JGI ARKA JAIN University Jharkhand | NAAC GRADE A ACCREDITED UNIVERSITY			[30-04-2026] END SEM EXAMINATION School of Engineering & IT
Program	**Electrical and Electronics Engineering**	**Branch**	**B. Tech**
Subject Name	**High Voltage Engineering**	**Session**	**Even, 2025-26**
Semester	**VI**	**Year**	**April, 2026**
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 are the different types of tests conducted on high-voltage equipment as per standards?	02	CO1	K1
ii	How do surge absorbers protect power systems?	02	CO4	K1
iii	Distinguish between flashover and puncture.	02	CO5	K2
iv	Mention some of the applications of liquid dielectrics	02	CO2	K1
v	What are the different types of solid insulating materials?	02	CO1	K2
vi	Define treeing and tracking	02	C02	K1
vii	Why is breakdown strength different for solid, liquid, and gaseous dielectrics?	02	C02	K5
viii	What are the advantages of parallel resonant circuit over series circuit	02	CO3	K4
ix	Mention the necessity of generating high dc voltage	02	CO3	K4
x	State the advantages of Sphere gaps	02	CO2	K3

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Explain in detail the methods of generation of high D.C. voltages. Discuss different circuits used and their advantages and limitations.	05	CO3	K4
3	Explain Secondary Ionisation Processes	05	CO2	K3
4	A steady current of 600 μA flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 kV is applied. Determine the Townsend's first ionization coefficient if a current of 60 μA flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value	05	CO1	K5
5	A solid dielectric specimen of dielectric constant of 4.0 and has an internal void of thickness 1 mm. The specimen is 1 cm thick and is subjected to a voltage of 80 kV (rms). If the void is filled with air and if the breakdown strength of air can be taken as 30 kV (peak)/cm, find the voltage at which an internal discharge can occur.	05	CO3	K5
6	Describe different types of over-voltages in power systems. How these are controlled using protective devices?	05	CO4	K5
7	Derive the expression of Ripple in Cascaded Voltage Multiplier Circuits.	05	CO3	K4

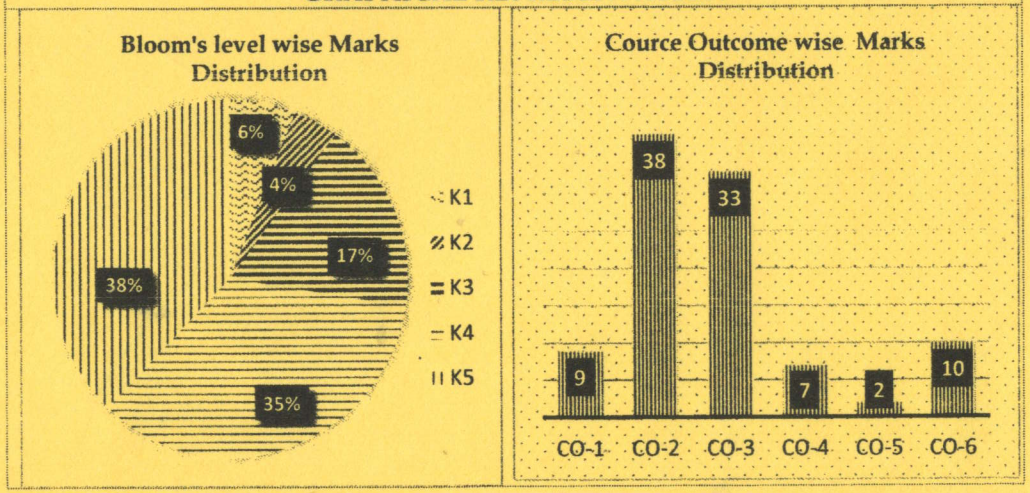
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Explain with neat sketches Cockroft-Walton voltage multiplier circuit	10	CO3	K4
9	Derive the expression of townsends second ionization coefficient	10	CO2	K3
10	The following observations were made in an experiment for determination of dielectric strength of transformer oil. Determine the power law equation. Gap spacing 2345 Breakdown Voltage (kV) 446080106	10	CO2	K5
11	A ten stage Cockraft-Walton circuit has all capacitors of 0.06 μF. The secondary voltage of the supply transformer is 100 kV at a frequency of 150 Hz. If the load current is 1 mA, Determine (i) Voltage Regulation (ii) The Ripple (iii) The Optimum Number Of Stages For Maximum Output Voltage (iv) The Maximum Output Voltage	10	CO6	K4
12	Discuss the factors affecting the selection of insulation levels for different components of a power system.	10	CO6	K4

