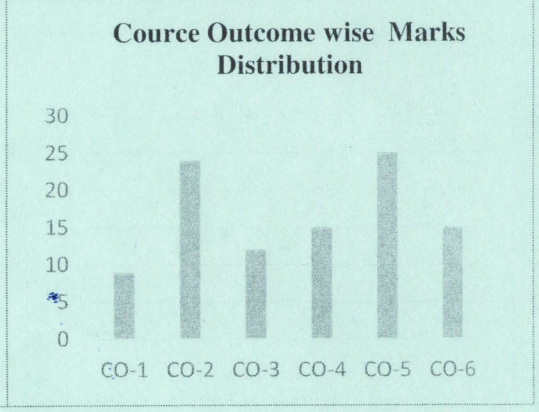
Q. No.	QUESTIONS	Marks	COs	KL
8	Evaluate $\iint xy(x+y)dxdy$ over the area between the curves $y=x^2$ and y=x	10	CO1	K6
9	Find the general and singular solution of $y=px-\sqrt{1+p^2}$.	10	CO4	K4
10	Solve by variation of parameter $\frac{d^2y}{dx^2}+a^2y=$ sec ax.	10	CO2	K2
11	Let a Rectangular domain bounded by x=0, y=0, x=1,y=2. Determine the region R' of W plane into Which R mapped under the Transformation W=Z+(2-i).	10	CO6	K6
12	Expand the series $F(z)=\frac{1}{z^2-3z+2}$ in the region (i) $0<\|z\|<1$ (ii) $1<\|z\|<2$.	10	CO4	K4

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

Course Out comes	CO1	The mathematical tools needed in evaluating multiple integrals and their usage.
	CO2	Understand the effective mathematical tools for the solution of differential equations that model physical process.
	CO3	Demonstrate the tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.
	CO4	Calculate the analytic function.
	CO5	Evaluate complex integrals by using Cauchy integral theorem.
	CO6	An ability to apply effective, creative and innovative solution both independently and cooperatively , to current and future problems.

GRAFICAL REPRESENTATION





M 20/06/24 I/C

ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY

END SEM EXAMINATION
School of Engineering & IT

Branch	**Computer Science and Engineering**	Program	**B. Tech**
Subject Name	**Engineering Chemistry**	Semester	**II**
		Year	**June 2024**

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**
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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 1	QUESTIONS	Marks	COs	KL
i	Define the term Chromophore with example.	2	CO2	K4
ii	What is the difference between covalent and coordinate bond?	2	CO1	K2
iii	Explain why size of cation is less than anion?	2	CO4	K3
iv	What is the standard reference used for measuring chemical shift and why?	2	CO2	K3
v	Phosphorus can form both PCl_3 and PCl_5 while Nitrogen can form only NCl_3. Explain.	2	CO4	K5
vi	How bond order of any molecule is calculated according to MOT theory?	2	CO1	K1
vii	Define entropy.	2	CO3	K2
viii	Sate first law of thermodynamics.	2	CO3	K1
ix	Which type of pollution is considered as chemical water pollution.	2	CO5	K1
x	Give reaction, properties and application of PVC.	2	CO5	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	State and explain the second law of thermodynamics. Explain the term entropy. Predict the nature of process for which (a) ΔH and ΔS are positive and (b) $\Delta H>0$ and $\Delta S<0$.	5	CO3	K4
3	What is meant by term chemical shift? What are shielding and deshielding effects.	5	CO2	K2
4	Write the general outer electronic configuration of s, and d block elements. Explain the general properties of elements belonging to these groups.	5	CO4	K1
5	Derive the Nernst equation for the potential of a single electrode from thermodynamic principle. What it is an application?	5	CO4	K3
6	What are the basic postulates of molecular orbital theory in explaining the bonding between atoms? Is N_2 molecule is paramagnetic or diamagnetic? Discuss.	5	CO1	K3
7	Explain different primary water treatment with the help of suitable diagram.	5	CO5	K1

