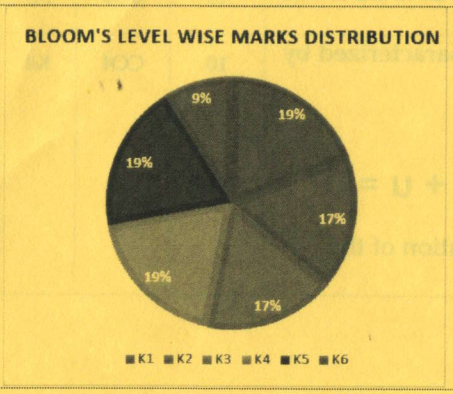
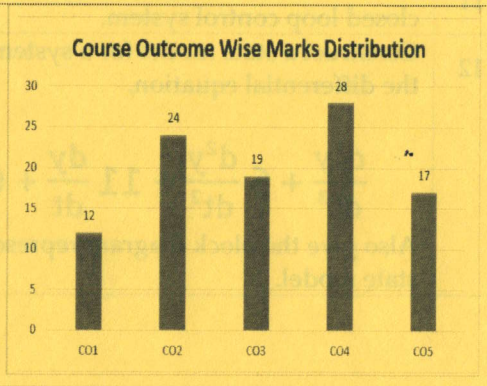
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	To understand mathematical modeling principles applied to physical systems.
	CO2	To interpret dynamical systems using input-output models, transfer functions, and state-space models.
	CO3	To analyze the design and implementation of controllers and compensators for improving dynamical system performance and stability...
	CO4	To apply mathematical techniques to simulate and predict the behavior of complex physical systems.
	CO5	To evaluate and optimize control strategies based on mathematical models for real-world applications.

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY

[29-11-2025]
END SEM EXAMINATION
School of Engineering & IT

Program	**Electrical & Electronic Engineering**	**Branch**	**B.Tech**
Subject Name	**Control Systems**	**Session**	**Odd, 2025-26**
Semester	**V**	**Year**	**Nov, 2025**

Time: 3 Hour
Max. Marks : 70

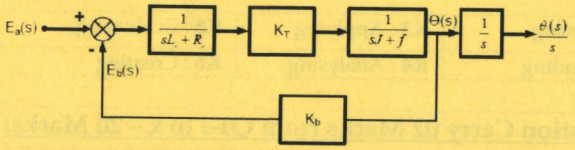
- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
- **Answer all Questions of Section A (Compulsory)**
- **Answer Any Four out of Six of Section B**
- **Answer Any Three out of Five of Section C**
- **Possession of Mobile Phone** or any kind of **Written Material, Arguments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

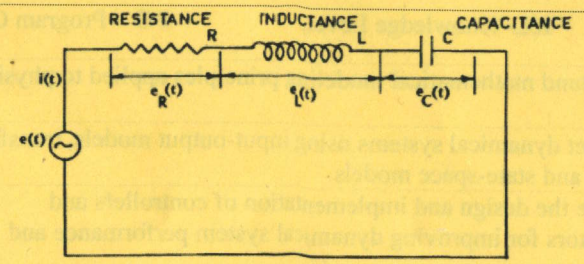
Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

Q. N 1	QUESTIONS	Marks	COs	KL
i	What do you mean by transfer function?	2	CO4	K2
ii	State the initial value theorem.	2	CO5	K1
iii	Define the phase cross over frequency.	2	CO1	K1
iv	Outline the advantages of Root Locus over the Routh-Hurwitz.	2	CO4	K4
v	Define the following terms: input and output node	2	CO4	K3
vi	Define the state vector.	2	CO2	K5
vii	Draw a signal flow graph and show its forward path.	2	CO2	K5
viii	Write any two applications of bode plot.	2	CO4	K4
ix	Define the polar plot	2	CO3	K6
x	Write any two advantages of root locus	2	CO3	K6

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Outline the procedure to draw the polar plot of closed loop control system.	5	CO1	K5
3	Determine the initial value of the time-domain response of the following equation using the Initial-value theorem. $$Y(s) = \frac{2s}{(s+1)^2(s+2)}$$	5	CO1	K1
4	Draw the signal flow graph of closed loop system shown in Figure given below. 	5	CO3	K4
5	Examine stability of the following system given by $s^5 + 2s^4 + 2s^3 + 4s^2 + 4s + 8$ using Routh-Hurwitz stability criterion	5	CO4	K6
6	Derive the mathematical model of error for first order system for step and parabolic input signal and discuss its dynamic response.	5	CO4	K2
7	Formulate the mathematical models indicating the correlation between time and frequency response for a second order system.	5	CO5	K3