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

Course Outcomes	CO1	Identify the tests on H. V. equipment and on insulating materials, as per the standards
	CO2	Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials.
	CO3	Utilize the concept of generation and measurement of D. C., A.C., & Impulse voltages.
	CO4	Analyze the causes for rise of over-voltages in a power system, and protection against these over voltages.
	CO5	Evaluate the system parameters for over voltages due to lightning
	CO6	Design of insulation levels of various parts of power system.

GRAPHICAL REPRESENTATION

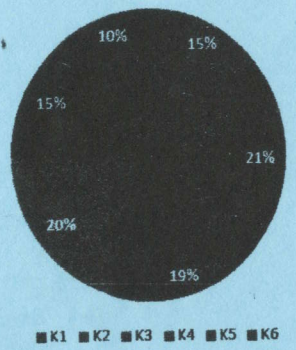


CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

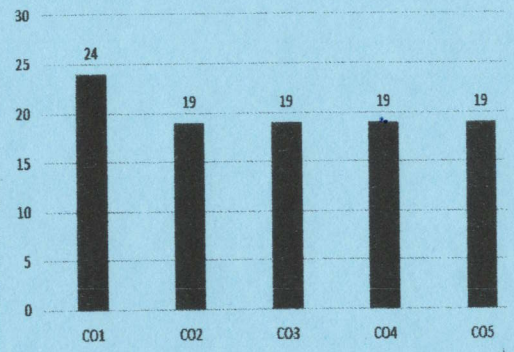
Course Outcomes	CO1	Represent signals mathematically in continuous and discrete-time, and in the frequency domain.
	CO2	Understand the Discrete-Fourier Transform (DFT) and the FFT algorithms.
	CO3	Apply digital signal processing for the analysis of real-life signals.
	CO4	Analyze discrete-time systems using z-transform.
	CO5	Estimate the response parameters for digital filters.

GRAPHICAL REPRESENTATION

BLOOM'S LEVEL WISE MARKS DISTRIBUTION



Course Outcome Wise Marks Distribution



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[04-05-2026]
END SEM EXAMINATION
School of Engineering & IT

Branch	**Electrical and Electronics Engineering**	**Program**	**B. Tech**
Subject Name	**Digital Signal Processing**	**Session**	**Even, 2025-26**
Semester	**VI**	**Year**	**Even 2026**

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-xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COS	KL
i	What do you mean by Nyquist rate?	02	CO3	K1
ii	Compare the computational complexities of DIT-FFT algorithm and direct computation of DFT for N=1024.	02	CO3	K1
iii	How many complex additions are involved in radix-2 DIT-FFT algorithms?	02	CO1	K1
iv	Give the expression for Fourier transform and inverse Fourier transform.	02	CO1	K2
v	Explain with an expression the term twiddle factor.	02	CO2	K3
vi	Explain the usefulness of the Z-transform.	02	CO4	K2
vii	State the condition for existence of DTFT?	02	CO5	K1
viii	In context to FFT, what is radix- 2?	02	CO5	K3
ix	Explain the significance of region of convergence (ROC) in Z-transform analysis.	02	CO4	K1

x	How circular convolution is implemented using DFT and IDFT?	02	CO1	K2

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

Q. No.	QUESTIONS	Marks	COS	KL
2	Compute DFT of the sequence x(n)= sin(n∏/2) using DIT FFT.	05	CO1	K1
3	Compute the Z-transform and determine the ROC for the sequence $x(n) = a^n u(n-1) \qquad a < 1$	05	CO4	K4
4	A discrete-time signal is given by, X(n)= {1, 2, 2, 1, 4} ↑ Sketch the following signals: i. X(n-1).δ(n-2) ii. X(n).u(n-3)	05	CO1	K4
5	Find the convolution of the signal x(n) = (3, 1, 2, 4) where impulse response of the signal is h (n) = (1, 3, 2, 1) using any method.	05	CO3	K3
6	DFT of a sequence x(n) by X(k)= { 3, 1, 0, -2 }. Determine x(n	05	CO5	K5
7	Determine the circular convolution of following sequences and compare the results with linear convolution. $x_1(n)$ = { 1, 1, 1, 1, -1, -1, -1, -1} $x_2(n)$ = { 0, 1, 2, 3, 4, 3, 2, 1}	05	CO2	K2

