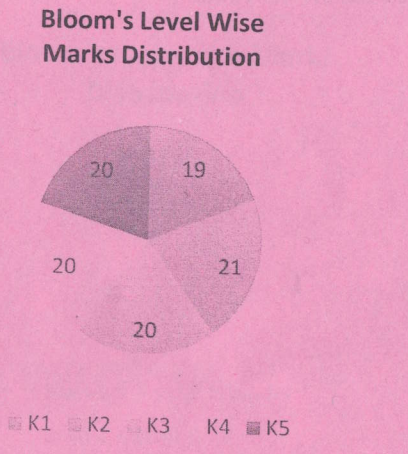
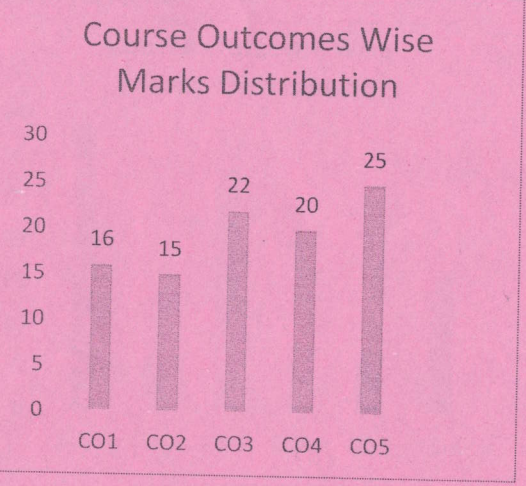
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Learn the features of different types of compensators & to design compensators using time- domain and frequency domain specifications.
	CO2	Understand the modelling of linear-time-invariant systems using transfer function and state-space representations.
	CO3	Apply the concept of stability and its assessment for linear-time invariant systems.
	CO4	Analyse the system response and stability of systems represented in state space form and to design compensators for systems modelled in state space form.
	CO5	Obtain models of dynamic systems in transfer function and state space forms.

GRAFICAL REPRESENTATION





ARKA JAIN University Jharkhand

END SEM EXAMINATION
School of Engineering & IT

Branch	**Electrical and Electronics Engineering**	**Program**	**B. Tech**
Subject Name	**Control Systems**	**Semester**	**V**
		Year	**Odd Nov/Dec 2023**

Time: 3 Hour
Max. Marks : 70

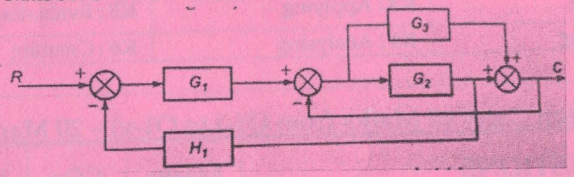
- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
- **Answer all Questions of Section A (Compulsory)**
- **Answer Any Four out of Six of Section B**
- **Answer Any Three out of Five of Section C**
- **Possession of Mobile Phones** or any kind of **Written Material, Arguments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

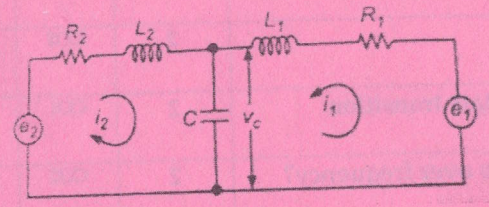
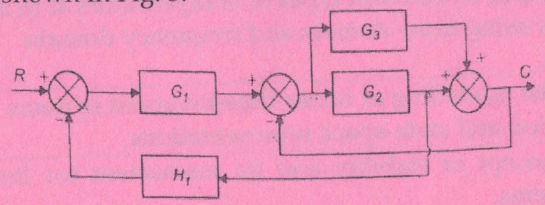
Section A (Each question Carry 02 Marks from Q1-i to Q1-x) – 20 Marks

Q. No	QUESTIONS	Marks	COs	KL	PO
i	What is the effect of positive feedback on stability of the system?	2	CO2	K1	PO1 PO12
ii	Define gain margin	2	CO2	K1	PO1
iii	What are the advantages of state space modelling using physical variables?	2	CO2	K2	PO1
iv	What is servomechanism?	2	CO1	K1	PO1
v	What are the roles of controller in Control systems?	2	CO1	K1	PO1
vi	Explain BIBO stability.	2	CO2	K1	PO1
vii	What are the properties of state transition matrix?	2	CO1	K2	PO1
viii	What is phase and gain cross over frequency?	2	CO2	K2	PO1
ix	Define state, state variable, state space.	2	CO3	K1	PO1
x	A closed loop control system has the characteristics equation given by, $s^3 + 4.5s^2 + 3.5s + 1.5 = 0$. Investigate the Stability using Routh-Hurwitz criterion.	2	CO3	K1	PO1