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

Q. No.	QUESTIONS	Marks	COs	KL
8	Estimate the error of the system for step and ramp input signal having (i) type-1, order-2	10	CO2	K5
9	Find system transfer function between function between the capacitance voltages to the source voltage in the following RLC circuit as shown in Figure given below.  Figure: RLC Circuit.	10	CO2	K2
10	Distinguish the dynamic response of under damped, critical damped and over damped control system and explain its practical limitations.	10	CO3	K1
11	Outline the procedure to draw the polar plot of closed loop control system.	10	CO5	K3
12	Construct a state model for a system characterized by the differential equation, $$\frac{d^3y}{dt^3} + 6\frac{d^2y}{dt^2} + 11\frac{dy}{dt} + 6y + u = 0$$ Also give the block diagram representation of the state model.	10	CO4	K4

JGi	**ARKA JAIN University** Jharkhand	NAAC GRADE A ACCREDITED UNIVERSITY	**[18-11-2025] END SEM EXAMINATION School of Engineering & IT**

Program	**Electrical and Electronic Engineering**	**Branch**	**B. Tech**
Subject Name	**Microprocessor**	**Session**	**Odd, 2025-26**
Semester	**V**	**Year**	**Nov, 2025**

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	What is the role of the Program Counter in a microprocessor?	2	CO1	K1
ii	List out the name of any four SFR's used in MC.	2	CO2	K2
iii	Write any two differences between 8-bit and 16-bit microcontrollers.	2	CO4	K1
iv	What does the instruction MOV A, #25H do?	2	CO3	K3
v	Write the importance of accumulator register.	2	CO3	K2
vi	Explain the Immediate addressing modes with example.	2	CO1	K3
vii	How many address lines are required to access 64 KB of memory?	2	CO3	K1
viii	Compare the Data and Programme memory.	2	CO5	K3
ix	Explain assembly and machine level language programme.	2	CO4	K2
x	What is the typical frequency range used for 8051 clock input?	2	CO4	K2

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Explain the differences between assemblers and compilers.	05	CO2	K3
3	Evaluate and explain the RAM memory organization of 8051.	05	CO3	K5
4	Design and explain the bus architecture of 8051	05	CO5	K3
5	Define opcode and operand with examples.	05	CO2	K6
6	With a neat diagram, explain the interfacing of ADC with 8051.	05	CO5	K4
7	Describe the concept of stack operation including the PUSH and POP operation	05	CO1	K3

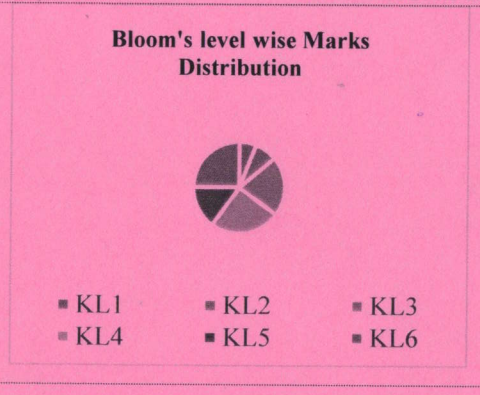
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

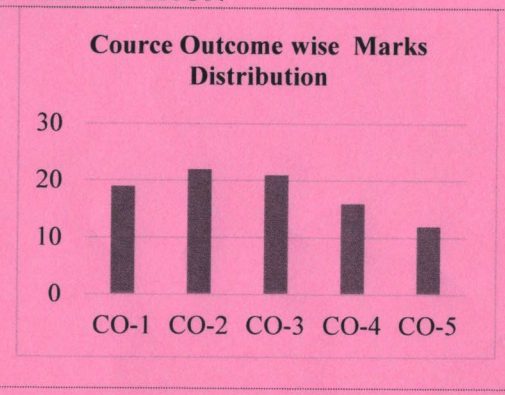
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the Data transfer and Arithmetic instruction set of 8051.	10	CO1	K5
9	Design and explain the interfacing concept of DC Motor with neat diagram with 8051.	10	CO4	K4
10	Draw and Explain the Block Diagram of 8051 MC. List out any five features of 8051.	10	CO2	K4
11	Write an assembly language program for adding two 8-bit numbers and store the result in memory.	10	CO3	K6
12	Discuss the function of all I/O ports of 8051 and Justify why Port 3 (P3) is called as multi-function Port.	10	CO5	K6