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

Q. No.	QUESTIONS	Marks	COs	KL
8	Given x(n)= {1, 2, 3, 4, 4, 3, 2, 1}, find X(k) using DIT FFT algorithm.	10	CO2	K5
9	Find the Fourier transform of a rectangle.	10	CO1	K6
10	Discuss the properties of DFT giving mathematical expression.	10	CO5	K3
11	Given the time-domain representation of a signal x(n) = { ½, ½, ½, ½, 0, 0, 0, 0 }, perform Decimation in Frequency FFT (using Radix-2 FFT algorithm) with N = 8. Show the intermediate steps of the FFT algorithm.	10	CO3	K4
12	Determine the IDFT of X (k) = {3, (2 + j), 1, (2 - j)}.	10	CO4	K2

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Program	**Electrical & Electronics Engineering**	**Branch**	**B. Tech**
Subject Name	**Measurements & Instrumentation**	**Session**	**Even, 2025-26**
Semester	**VI**	**Year**	**April, 2026**

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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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	List the various errors that are observed in measurements.	02	CO1	K1
ii	Why LVDT is called linear differential transformer?	02	CO3	K2
iii	Define the terms "Indicating instruments", "Recording instruments" and integrating Instruments". Give examples of each.	02	CO1	K1
iv	What are the types of DC potentiometer?	02	CO3	K2
v	What is a resolution of an instrument? How would a voltage of 2V be displayed on '10V range' and on '100V range'?	02	CO1	K1
vi	Define AC Potentiometer.	02	CO3	K2
vii	Write any two applications of CT and of PT.	02	CO2	K1
viii	Write any two limitations of wheat stone bridge.	02	CO6	K2
ix	Name the method used for low resistance measurement.	02	CO6	K1
x	Define Creeping in Energy meter.	02	CO2	K6

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Draw the equivalent circuit and phasor diagram of CT. Derive its transformation ratio.	05	CO4	K3
3	Compare PMMC and MI instruments based on construction and performance	05	CO6	K3
4	Explain the construction and working principle of megger instrument.	05	CO2	K2
5	Explain the constructional features and working principle of a two channel automated digital CRO.	05	CO3	K3
6	The Coil of instrument has 42.5 turns. The mean width of the coil is 2.5cm and the axial length of the coil is 2 cm. If the flux density is 0.1 Wb/m2, Calculate the torque on the moving coil in NM.	05	CO2	K5
7	With a neat construction diagram, explain the operation of single phase induction type energy Meters	05	CO3	K3

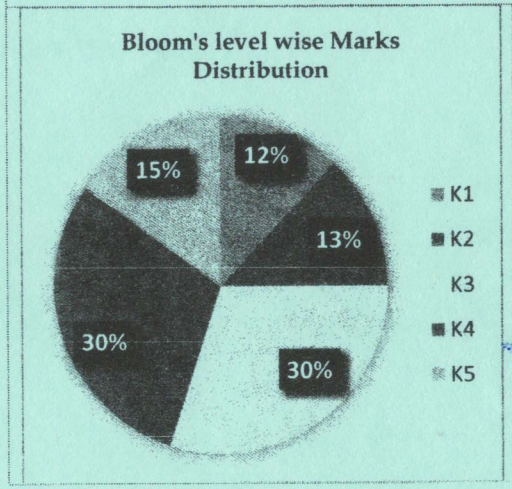
Section C (Answer any THREE out of FIVE) – 30 Marks
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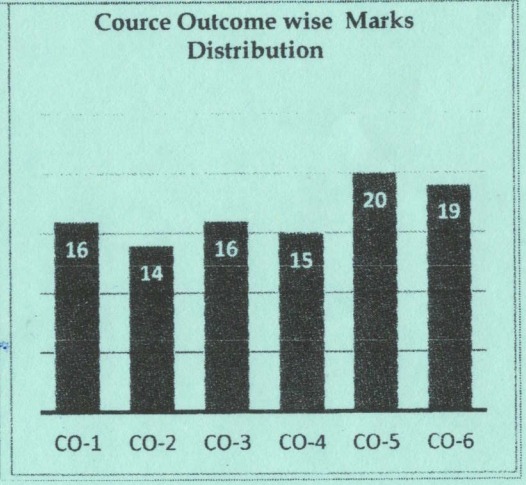
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the construction and working principle of repulsion type moving iron instrument and also discuss its merits and demerits.	10	CO4	K3
9	Explain Kelvin's double bridge with diagram.	10	CO1	K4
10	An LVDT produces 2 mV/mm. If output is 20 mV, calculate displacement and discuss characteristics.	10	CO6	K5
11	Explain the working principle and characteristics of different types of A/D converters. Compare their applications.	10	CO5	K4
12	Discuss about DC Crompton's Potentiometers with neat sketch and Explain the Applications	10	CO5	K4