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Derive an Expression for Step Response of First Order System	5	CO4	K4	PO2
3	Explain the breakaway and break-in point. How to determine them?	5	CO2	K2	PO1 PO2
4	Distinguish between Block diagram Reduction Technique and Signal Flow Graph	5	CO3	K5	PO3
5	Explain about the following controllers. i) PI controller ii)PID controller	5	CO4	K5	PO1
6	Determine the transfer function relating C and R for the block diagram shown Fig. 1. Use Mason's Gain Formula.  Fig. 1	5	CO3	K4	PO2
7	Write the analogy between mechanical systems and electrical systems.	5	CO5	K1	PO1 PO2

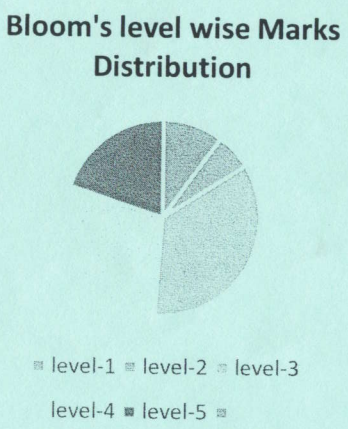
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

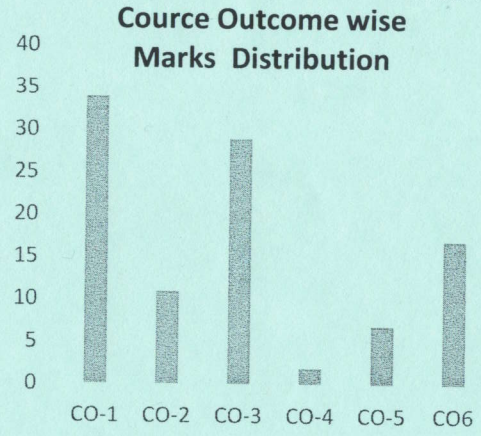
Q. No.	QUESTIONS	Marks	COs	KL	PO
8	For the electrical network shown Fig. 2, determine the state model. Consider i_1, i_2, and Vc as state variables. The variable are i_1 and i_2.  Fig. 2	10	CO3	K3	PO2
9	Write short note on Lead, Lag, lead lag compensators.	10	CO5	K2	PO1
10	List out the time domain specifications and derive the expressions for Rise time, Peak time and Peak overshoot	10	CO1	K4	PO1 PO12
11	Determine the C/R from the block diagram shown in Fig. 3.  Fig. 3	10	CO5	K3	PO2
12	Explain the procedure for constructing root locus	10	CO4	K5	PO2 PO3

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

Course Outcomes	CO1	List the constructional parts and performance characteristics of electrical machines.
	CO2	Understand the various factors that influence the design: electrical, magnetic and thermal loading of electrical machines
	CO3	Apply the principles of electrical machine design and carry out a basic design of an AC machine
	CO4	Discover software tools to do design calculations.
	CO5	Interpret the information required for the fabrication of the alternator with an estimate of various performance indices
	C06	Generate a detailed design of an induction machine and provide the information required for the fabrication of the same along with an estimate of various performance indices.

GRAFICAL REPRESENTATION





JGI ARKAJAIN University Jharkhand		**END SEM EXAMINATION** School of Engineering & IT	
Branch	**Electrical and Electronics Engineering**	**Program**	**B.Tech**
Subject Name	**Electrical Machine Design**	**Semester**	**V**
		Year	**Odd Nov/Dec 2023**
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 total magnetic loading	2	CO1	K1	PO3
ii	List some factor providing the limitation in the design.	2	CO2	K2	PO2
iii	Define total electric loading	2	CO3	K1	PO3
iv	What is carter's coefficient?	2	CO2	K1	PO2
v	Define gap contraction factor for the slots.	2	CO1	K2	PO3
vi	Salient pole machines are not suitable for high speed operations, why?	2	CO1	K2	PO1
vii	State three important features of turbo alternator rotors?	2	CO5	K1	PO2
viii	What is the purpose of tertiary winding?	2	CO3	K4	PO1
ix	Why wound rotor construction is adopted?	2	CO6	K4	PO3
x	What software tools do you use for electrical design?	2	CO4	K1	PO2