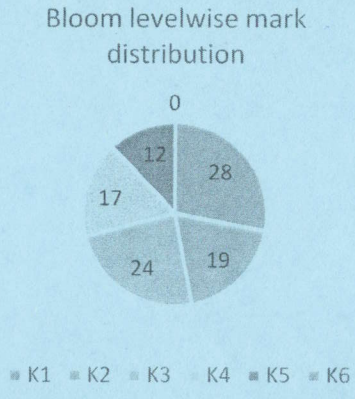
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

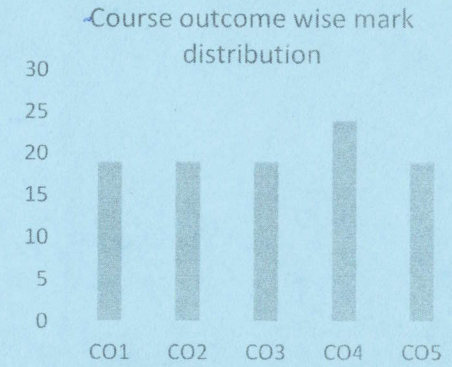
Q. No.	QUESTIONS	Marks	COs	KL
8	a. Explain the rusting of iron on the basis of electrochemical theory of corrosion. b. Calculate the electrode potential of copper, if the concentration of $CuSO_4$ is 0.206 M at 23.1^{0}C. Given that $E^o_{Cu2+/Cu}$ = +0.34 V.	10	CO3	K4
9	Explain Crystal field theory for octahedral complex. Why CFSE value of strong ligand and weak ligand field is not same. Calculate the CFSE value of strong and weak field ligands for a central atom having d_3, d_6 and d_9 electrons.	10	CO1	K3
10	a. Distinguish between thermosetting and thermoplastic polymers. b. Discuss how process of vulcanization of rubber is carried out and give its properties?	10	CO5	K1
11	a. Explain with example, the role of lone pair of electrons in determining the shape of the molecules acc. To VSEPR theory. b. Role and importance of effective nuclear charge in periodicity periodic properties.	10	CO4	K2
12	What do you understand by electronic spectroscopy? 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) CH3Cl b) CH3- CH =O	10	CO2	K5

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

Course Outcomes	CO1	Better understanding of energy level of bonding molecules.
	CO2	Concepts and various application of Spectroscopy.
	CO3	Understand about energy flow in surrounding and chemical equilibrium.
	CO4	Periodic table: Provide a great deal of information about elements.
	CO5	Understand the interdisciplinary nature of chemistry.

GRAFICAL REPRESENTATION





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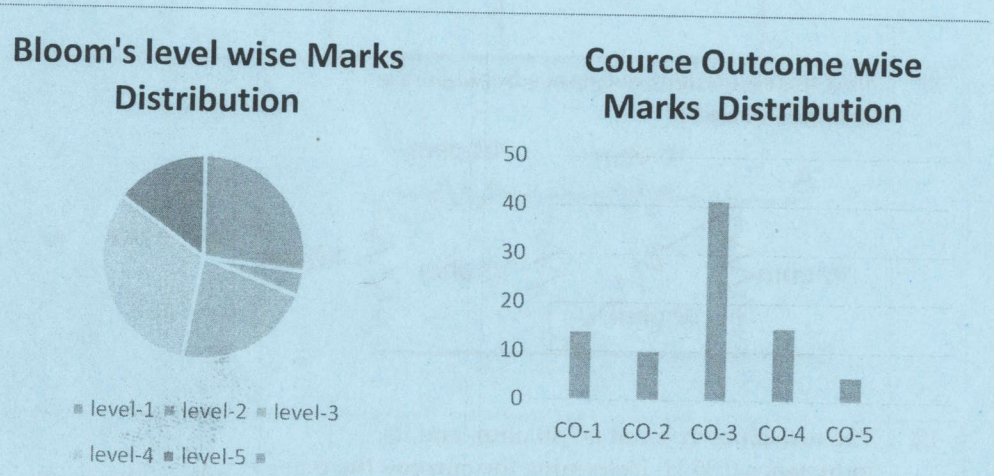
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Understand the basic knowledge of electrical quantities such as current, voltage, power, energy and frequency
	CO2	Predict the behavior of any electrical and magnetic circuits
	CO3	Formulate and solve complex AC, DC circuits
	CO4	Identify the type of electrical machine used for that particular application
	CO5	Realize the requirement of transformers in transmission and distribution of electric power and other applications.