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

Course Outcomes	CO1	Understanding the working of various electrical bridges.
	CO2	Understanding the construction and working of various measuring instruments.
	CO3	Apply the energy conversion techniques.
	CO4	Analyze the different types of errors in measurement, calibration process and standards.
	CO5	Interpret the methods for measurement of non-electrical quantities like temperature, Pressure, Force, Torque, Density, Liquid level, Viscosity, Flow, Displacement etc.
	CO6	Improve the existing technology in the field of measurements in terms of accuracy, cost, and durability and user friendliness

GRAPHICAL REPRESENTATION





JGI ARKA JAIN University Jharkhand | NAAC GRADE A ACCREDITED UNIVERSITY			[08-05-2026] END SEM EXAMINATION School of Engineering & IT
Program	**Electrical & Electronics Engineering**	**Branch**	**B. Tech**
Subject Name	**IPR**	**Session**	**Even, 2025-26**
Semester	**VI**	**Year**	**April, 2026**
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)**.		
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	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 Geographical Indication (GI)	02	CO5	K2
ii	Define Intellectual Property Rights	02	CO1	K1
iii	Mention the year of India's National IPR Policy.	02	CO5	K1
iv	Name any two artistic works protected by copyright.	02	CO3	K3
v	What does TRIMS stand for?	02	CO1	K2
vi	Write any four examples of non-registrable trademarks.	02	CO4	K4
vii	Define a Trademark under the Trade Marks Act, 1999.	02	CO4	K1
viii	Name the authority responsible for granting patents in India.	02	CO2	K1
ix	List any two remedies for copyright infringement.	02	CO3	K3
x	State the year of establishment of the Berne Convention.	02	CO1	K2

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Compare between GI and Patent	05	CO5	K2
3	Assess the role of the Intellectual Property Appellate Board (IPAB) in resolving trademark disputes.	05	CO4	K4
4	Explain the rights granted to a patentee under the Patent Act.	05	CO2	K1
5	Analyze the types of copyright infringement.	05	CO3	K3
6	Explain the need for Intellectual Property Rights in the modern knowledge economy.	05	CO1	K2
7	Critically evaluate the role of copyright registration in enforcement.	05	CO3	K4

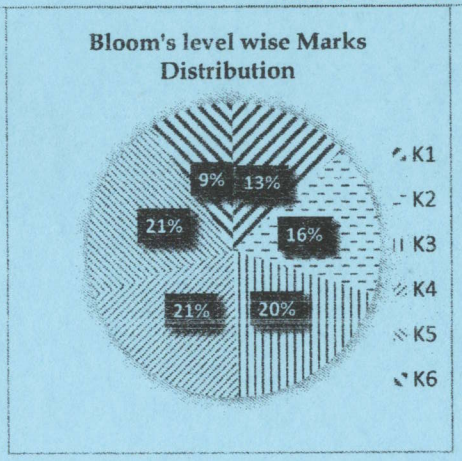
Section C (Answer any THREE out of FIVE) – 30 Marks
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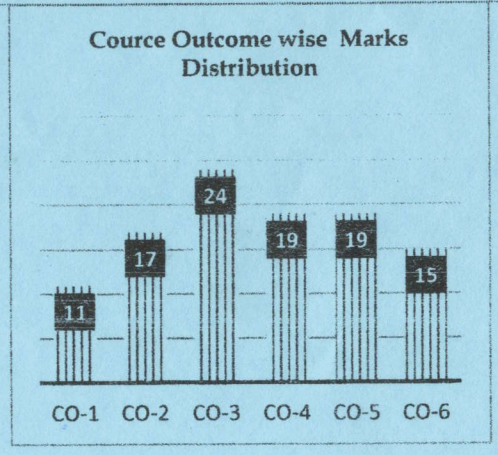
Q. No.	QUESTIONS	Marks	COs	KL
8	Assess the role of the Intellectual Property Appellate Board (IPAB) in resolving trademark disputes.	10	CO4	K4
9	Critically evaluate the duties imposed on a patentee	10	CO2	K5
10	Identify the type of trademark in each case: (a) ISI Mark (b) Google (c) Airtel (d) Signature of a fashion designer	10	CO6	K4
11	Analyze the term of protection provided under different forms of IPR.	10	CO5	K5
12	. Justify whether related rights should be treated separately from copyright.	10	CO3	K3

