JGI	ARKA JAIN University, Jharkhand — NAAC GRADE A, ACCREDITED UNIVERSITY	[01-05-2026] END SEM EXAMINATION School of Engineering & IT	
Program	Electrical & Electronics Engineering	Branch	B. Tech
Subject Name	Wind and Solar Energy Systems	Session	Even, 2025-26
Semester	VIII	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	Define wind energy and list major milestones in the development of wind power globally and in India.	02	CO1	K1
ii	List advantages and limitations of Fresnel collectors.	02	CO2	K2
iii	Define Fault Ride Through (FRT) capability.	02	CO5	K2
iv	What is solar constant?	02	CO3	K2
v	Compare central receiver and parabolic dish systems.	02	CO2	K3
vi	Distinguish between fixed speed and variable speed wind turbines.	02	CO1	K1
vii	Differentiate between stall control and pitch control mechanisms.	02	CO2	K1
viii	Define solar thermal energy.	02	CO1	K1
ix	What is grid synchronization?	02	CO1	K1
x	Explain briefly (i) Batteries (ii) Charge Controllers	02	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 working principle of parabolic trough system.	05	CO3	K2
3	Derive maximum power coefficient using Betz theory.	05	CO2	K5
4	List the different types of Vertical Axis Wind Turbine (VAWT), explain each of them	05	CO2	K3
5	Grid voltage limit is ±5% for 33 kV system. Determine permissible voltage range.	05	CO5	K5
6	Define solar radiation. Explain the process of capturing solar radiation.	05	CO6	K2
7	A 25 MW wind farm operates at 0.9 lagging PF. Calculate reactive power supplied to grid.	05	CO5	K4

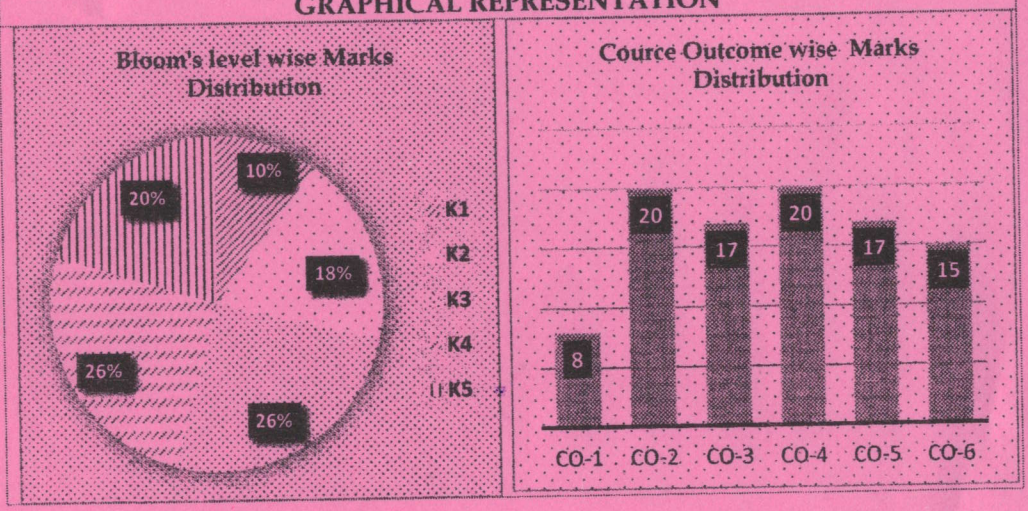
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the basic principle of operation of an Induction Generator showing the Torque –Speed Characteristic of an Induction Machine beyond the Synchronous speed.	10	CO6	K4
9	A PV array has 10 modules in series and 5 strings in parallel. Each module = 250 W, 30 V. Determine total power and voltage.	10	CO4	K5
10	Compare hybrid and isolated renewable systems.	10	CO5	K4
11	Illustrate V–I characteristics of a PV cell and explain MPPT.	10	CO3	K3
12	Explain in detail the need and functioning of the following control systems in Horizontal Axis Wind Turbines. (i) Pitch angle control (ii) Stall control	10	CO4	K3

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

Course Outcomes	CO1	Identify the basic properties of different renewable sources of energy and technologies for their utilisation,
	CO2	Understand the basic physics of wind and solar power generation.
	CO3	Describe main elements of technical systems designed for utilisation of renewable sources of energy.
	CO4	Discover the issues related to the grid-integration of solar and wind energy systems.
	CO5	Interpret the energy scenario and the consequent growth of the power generation from renewable energy sources.
	CO6	Design a power electronic interface for wind and solar generation.