GRAFICAL REPRESENTATION



ARKA JAIN University
Jharkhand
NAAC GRADE A ACCREDITED UNIVERSITY

END SEM EXAMINATION
School of Engineering & IT

Branch	**Computer Science and Engineering**	**Program**	**B.Tech**
Subject Name	**Basic Electrical Engineering**	**Semester**	**II**
		Year	**June 2024**

Time: 3 Hour
Max. Marks : 50

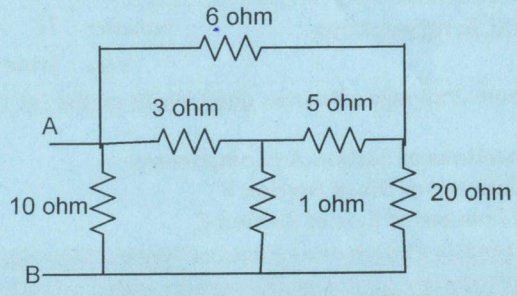
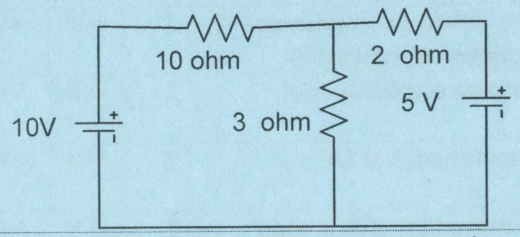
- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
- **Answer all Questions of Section A (Compulsory)**
- **Answer Any Four out of Six of Section B**
- **Answer Any Three out of Five of Section C**
- **Possession of Mobile Phones or any kind of Written Material, Arguments 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

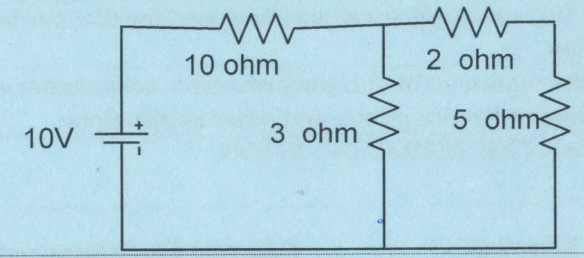
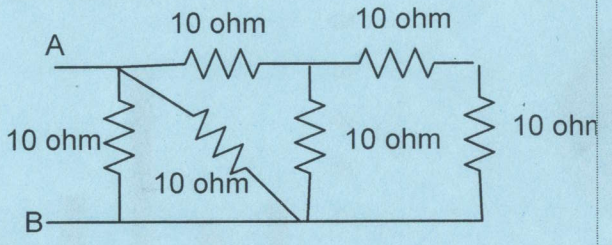
Section A (Each question Carry 02 Marks from Q1-i to x) 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Calculate the total resistance when two resistance of 8 ohm and 12 ohm are connected in parallel	2	CO3	K2	PO3
ii	Write down two Difference between Ideal and practical transformer?	2	CO1	K1	PO1
iii	Draw the torque speed characteristics of DC Shunt motor	2	CO4	K1	PO3
iv	A three phase 4 pole 50 Hz Induction motor runs at 1000rpm .Find synchronous speed	2	CO4	K1	PO3
v	Define apparent power, active power and reactive power	2	CO1	K1	PO3
vi	Draw the speed armature characteristics of DC Shunt motor	2	CO4	K2	PO2
vii	Define reluctance, magnetic field intensity?	2	CO3	K2	PO3
viii	Why Carbon brushes are generally used?	2	CO4	K4	PO1
ix	Draw the equivalent circuit diagram of single phase transformer	2	CO4	K2	PO2
x	What are digital circuits	2	CO3	K1	PO2