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

Course Outcomes	CO1	Identify activities, constitute IP infringements and the remedies available to the IP owner, and describe the precautious steps to be taken to prevent infringement of proprietary rights in products and technology development.
	CO2	Understand the knowledge on patent and copyright for their innovative research works.
	CO3	Apply information in patent documents provide useful insight on novelty of their idea from state of-the art search. This provide further way for developing their idea or innovations.
	CO4	Apply the activities and constitute IP infringements and the remedies available to the IP owner and describe the precautious steps to be taken to prevent infringement of proprietary rights in products and technology development.
	CO5	Anticipate the critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation.
	CO6	Formulate the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing.

GRAPHICAL REPRESENTATION

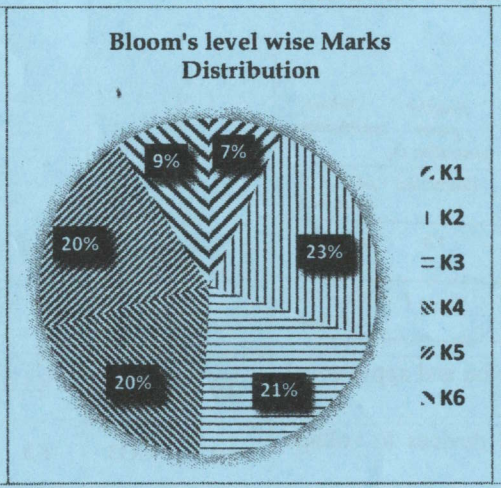


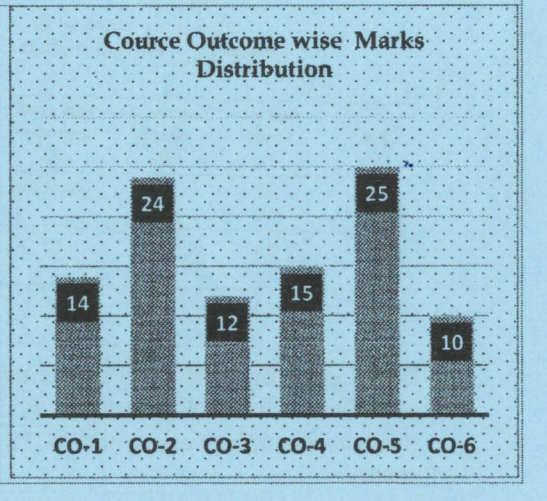


CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Recognize the basics of power system economics.
	CO2	Understand the monitoring and control of a power system.
	CO3	Apply the methods to control the voltage, frequency and power flow.
	CO4	Analyze the stability constraints in a synchronous grid.
	CO5	Estimate the steady state parameters of power system using various numerical methods.
	CO6	Formulate load flow & short circuit calculations

GRAPHICAL REPRESENTATION





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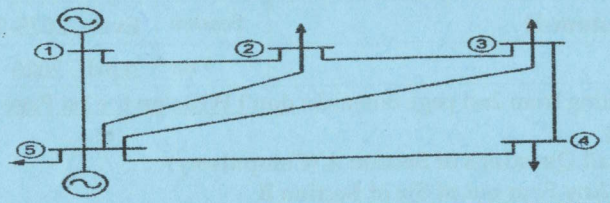
[11-05-2026]
END SEM EXAMINATION
School of Engineering & IT