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

	QUESTIONS	Marks	COs	KL	PO
	Explain Limitations in design of electrical machine?	5	CO1	K4	PO1
	Derive the expression Reluctance of air gap in machines (with Smooth Armature)?	5	CO1	K3	PO2
	Derive the expression of Gap contraction factor for slots	5	CO2	K4	PO1
	Explain in details Materials for Electrical Machines	5	CO2	K3	PO2
	Derive the Output equation of induction machines	5	CO6	K3	PO3
	Derive the output equation of synchronous machine	5	CO5	K4	PO4

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

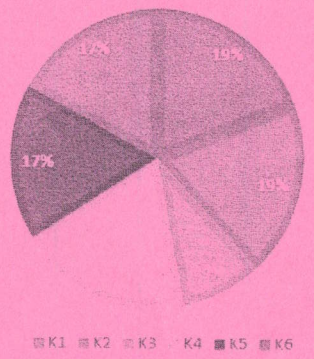
	QUESTIONS	Marks	COs	KL	PO
	Explain the Major considerations in Electrical Machine Design	10	CO1	K3	PO2
	Derive the Output equation of single- phase transformer	10	CO3	K4	PO4
	Write the properties of Insulating materials and its Classification of insulating materials based on thermal consideration	10	CO1	K3	PO2
	Estimate the stator core dimensions, number of stator slots and number of stator conductors per slot for a 100 kw, 3300v, 50 Hz, 12 pole star connected slip ring induction motor. Assume average gap density = 0.4 wb/m2; Conductors per metre = 25,000 A/m efficiency = 0.9, power factor = 0.9 and winding factor = 0.96 choose main dimensions to give overall design.	10	CO6	K5	PO4
	Calculate the mmf required for the air gap of a machine having core length = 0.32 m including 4 ducts of 10mm each, pole arc 0.19m, slot pitch = 65.4mm, slot opening = 12mm, air gap length = 6mm and useful flux per pole = 25 mwb. Take Carter's coefficient for slot as 0.03	10	CO3	K5	PO4

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

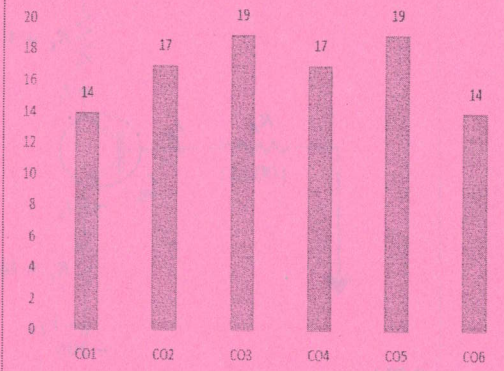
Course Outcomes	CO1	Acquire the knowledge of principles of semiconductor Physics.
	CO2	Understand and utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.
	CO3	Develop analysis capability in BJT and FET Amplifier Circuits.
	CO4	Distinguish competence in frequency response analysis of discrete amplifiers.
	CO5	Interpret design competence in signal and power amplifiers using BJT and FET.
	CO6	Design trade-offs in various digital electronic families with a view towards reduced power consumption.

GRAFICAL REPRESENTATION

BLOOM'S LEVEL WISE MARKS DISTRIBUTION



Course Outcome Wise Marks Distribution



8/12/23

ARKAJAIN University Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	Electrical and Electronics Engineering	Program	B.Tech
Subject Name	Electronic Devices	Semester	V
		Year	Odd Nov/Dec 2023

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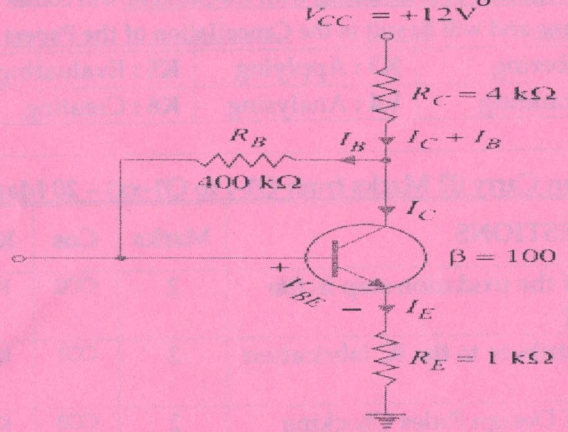
- **Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Papers.**