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Find the equivalent resistance between A and B? 	5	CO3	K1	PO3
3	Derive the expression of current through pure resistive circuit	5	CO3	K4	PO1
4	A three phase 4 pole 50 Hz Induction motor runs at 1000rpm .Find (a) synchronous speed (b) percentage of slip	5	CO5	K3	PO4
5	As shown in the figure ,determine the values of current on individual branches using mesh analysis 	5	CO3	K5	PO2
6	Derive the expression of emf equation of generator	5	CO4	K4	PO5
7	Derive the Relationship between line and phase values of voltage and current for balanced delta connections.	5	CO3	K3	PO4

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	A conductor carrying current of 70A is kept perpendicular to the magnetic field of flux density 0.4 Wb/m2.calculate the force developed in the conductor in newtons when the length of the conductor is 1m	10	CO2	K5	PO2
9	Find the resonance frequency and maximum current of a series RLC circuit having R=5ohm,L=4mH and C=0.1microfaraday	10	CO3	K3	PO2
10	Find the values of current through 5 ohm using Norton's theorm 	10	CO3	K1	PO2
11	Find the equivalent resistance between the terminal A and B 	10	CO1	K4	PO4
12	The resistance of a coil is 140 ohm and its inductance 0.85 H. Determine the current, the p.f. and the circuit impedance when the coil is connected to 120 V, 60 Hz supply	10	CO4	K5	PO5

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JGi ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Branch	Computer Science and Engineering	Program	B. Tech
Subject Name	Programming With Python	Semester	II
		Year	June 2024
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 comes 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 1	QUESTIONS	Marks	COs	KL
i.	Describe Python jump statements with examples.	2	CO1	K1
ii.	What is polymorphism?	2	CO1	K2
iii.	Define read & Write operations in file.	2	CO2	K1
iv.	Write the need of break and continue keywords.	2	CO3	K2
v.	What are the applications of Python programming language?	2	CO3	K2
vi.	What operators does python support?	2	CO2	K1
vii.	What is class and objects?	2	CO5	K2
viii.	What do you understand by dynamically typed language?	2	CO6	K2
ix.	Using the range function, write a loop that prints numbers from 0 to 57.	2	CO3	K1
x.	What is the purpose of global keyword in Python?	2	CO2	K4

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Write a Python program to check if a given number is even or odd.	05	CO1	K6
3	Differentiate between for and while loop.	05	CO2	K6
4	Explain the term Regression and classification.	05	CO6	K4
5	What do you mean by sets? Explain the operations performed on sets.	05	CO4	K1
6	What do you mean by multiple inheritance? Explain in detail.	05	CO4	K2
7	What are the Different Types of Data Structures in Pandas?	05	CO5	K6

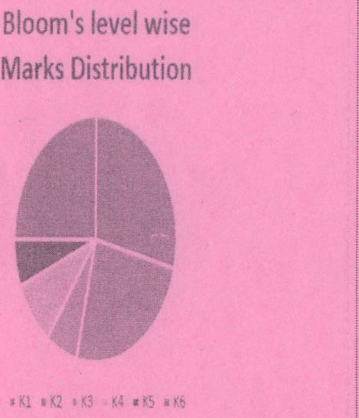
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

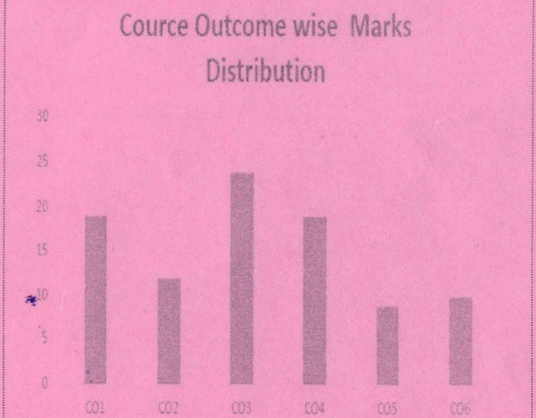
Q. No.	QUESTIONS	Marks	COs	KL
8	Develop a Python program that can analyze a text taken as input and calculate various character statistics, including the counts of vowels, consonants, uppercase letters, and lowercase letters	10	CO1	K6
9	List different operators in Python, in the order of their precedence.	10	CO3	K2
10	Write a Python program that prints multiplication table of a given number	10	CO2	K6
11	Write a program to get five marks using a list and display the marks in a Pie chart.	10	CO3	K6
12	Write a Python Program to Calculate Area and Perimeter of different Shapes using Polymorphism.	10	CO4	K6