Branch	**Electrical and Electronics Engineering**	**Program**	**B. Tech**
Subject Name	**Power System-II**	**Session**	**Even, 2025-2026**
Semester	**VI**	**Year**	**April, 2026**
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.		
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Section A (Each question Carry 02 Marks from Q1-i to Q1-xx) – 20 Marks

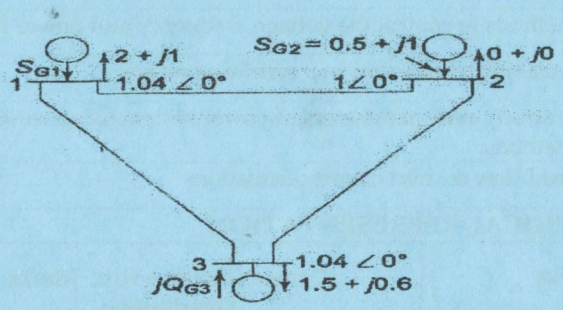
Q. N 1	QUESTIONS	Marks	COs	KL
i	What is a slack bus?	02	CO1	K1
ii	What is load flow analysis?	02	CO3	K1
iii	Define tap-changing transformer.	02	CO2	K1
iv	What do you mean by spinning reserve?	02	CO2	K1
v	Define bus in power system.	02	CO3	K1
vi	Define the swing equation and its components.	02	CO3	K2
vii	Write down the advantages of bus admittance matrix (Y_{bus}).	02	CO4	K1
viii	Define Energy Control Centre.	02	CO4	K2
ix	What is demand-side management?	02	CO5	K4
x	Which load flow method is better for large systems?	02	CO5	K5

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Compare SCADA and WAMS.	05	CO2	K4
3	Find Y-bus for the four bus system 	05	CO3	K1
4	Describe the working of an Automatic Voltage Regulator (AVR).	05	CO3	K2
5	Describe the power-angle curve.	05	CO4	K2
6	Explain the Gauss-Seidel method in load flow analysis.	05	CO5	K2
7	The cost function of a 80 MW. Generator is given by $C_1 = 75 + 10P_1 + 0.16P_1^2$ Rs./hr., where 'P_1' is the generator loading. Find the followings: (a) The incremental fuel cost (I.F.C.) expression (b) I.F.C, when 100% loading is applied. (c) I.F.C, when 50% loading is applied	05	CO4	K4

Line (bus to bus)	Impedance	Line charging (Y/2)
1-2	0.02 + j0.10	j0.030
1-5	0.05 + j0.25	j0.020
2-3	0.04 + j0.20	j0.025
2-5	0.05 + j0.25	j0.020
3-4	0.05 + j0.25	j0.020
3-5	0.08 + j0.40	j0.010
4-5	0.10 + j0.50	j0.075

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

Q. No.	QUESTIONS	Marks	COs	KL
8	Describe the Newton-Raphson method using flow chart describing the procedure for load flow analysis	10	CO5	K2
9	Consider the three-bus system of Figure. Each of the three lines has a series impedance of 0.03 + j0.09 pu and a total shunt admittance of j0.03 pu. The specified quantities at the buses are tabulated below 	10	CO2	K4
10	Describe briefly about equal area criterion and apply equal area criterion for stability assessment.	10	CO4	K3
11	Evaluate the effectiveness of FACTS devices in voltage control.	10	CO3	K5
12	Incremental fuel costs in Rs./M.W.h for a plant consisting of two units are $IC_1 = 50 + 0.2P_1$ and $IC_2 = 40 + 0.25P_2$. Find the saving in fuel cost in Rs./h for the optimal scheduling of a total load of 150 MW as compared to equal distribution of the same load between the two units.	10	CO4	K6

Bus	Real load demand P_D	Reactive load demand Q_D	Real power generation P_G	Reactive power generation Q_G	Voltage specification
1	2.0	1.0	Unspecified	Unspecified	V_1=1.04 + j0 (slack bus)
2	0.0	0.0	0.5	1.0	Unspecified (PQ bus)
3	1.5	0.6	0.0	Q_{G3} = ?	$\|V_3\|$ = 1.04 (PV bus)