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

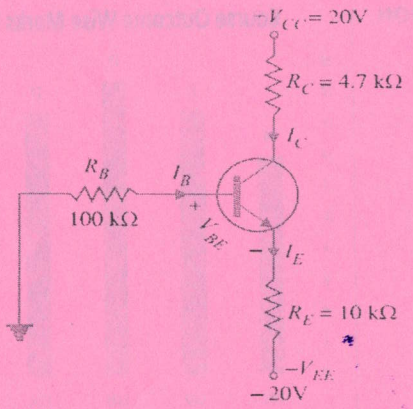
Section A (Each question Carry 02 Marks from Q1-i to Q1-xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	Cos	KL	PO
i	What is the purpose of the oxidation step in the IC fabrication process?	2	CO2	Kl	CO2
ii	How does etching contribute to the IC fabrication process?	2	CO1	K3	CO1
iii	What is the purpose of Design Rules Checking (DRC) in PCB design?	2	CO3	K1	CO3
iv	Give the expression for current gain.	2	CO4	K3	CO4
v	Derive a relation between α and β.	2	CO1	K2	CO1
vi	What is sputtering in IC fabrication?	2	CO6	K4	CO6
vii	What are the key advantages of Surface Mount Device (SMD) technology in PCB assembly?	2	CO6	K5	CO6
viii	What are the different types of biasing used in electronics circuits?	2	CO3	K4	CO3
ix	How light is emitted in LED?	2	CO5	K2	PO2
x	What is the advantage of using FET instead of BJT?	2	CO5	K6	PO2

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

Q. No.	QUESTIONS	Marks	Cos	KL	PO
2	Write down the difference between enhancement type MOSFET and depletion type MOSFET.	5	CO3	K1	PO1
3	Write down the difference between BJT and FET. Or Design an inverting amplifier with a voltage gain of -5, and 4.7 kΩ resistor for Rf. Calculate the value of R1	5	CO1	K2	PO1
4	Why surface inversion is an essential condition for MOS operation.	5	CO2	K5	PO2
5	Find the Q-point values (IC and VCE) for the collector feedback bias circuit shown in figure. 	5	CO4	K4	PO2
6	Explain briefly any two: a) Masking, b) Oxidation, c) Photolithography	5	CO5	K3	PO2
7	Derive an expression for output voltage of an integrator amplifier. OR Define the layout cross-section in PCB design. Explain the various layers involved and their functions. How does a typical PCB layout ensure efficient signal transmission and power distribution?	5	CO1	K6	PO2

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

Q. No.	QUESTIONS	Marks	Cos	KL	PO
8	Discuss the concept of Design Rules Checking (DRC) in PCB design. What are the typical design rules that need to be checked, and how does DRC software help designers in identifying and correcting errors? OR When working with constraints in PCB design, what are the key parameters that designers must consider? Explain the importance of constraints for successful PCB design, and how they affect the final product's functionality and performance.	10	CO2	K1	PO1
9	Draw and explain the V-I characteristics of diode for both forward and reverse biasing.	10	CO3	K4	PO1
10	For the emitter bias circuit shown in figure, find I_E, I_C, VC and V_C and V_{CE} for β= 85 and V_{BE} =  0.7V.	10	CO4	K6	PO1
11	Discuss the fabrication process of nMOS transistor. OR Design a differentiator circuit with a time constant (RC) of 0.05 seconds and an input voltage $V_{in}(t)=3\cos(200\pi t)$. Calculate the output voltage $V_{out}(t)$ at t=0.02 seconds.	10	CO5	K5	PO2
12	With a diagram explain the working of a Zener diode. OR The twin-tub CMOS process is a common approach for fabricating complementary metal-oxide-semiconductor (CMOS) devices. Describe the key steps and components of the twin-tub CMOS process, emphasizing how it enables the creation of both n-channel and p-channel MOS transistors on a single silicon substrate.	10	CO6	K2	PO2