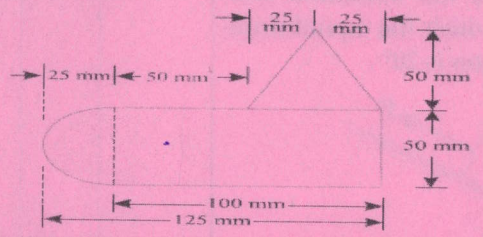
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Will understand s global vision & its utility as a scripting language for developers.
	CO2	Will understand how to write loops, decision statements, functions, and pass arguments in Python.
	CO3	Will learn how to use lists, tuples, dictionaries, and identify Python object types.
	CO4	Will learn how to read and write files in Python, create Pandas Data Frames, calculate aggregates, and merge multiple tables.
	CO5	Will understand how to import built-in libraries, use matplotlib for graph representation, and perform regular pattern matching.
	CO6	Will understand the concepts of Machine Learning algorithms.

GRAPHICAL REPRESENTATION





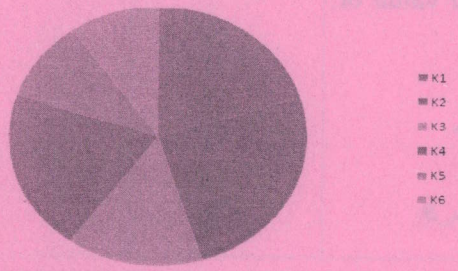
11	A uniform lamina shown in Fig. consists of a rectangle, a circle and a triangle. Determine the centre of gravity of the lamina. All dimensions are in mm. 	10	CO4	K5	PO4
12	Explain any one system of pulleys as lifting machine. Find equation for velocity ratio for the same. There are four pulleys arranged in the third system of pulleys. Find the load that can be lifted by an effort of 80 N, if efficiency of the machine is 70%.	10	CO5	K1	PO4

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

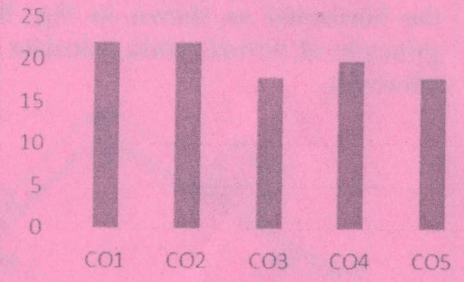
Course Outcomes	CO1	Identify the force systems for given conditions by applying the basics of mechanics.
	CO2	Determine unknown force(s) of different engineering systems.
	CO3	Apply the principles of friction in various conditions for useful purposes.
	CO4	Find the centroid and centre of gravity of various components in engineering systems.
	CO5	Select the relevant simple lifting machine(s) for given purposes.

GRAPHICAL REPRESENTATION

Blooms Level wise marks Distribution



Course Outcome Wise Marks Distribution



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ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY

END SEM EXAMINATION
School of Engineering & IT

Branch	Computer Science and Engineering	Program	B. Tech
Subject Name	Engineering Mechanics	Semester	II
		Year	June 2024