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

Course Outcomes	CO1	Learn configuring and using different peripherals in a digital system like I/O, A/D, D/A, timer etc.
	CO2	Understand the working of a Microprocessor/microcontroller.
	CO3	Compile and debug a Program
	CO4	Generate an executable programme file and use it.
	CO5	Develop systems using different microprocessor/ Microcontrollers.

GRAPHICAL REPRESENTATION



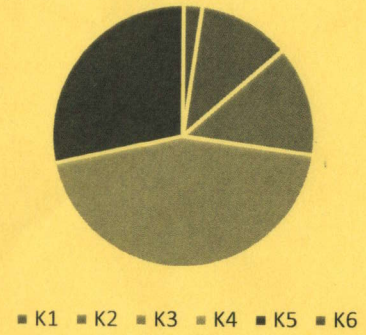


CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

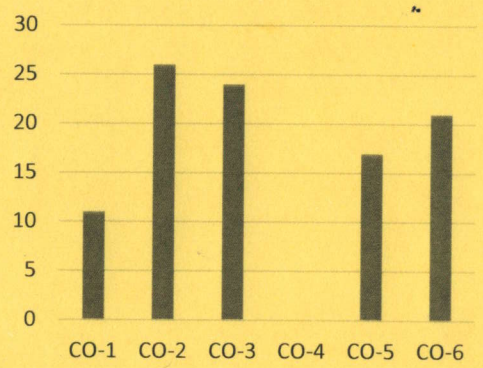
Course Outcomes	CO1	List the constructional parts and performance characteristics of electrical machines
	CO2	Understand the various factors that influence the design: electrical, magnetic and thermal loading of electrical machines
	CO3	Apply the principles of electrical machine design and carry out 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.
	CO6	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.

GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



Cource Outcome wise Marks Distribution



ARKA JAIN University
Jharkhand

NAAC GRADE A ACCREDITED UNIVERSITY

[20-11-2025]
END SEM EXAMINATION
School of Engineering & IT

Program	**Electrical and Electronic Engineering**	**Branch**	**B. Tech**
Subject Name	**Electrical Machine Design**	**Session**	**Odd, 2025-26**
Semester	**V**	**Year**	**Nov, 2025**

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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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	What is carter's coefficient?	2	CO1	K1
ii	Name the different methods of cooling of transformers.	2	CO3	K2
iii	What are the advantages of having circular coil in a transformer?	2	CO3	K4
iv	What are the methods adopted to reduce harmonic torques?	2	CO2	K3
v	List out the methods to improve the power factor of the induction motor	2	CO6	K2
vi	What happens if the air gap length is doubled?	2	CO2	K4
vii	What are the main dimensions of an induction motor?	2	CO6	K2
viii	Mention the uses of damper windings in a synchronous machine?	2	CO5	K3
ix	Why rotor slot are slightly skewed in squirrel cage rotor.	2	CO6	K2
x	What is critical speed of alternator?	2	CO2	K2

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Explain the major consideration required for the designing the electrical machine	05	CO1	K3
3	Classify insulating materials based on thermal considerations as per IEC standards. State the maximum permissible temperature for each class and give suitable examples.	05	CO1	K4
4	Derive the expression for the reluctance of an air gap with smooth.	05	CO2	K4
5	Differentiate between a squirrel cage induction motor and a slip ring induction motor in terms of construction, starting method, performance, and applications.	05	CO6	K4
6	Differentiate between a salient and non-salient pole motor in terms of construction, starting method, performance, and applications.	05	CO5	K3
7	Calculate the mmf required for air gap of a dc machine from the following data. Length = 170mm, width of duct = 10mm, number of duct = 4, pole are / pole pitch = 0.67, slot pitch = 28 mm, length of air gap = 5mm, average air gap density = 0.71 wb/m2. Slot opening = 13mm.	05	CO2	K5