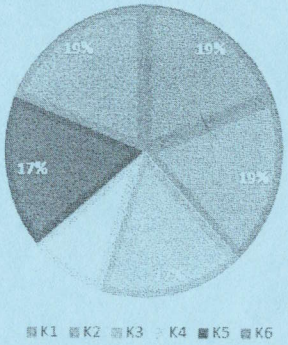
4/12/23 45

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

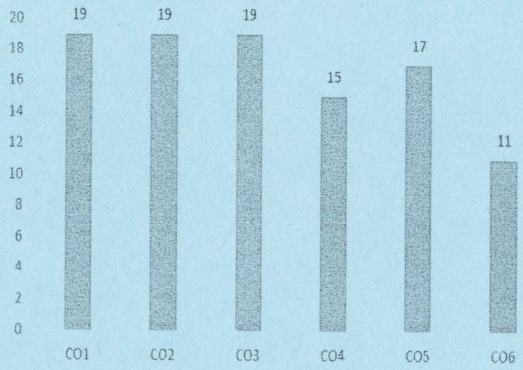
Course Outcomes	CO1	Recall the behavior of a communication system in presence of noise.
	CO2	Compare different analog modulation schemes for their efficiency and bandwidth.
	CO3	Apply different digital modulation schemes and compute the bit error performance.
	CO4	Explain different Analysis and Detection of Characteristics of PMS
	CO5	Interpret pulsed modulation system and analyze their system performance.
	CO6	Build an innovative technique for Carrier Recovery for Digital modulation.

GRAPHICAL REPRESENTATION

BLOOM'S LEVEL WISE MARKS DISTRIBUTION



Course Outcome Wise Marks Distribution



JGI ARKAJAIN University Jharkhand

END SEM EXAMINATION
School of Engineering & IT

Branch	**Electrical & Electronics Engineering**	**Program**	**B.Tech**
Subject Name	**Microprocessors**	**Semester**	**V**
		Year	**Odd Nov/Dec 2023**

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	What is the difference between microprocessor and microcontroller?	2	CO1	K1	PO1
ii	What is a bus?	2	CO1	K1	PO1
iii	Define opcode and operand.	2	CO3	K2	PO3
iv	What is RS232?	2	CO2	K3	PO4
V	What are the different register pairs in 8085?	2	CO3	K4	PO2
vi	What is direct addressing mode in 8085?	2	CO2	K2	PO1
vii	Explain any two data transfer instruction of 8085.	2	CO6	K5	PO2
viii	What are the hardware and the software interrupts of 8085?	2	CO5	K6	PO1
ix	The data is 45H with carry 0.What will be the value after execution of RLC instruction?	2	CO6	K4	PO5
x	A memory system has a total of 8 memory chips.Each have 12 address lines and 4 data lines, find the size of the memory system.	2	CO6	K6	PO5

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

Q. No.	QUESTIONS	Marks	Cos	KL	PO
2	Write an assembly language program of adding two 8 bits number.	5	CO1	K3	PO1
3	Draw the pin diagram of 8085.	5	CO3	K5	PO2
4	Explain the flags in 8085.	5	CO2	K4	PO5
5	Explain the role of timers and counters in a microcontroller.	5	CO5	K6	PO4
6	Define interrupts in the context of microprocessor.	5	CO6	K1	PO3
7	Describe various addressing modes of 8085.	5	CO4	K2	PO3

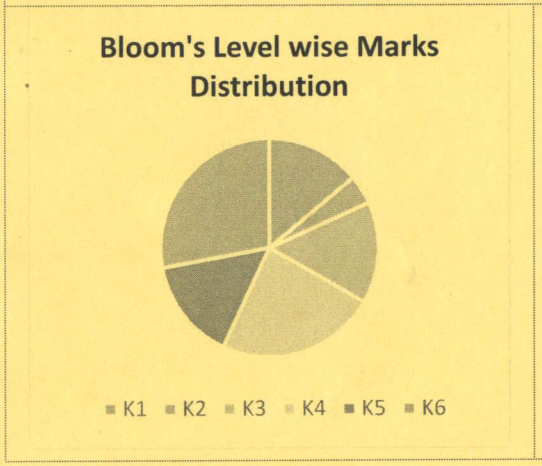
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