GRAPHICAL REPRESENTATION



ARKA JAIN University
Jharkhand

NAAC GRADE A
ACCREDITED UNIVERSITY

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

Program	Electrical & Electronics Engineering	Branch	B. Tech
Subject Name	VLSI Circuits	Session	Even, 2025-26
Semester	VIII	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	PO
i	Write the expression for the drain current in the linear region of a nMOS.	02	CO1	K1	PO1
ii	What is the effect of constant field scaling on drain current? Give expression.	02	CO3	K3	PO1
iii	What are the two primary regions of operation for a MOSFET, and how are they defined?	02	CO1	K3	PO1
iv	What is meant by "scaling" in the context of MOSFET technology?	02	CO1	K2	PO1
v	Give an expression for aspect ratio of a chip.	02	CO2	K3	PO2
vi	Design a CMOS logic for NOR gate.	02	CO5	K4	PO1
vii	Explain the concept of channel length modulation.	02	CO4	K2	PO2
viii	Why channel in a MOS is narrow at the drain end and wide at the source end?	02	CO6	K1	PO1
ix	Why is PMOS used in the pull-up network instead of NMOS?	02	CO6	K1	PO2
x	Give an expression for power after constant voltage scaling?	02	CO2	K4	PO1

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

Q. No.	QUESTIONS	Marks	Cos	KL	PO
2	Why surface inversion is an essential condition for MOS operation?	05	CO2	K2	PO1
3	Discuss constant voltage scaling with two parameters.	05	CO1	K2	PO2
4	Draw the stick diagram for the expression $\overline{A.B}$. Use of color is mandatory.	05	CO6	K3	PO2
5	Draw and explain the CMOS 2-input NOR gate.	05	CO5	K2	PO2
6	Draw a pull up and pull down network. Explain why pMOS is used in pull up and nMOS is used in pull down network. Explain with a truth table.	05	CO4	K5	PO1
7	Explain any two of the following: i. Etching ii. Masking iii. Oxidation	05	CO3	K4	PO1

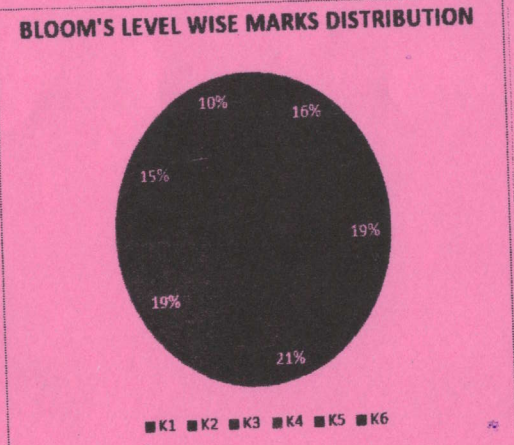
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

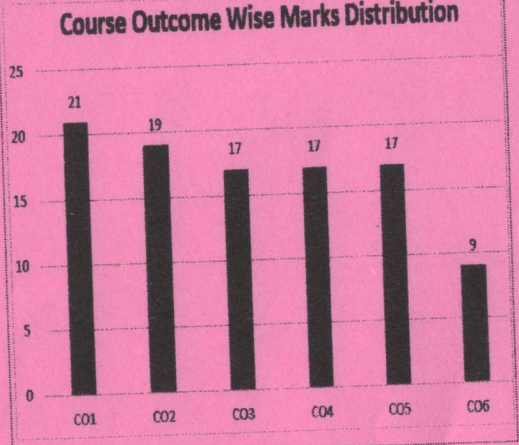
Q. No.	QUESTIONS	Marks	Cos	KL	PO
8	Describe in details the steps involved in the fabrication of NMOS.	10	CO2	K1	PO1
9	Derive an expression for drain current in n-channel MOSFET for saturation mode operation.	10	CO1	K3	PO2
10	Explain the resistive load inverter with a voltage transfer characteristic curve. Give the expression for VOH, VOL, VIH, VIL	10	CO3	K6	PO1
11	Draw the circuit diagram; stick diagram and layout for CMOS inverter.	10	CO5	K5	PO2
12	Design a complementary static CMOS XOR gate at the transistor level. The XOR gate Boolean expression F has five literals and is F= (A'B + C'(D+E))'	10	CO4	K4	PO1

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

Course Outcomes	CO1	Recognize the scale of integration for VLSI design.
	CO2	Understanding the processes for VLSI fabrication.
	CO3	Solve the performance issues in circuit layout.
	CO4	Analyze circuits using both analytical and CAD tools.
	CO5	Interpret logic circuits with different design styles.
	CO6	Create appropriate automation algorithms for partitioning, floor planning, placement and routing.