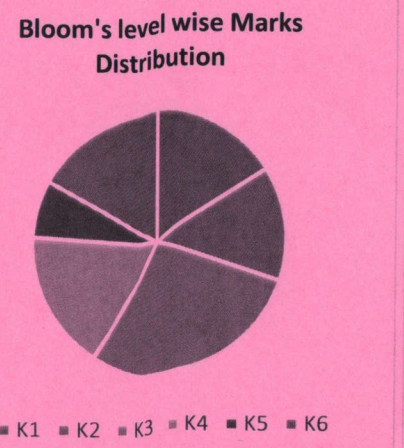
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

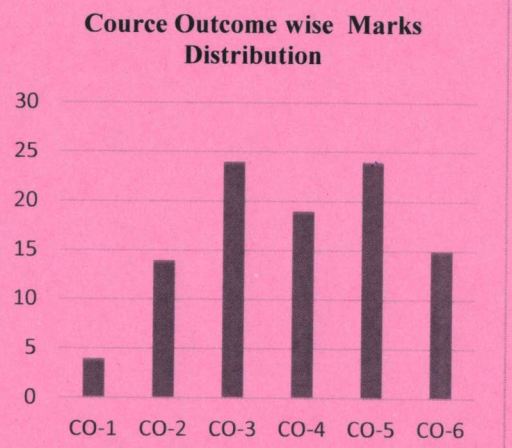
Q. No.	QUESTIONS	Marks	COs	KL
8	Derive the EMF equation of a three phase transformer. Clearly state the assumptions made during the derivation	10	CO3	K4
9	Determine the dimension of core and yoke for a 200 kVA, 50 Hz single phase transformer. A cruciform core is used with distance between adjacent limbs equal to 1.6 times the width of core lamination. Assume voltage per turn 14V, maximum fluxdensity1.1wb/m^2, window space factor 0.32 ,current density3A/mm^2, and stacking factor=0.9. the net iron is 0.56d^2 in a cruciform core where d is the diameter of the circumscribing circle. Also the the width of largest stamping is 0.85d	10	CO3	K5
10	Calculate the mmf required for the air gap of a DC machine with an axial length of 20cm (No ducts) and a pole arc of 18 cm. The slot pitch = 27mm, slot opening = 5mm, air gap length = 5mm, flux per pole = 52 mwb. Carter"s coefficient for slot = 0.46 and Carters coefficient for duct = 0.65	10	CO2	K5
11	Derive the output equation of Induction motor	10	CO6	K4
12	Derive the output equation of Synchronous motor	10	CO5	K3

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

Course Outcomes	CO1	Identify and explain the different methods of generation, distribution, control and compensation involved in the operation of power systems.
	CO2	Design the mathematical models of the mechanical and electrical components involved in the operation of power systems and demonstrate the understanding of the open loop and closed loop control practices associated with the voltage and frequency control of single area or interconnected multi area power systems.
	CO3	Specify the equivalent electrical parameters of transmission line to prepare and analyze models to predict the range and ratings of the equipment's to be used, the protection required against line transients and determine the appropriate methods of compensation required for operational stability.
	CO4	Solve the problems related to the economic dispatch of power, plant scheduling, unit commitment and formulate strategies to minimize transmission line losses and penalties imbibed.
	CO5	Design protection schemes required for the system to safeguard against faults after identifying and determining the severity of the faults occurring during the period of operation and design testing strategies to determine the performance characteristics of the compensating equipment to be used in the system.
	CO6	Assess the different methods of control and compensation to choose the best option so that social and environmental problems are minimized and recognize the need to continuously follow the advancements in technology and incorporate them in the present system to improve efficiency and increase the flexibility and quality of operation.

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand — NAAC GRADE A — ACCREDITED UNIVERSITY

[27-11-2025]
END SEM EXAMINATION
School of Engineering & IT

Program	**Electrical & Electronic Engineering**	**Branch**	**B. Tech**
Subject Name	**Power System-I**	**Session**	**Odd, 2025-26**
Semester	**V**	**Year**	**Nov, 2025**

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)**
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- **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 Power System.	2	CO1	K1
ii	State the significance of per-unit system in power system calculations.	2	CO1	K3
iii	What do you mean by corona in the power system?	2	CO2	K3
iv	Define Skin effect.	2	CO2	K5
v	What do mean by sag and enlist the types of sag in overhead line?	2	CO3	K1
vi	Define surge impedance loading.	2	CO3	K2
vii	Write down the difference between EHVAC and HVDC transmission system.	2	CO4	K1
viii	What is the function of bedding and armouring in underground cables?	2	CO4	K2
ix	What are the disadvantages of OLTC transformer?	2	CO5	K4
x	What do you mean by feeder and distributor?	2	CO5	K6