Time: 3 Hour
Max. Marks : 70

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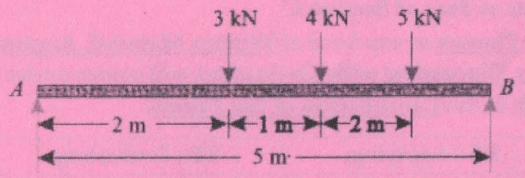
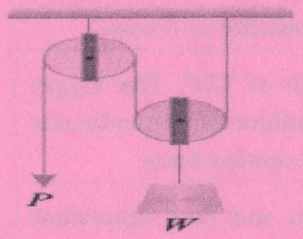
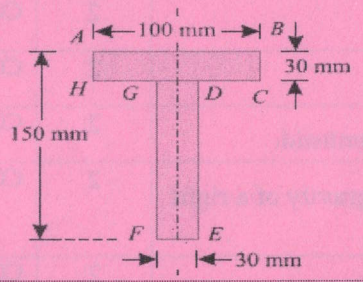
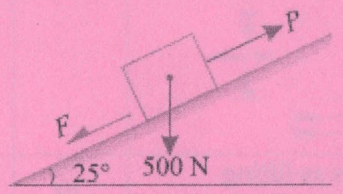
Knowledge Level (KL)			
	K1 : Remembering	**K3 :** Applying	**K5 :** Evaluating
	K2 : Understanding	**K4 :** Analysing	**K6 :** Creating

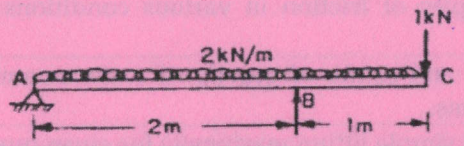
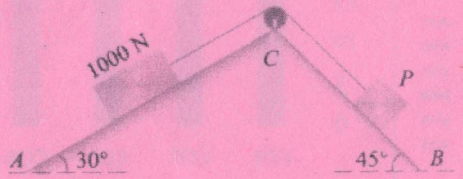
Section A (Each question Carry 02 Marks from Q1-i to Q1-xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	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	Explain UVL load in beam and find equivalent load and point of action of beam.	2	CO2	K4	PO3
iv	What are different types of Beams?	2	CO2	K2	PO3
v	Define cone of friction.	2	CO3	K4	PO4
vi	What is virtual work?	2	CO3	K5	PO4
vii	Draw a semicircle and locate its centroid.	2	CO4	K2	PO3
viii	What is the location of Centre of gravity of a right circular cone?	2	CO4	K3	PO4
ix	Write applications of lifting machines.	2	CO5	K4	PO3
x	Define the term velocity ratio and efficiency for lifting machines.	2	CO5	K4	PO3

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 magnitude of the two forces, such that if they act at right angles, their resultant is $\sqrt{10}$ N. But if they Act at 60°, their resultant is $\sqrt{13}$ N.	5	CO1	K2	PO3
3	A simply supported beam AB of span 5m is loaded as shown in Fig. Find the reactions at A and B. 	5	CO1	K3	PO2
4	Write sign convention for virtual work. A weight (W) of 5kN is raised by a system of pulleys as shown in figure. Using the principle of virtual work, find the force P, which can hold the weight in equilibrium. 	5	CO2	K4	PO3
5	Find the centre of gravity of a 100 mm × 150 mm × 30 mm T-section. 	5	CO3	K4	PO4
6	Explain working of Worm and worm Wheel with neat sketch.	5	CO4	K4	PO3
7	A body of weight 500 N is lying on a rough plane inclined at an angle of 25° with the horizontal. It is supported by an effort (P) parallel to the plane as shown in Fig. Determine the minimum and maximum values of P, for which the equilibrium can exist, if the angle of friction is 20° . 	5	CO3	K5	PO4

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Four forces of 25 N, 20 N, 15N and 10 N are acting simultaneously along straight lines OA, OB, OC, and OD such that <AOB = 45°, <BOC = 90° and <COD = 125°. Find analytically or graphically magnitude and direction of the resultant force.	10	CO1	K5	PO3
9	An overhanging beam carries the loads as shown in figure. Calculate the reactions at both the supports. 	10	CO2	K2	PO4
10	Write principle of virtual work. A weight of 1000 N resting over a smooth surface inclined at 30° with the horizontal, is supported by an effort (P) resting on a smooth surface inclined at 45° with the horizontal as shown in Fig. By using the principle of virtual work, calculate the value of effort (P). 	10	CO3	K3	PO3