GRAPHICAL REPRESENTATION

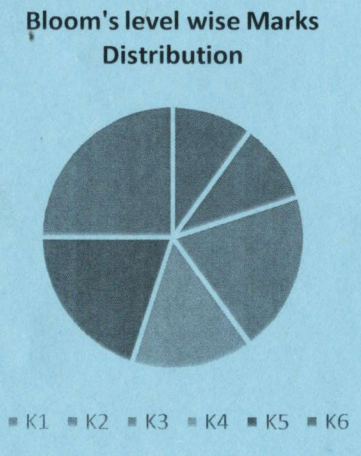


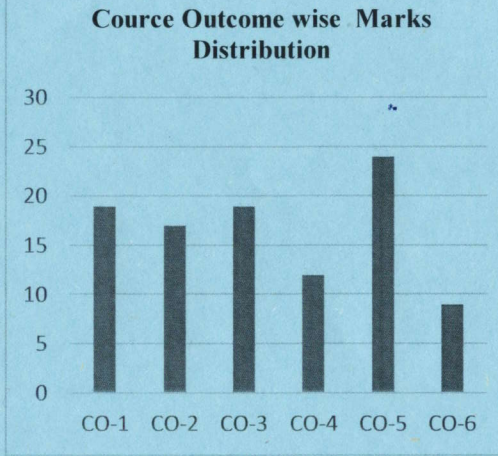


CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Identify key issues in big data management and its associated applications in intelligent business and scientific computing.
	CO2	Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
	CO3	Apply the fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and No SQL in big data analytics.
	CO4	Analyze adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.
	CO5	Choose machine learning libraries and mathematical and statistical tools with modern technologies like hadoop and map reduce.
	CO6	Create machine learning techniques and computing environment that are suitable for the applications under consideration.

GRAPHICAL REPRESENTATION





ARKA JAIN University
Jharkhand
NAAC GRADE A ACCREDITED UNIVERSITY

[14-05-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**Electrical & Electronics Engineering**	**Branch**	**B. Tech**
Subject Name	**Big Data Analysis**	**Session**	**Even, 2025-26**
Semester	**VIII**	**Year**	**April, 2026**

Time: 3 Hour
Max. Marks : 70

- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
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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 graph databases.	2	CO1	K1
ii	Name any two open-source Big Data technologies.	2	CO2	K2
iii	Define the term Big Data.	2	CO1	K1
iv	List the different types of NoSQL databases.	2	CO3	K2
v	What is HDFS?	2	CO4	K1
vi	What is data compression in Hadoop?	2	CO3	K2
vii	What is the purpose of local testing in MapReduce?	2	CO5	K1
viii	What is job scheduling in Hadoop?	2	CO5	K2
ix	What is data manipulation language (DML) in HiveQL?	2	CO6	K1
x	List different Hive data types.	2	CO6	K2

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Explain why Big Data is important for modern industries.	05	CO1	K3
3	Discuss the importance of Big Data in fraud detection.	05	CO2	K5
4	Describe the need for NoSQL databases.	05	CO3	K5
5	Differentiate between unit testing and local testing in Hadoop.	05	CO5	K4
6	Discuss failures in classic MapReduce systems.	05	CO5	K3
7	Demonstrate the different file formats supported in Hive.	05	CO6	K6

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

Q. No.	QUESTIONS	Marks	COs	KL
8	Design a Big Data framework for an e-commerce company.	10	CO1	K6
9	Assess the advantages of graph databases over relational databases.	10	CO2	K5
10	Differentiate between compression and serialization in Hadoop.	10	CO5	K4
11	Demonstrate the execution of a MapReduce workflow.	10	CO3	K3
12	Develop HiveQL queries for sales data analysis.	10	CO4	K6