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Draw and explain briefly about single line diagram of the power system.	5	CO3	K3
3	Explain briefly about different types of insulators and their properties used in power system.	5	CO3	K1
4	Explain briefly the functional difference between tap changing transformer and regulating transformer.	5	CO5	K4
5	A transmission line has a span of 150 m between level supports. The conductor has a cross-sectional area of 2 cm^2. The tension in the conductor is 2000 kg. If the specific gravity of the conductor material is 9.9 gm/cm^3 and wind pressure is 1.5 kg/m length, calculate the sag. What is the vertical sag?	5	CO5	K5
6	Explain briefly the methods used to improve string efficiency in transmission line.	5	CO6	K1
7	Describe briefly the performance of single-phase short transmission line with vector diagram.	5	CO4	K6

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

Q. No.	QUESTIONS	Marks	COs	KL
8	A balanced 3-phase load of 30 MW is supplied at 132 kV, 50 Hz and 0·85 p.f. lagging by means of a transmission line. The series impedance of a single conductor is (20 + j52) ohms and the total phase-neutral admittance is 315×10^{-6} siemen. Using nominal T method, determine: (i) The A, B, C and D constants of the line (ii) Sending end voltage (iii) Regulation of the line	10	CO3	K3
9	Explain briefly about advantages of the High voltage Transmission.	10	CO2	K4
10	Derive the expression of sending end voltage, transmission line efficiency using the followings methods: (a) Nominal-π method. (b) Nominal-T method.	10	CO5	K2
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
12	Describe the various methods of laying underground cables. What are the relative advantages and disadvantages of each method	10	CO4	K6

ARKA JAIN University Jharkhand	NAAC GRADE A ACCREDITED UNIVERSITY	[25-11-2025] END SEM EXAMINATION School of Engineering & IT	
Program	Electrical and Electronics Engineering	Branch	B. Tech
Subject Name	Professional Practice Law and Ethics	Session	Odd, 2025-26
Semester	V	Year	NOV, 2025
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	When was the Copyright Act enacted in India?	2	CO3	K1
ii	Write down about the five moral values	2	CO1	K3
iii	List two types of arbitration	2	CO4	K1
iv	Define ethics in a professional context.	2	CO1	K2
v	What is professionalism	2	CO2	K3
vi	Define arbitration	2	CO4	K2
vii	What is a foreign award?	2	CO6	K1
viii	In which year was the Industrial Disputes Act enacted?	2	CO4	K2
ix	List any three rights of a patentee.	2	CO3	K3
x	Define Contract	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	Explain how direct and indirect taxes differ	05	CO6	K4
3	Analyze how the 2012 amendments strengthened the Copyright Act, 1957	05	CO3	K3
4	Discuss the objectives of IRC	05	CO4	K2
5	What are the common type of Professional misconduct, discuss	05	CO2	K2
6	Explain consortium and its advantages and disadvantages	05	CO3	K3
7	Discuss about the functions of an insurance Company.	05	CO5	K4

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

Q. No.	QUESTIONS	Marks	COs	KL
8	a) List the general principle of contracting b) Write down the advantages of Contract	10	CO2	K2
9	Apply the concept of collective bargaining in resolving a wage dispute between management and workers	10	CO6	K5
10	a) Distinction between mediation and arbitration b) Explain the method for assessing and controlling the contractors	10	CO5	K5
11	Break down the structural differences between Lok Adalats and arbitration tribunals	10	CO4	K4
12	Discuss about Engineering Ethics. Differentiate between Moral and Ethics	10	CO1	K3

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

Course Outcomes	CO1	Understand what constitutes professional practice, introduction of various stakeholders and their respective roles; understanding the fundamental ethics governing the profession.
	CO2	Compare into contracts and contracts management in engineering, dispute resolution mechanisms; laws governing engagement of labor
	CO3	Apply the understanding of Intellectual Property Rights, Patents
	CO4	Distinguish various constitutional laws & ethics
	CO5	Justify the types of roles they are expected to play in the society as practitioners of the engineering profession
	CO6	Build good ideas of the legal and practical aspects of their profession

GRAFICAL REPRESENTATION