JGI	ARKA JAIN University, Jharkhand	NAAC GRADE A, ACCREDITED UNIVERSITY	[01-05-2026] END SEM EXAMINATION School of Engineering & IT

Program	**Master of Computer Application**		
Subject Name	**Quantum Computing**	**Session**	**Even, 2025-26**
Semester	**IV**	**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 come 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 quantum superposition.	02	CO1	K1
ii	Explain the concept of measurement in quantum mechanics.	02	CO5	K2
iii	State the function of the Pauli-X gate.	02	CO1	K5
iv	What is a quantum algorithm?	02	CO3	K1
v	Define Quantum Fourier Transform (QFT).	02	CO2	K5
vi	Define quantum decoherence.	02	CO1	K4
vii	What are observables in quantum mechanics?	02	CO4	K6
viii	Name any one application of quantum computing.	02	CO3	K6
ix	What is the integer factorization problem?	02	CO2	K3
x	Define the quantum search problem.	02	CO1	K6

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Explain the Hadamard gate and its significance in quantum computing.	05	CO5	K2
3	Explain the steps involved in Grover's Algorithm.	05	CO1	K5
4	Describe the working of Pauli-X, Y, and Z gates.	05	CO5	K1
5	Explain the Quantum Fourier Transform (QFT) and its importance.	05	CO2	K3
6	Discuss applications of quantum computing in machine learning and optimization.	05	CO5	K6
7	Describe quantum error correction techniques.	05	CO2	K4

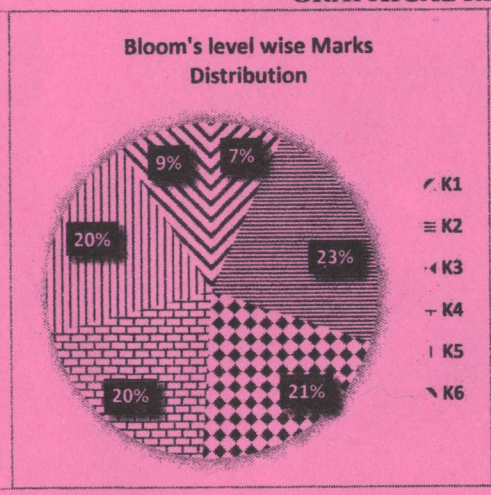
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

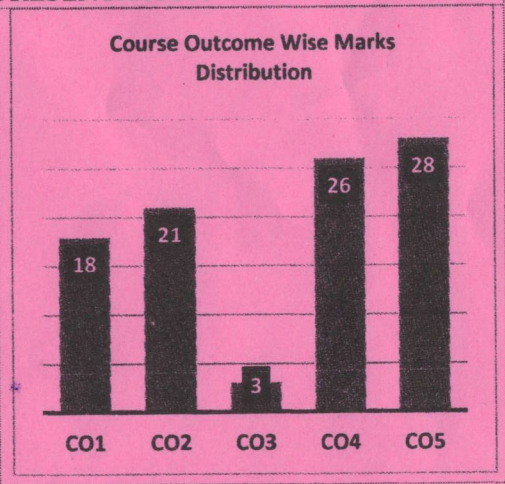
Q. No.	QUESTIONS	Marks	COs	KL
8	Discuss optimizations and limitations of Grover's Algorithm along with real-world applications.	10	CO1	K1
9	Explain Shor's Algorithm step-by-step for integer factorization with suitable examples.	10	CO2	K3
10	Discuss quantum error correction codes such as Shor Code and Surface Code, and explain fault-tolerant quantum computing.	10	CO5	K6
11	Discuss various applications of quantum computing in areas such as chemistry, material science, optimization (QAOA), and machine learning, along with programming tools and frameworks.	10	CO1	K4
12	Explain quantum cryptography, including its principles, applications, and challenges in modern communication systems.	10	CO5	K5

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

Course Outcomes	CO1	To understand the principles of quantum mechanics and their relevance to computing.
	CO2	To learn about quantum gates and circuits and their computational model.
	CO3	To explore quantum algorithms, including Shor's algorithm and Grover's algorithm.
	CO4	To analyze the potential Application of quantum computing in various domains.
	CO5	To gain practical experience in simulating and programming quantum algorithms.

GRAPHICAL REPRESENTATION





JGI	**ARKA JAIN University** Jharkhand	NAAC GRADE A ACCREDITED UNIVERSITY	[05-05-2026] END SEM EXAMINATION School of Engineering & IT

Program	**Master of Computer Application**		
Subject Name	**Artificial Intelligence and Deep learning**	**Session**	**Even, 2025-26**
Semester	**IV**	**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 Artificial Intelligence.	02	CO1	K1
ii	List any four applications of AI.	02	CO4	K1
iii	What are the types of AI?	02	CO1	K2
iv	What is ethical AI?	02	CO5	K2
v	Why is Python preferred for AI?	02	CO3	K3
vi	Define variables and data types in Python.	02	CO2	K3
vii	What is supervised learning?	02	CO2	K1
viii	Define Deep Learning.	02	CO1	K1
ix	What is an artificial neural network?	02	CO5	K1
x	What is IBM Cloud?	02	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 the need for switching from traditional systems to AI systems.	05	CO1	K1
3	Explain the features of Python that make it suitable for AI applications.	05	CO3	K2
4	Compare AI and Machine Learning with suitable examples.	05	CO2	K4
5	Explain the structure of a neural network.	05	CO4	K3
6	Explain the role of IBM Cloud services in AI development.	05	CO2	K2
7	Discuss in detail how machine learning helps in making machines intelligent	05	CO5	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
8	Explain Artificial Intelligence, its types, and major real-world applications in detail.	10	CO4	K2
9	Write a detailed note on Python programming fundamentals including variables, data types, operators, and syntax.	10	CO2	K4
10	Compare supervised, unsupervised, reinforcement, and ensemble learning with examples.	10	CO4	K2
11	Explain CNN architecture including convolution, pooling, padding, and implementation using Keras.	10	CO3	K5
12	Explain IBM Cloud AI services and their significance in modern AI application development.	10	CO1	K6

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

Course Outcomes	CO1	Analyze the foundation and basic concept of Artificial Intelligence.
	CO2	Apply various problem-solving methodology to develop AI enabled system.
	CO3	Analyze the concept of representing the knowledge and the process of inference to derive new representations of the knowledge.
	CO4	Apply the concept of soft computing notion for Planning, Game playing and NLP in AI and basic techniques in the classical systems.
	CO5	Analyze the concept of Fuzzy Logic.

GRAPHICAL REPRESENTATION