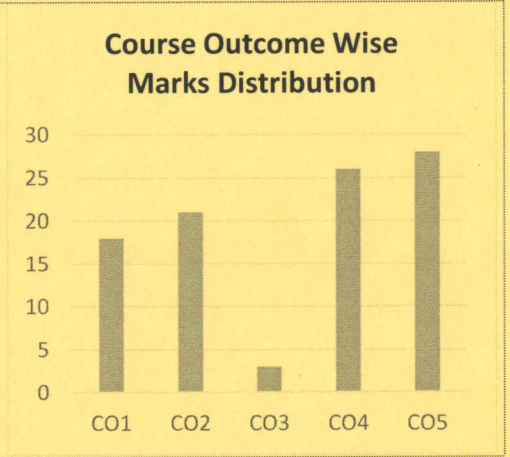
Q. No.	QUESTIONS	Marks	Cos	KL	PO
8	Describe the architecture of 8085.	10	CO1	K1	PO1
9	Explain briefly the following instruction sets of 8085 with proper example: i. LDA ii. STAX iii. SPHL Iv. JMP	10	CO4	K3	PO2
10	What is embedded system? Explain its block diagram.	10	CO5	K6	PO5
11	Draw and explain the architecture of 8051.	10	CO2	K5	PO4
12	Write an assembly language program to multiply two 16 bits hexadecimal numbers.	10	CO3	K2	PO3

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

Course Outcomes	CO1	Identify the various method of transmission and distribution of electrical power.
	CO2	Understand the process of transmission and distribution of electrical power, also term like insulator, sag, corona, voltage regulation in transmission line.
	CO3	Apply different method of distribution system to obtain performance characteristics.
	CO4	Evaluate the voltage drop, efficiency and voltage regulation of transmission line.
	CO5	Design transmission and distribution line in context with voltage drop, efficiency, voltage regulation, sag, corona etc.

GRAFICAL REPRESENTATION





JGI ARKAJAIN University Jharkhand			**END TERM EXAMINATION** **School of Engineering & IT**
Branch	**Electrical and Electronics Engineering**	**Program**	**B.Tech**
Subject Name	**Power System-I**	**Semester**	**V**
		Year	**Odd Nov/Dec 2023**
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	Enlist the types of transmission line?	2	CO1	K1	PO2
ii	Define string efficiency and Enlist the method used to improve string efficiency	2	CO1	K3	PO1
iii	What do you mean by corona in the power system?	2	CO2	K3	PO3
iv	Enlist the classification of a transmission system.	2	CO2	K5	PO4
v	What do mean by sag and enlist the types of sag in overhead line?	2	CO3	K1	PO3
vi	What do you mean by distribution system?	2	CO3	K2	PO2
vii	What do you mean by diversity factor	2	CO4	K1	PO4
viii	What do you mean by skin effect?	2	CO4	K2	PO4
ix	What do you mean by feeder and distributor	2	CO5	K4	PO5
x	Define voltage regulation in terms of transmission line voltage	2	CO5	K6	PO6

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Draw and explain briefly about single line diagram of the power system	5	CO3	K3	PO1
3	Explain briefly about different types of insulators and their properties used in power system	5	CO3	K1	PO1
4	Write down the difference between EHVAC and HVDC transmission line system	5	CO5	K4	PO4
5	Write down the limitations of end condenser method	5	CO5	K5	PO2
6	Explain briefly the methods used to improve string efficiency in transmission line	5	CO6	K1	PO5
7	A two-wire d.c. distributor AB, 600 meters long is loaded as under : Distance from A (metres): 150 300 350 450 Loads in Amperes: 100 200 250 300 The feeding point A is maintained at 440 V and that of B at 430 V. If each conductor has a resistance of 0•01 Ω per 100 meters, calculate: (i) The currents supplied from A to B, (ii) The power dissipated in the distributor.	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	Explain briefly about advantage of High voltage Transmission.	10	CO3	K3	PO1
9	Explain briefly about construction of underground cable with neat sketch	10	CO2	K4	PO4
10	Describe briefly the performance of single phase short transmission line with vector diagram	10	CO5	K2	PO4
11	A 3-phase transmission line is being supported by three disc insulators. The potentials across top unit (i.e., near to the tower) and middle unit are 8 kV and 11 kV respectively. Calculate (i) the ratio of capacitance between pin and earth to the self-capacitance of each unit (ii) the line voltage and (iii) string efficiency.	10	CO6	K3	PO5
12	A transmission line has a span of 275 m between level supports. The conductor has an effective diameter of 1•96 cm and weighs 0•865 kg/m. Its ultimate strength is 8060 kg. If the conductor has an ice coating of radial thickness of 1•27 cm and is subjected to a wind pressure of 3•9 gm/cm2 of projected area, calculate sag for a safety factor of 2. The weight of 1 c.c. of ice is 0•91 gm.	10	CO4	K6	PO6