

PRN No.



Dr. Vishwanath Karad

MIT WORLD PEACE UNIVERSITY | PUNE

TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

School of Computer science and Engineering

Department of Computer Engineering and Technology

TY BTech (AIDS) (Academic Year 2025-26)

Mid Term Exam - Semester ...V

Course Name:- AI Systems and Applications

Course Code:- AID3PE41A

Maximum Marks: 30

Time: 1 Hrs

Date: 30/09/25

Instructions:-

1. Attempt any 3 questions from Q. 1 to Q. 4 AND Attempt any 3 questions from Q. 5 to Q. 8
2. Figure to the right indicates full marks.
3. Use of cell phone is prohibited in the examination hall.
4. Neat diagrams must be drawn wherever necessary.
5. Assume suitable data, if necessary and clearly state.
6. Use of scientific calculator is allowed

Attempt any 3 questions from Q. 1 to Q. 4

Q.1	CO1, understanding	Explain how AI systems work with an example.	[5 Marks]
Q.2	CO1, CO2 applying	Explain with examples how AI has been applied in different domains.	[5 Marks]
Q.3	CO1, CO2 Understanding	Describe the key components of an AI system.	[5 Marks]
Q.4	CO2, CO3 Evaluating,	Given a 3×3 grayscale image and a 2×2 filter (kernel), compute the feature map using: • Stride = 1 • Padding = 0 (valid convolution)	[5 Marks]

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		Input image I (3x3): $I = \begin{bmatrix} 1 & 2 & 0 \\ 3 & 1 & 2 \\ 0 & 1 & 2 \end{bmatrix}$ Filter F (2x2): $F = \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix}$	
Attempt any 3 questions from Q. 5 to Q. 8			
Q.5	C02, C03 Remembering	What is a Convolutional Neural Network (CNN)? Explain its architecture and the function of its key layers and operations.	[5 Marks]
Q.6	C02, C03 Understanding	Explain the difference between Image Classification, Object Detection, and Image Segmentation.	[5 Marks]
Q.7	C02, C03 Remembering	What is Generative AI? What are the limitations of Generative AI?	[5 Marks]
Q.8	C02, C03 analyzing	What are the key limitations and ethical challenges associated with LLMs?	[5 Marks]



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Term End Examinations December 2025

AID3PE41A - AI Systems and Applications

Question Paper ID: 066772

Faculty/School	School of Computer Science and Engineering	Term	Semester V
Program	TY B.Tech AIDS	Duration	1 hour 30 minutes
Specialization	-	Max. Marks	40

Section - 1 (8 X 5 Marks)

Answer any 8 questions

1	Define Artificial Intelligence. Explain its scope and key components of AI systems with suitable examples.	5 marks	CO1	Remembering								
2	Compare Machine Learning, Deep Learning, and Reinforcement Learning with suitable examples.	5 marks	CO2	Understanding								
3	Describe the importance of AI tools and frameworks such as TensorFlow and Pandas in developing AI solutions.	5 marks	CO3	Applying								
4	What is Generative AI? Explain its working with an example of image generation using GANs.	5 marks	CO4	Analysing								
5	1. Find the optimal sequence of moves to transform the Initial State of the 8-puzzle to the Goal State using the A* search algorithm and calculate the value of cost function. Puzzle States <table><thead><tr><th>Initial State</th><th>Goal State</th></tr></thead><tbody><tr><td>1 2 3</td><td>1 2 3</td></tr><tr><td>4 0 5</td><td>4 5 6</td></tr><tr><td>6 7 8</td><td>7 8 0</td></tr></tbody></table>	Initial State	Goal State	1 2 3	1 2 3	4 0 5	4 5 6	6 7 8	7 8 0	5 marks	CO4	Evaluating
Initial State	Goal State											
1 2 3	1 2 3											
4 0 5	4 5 6											
6 7 8	7 8 0											

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6	Given the following 3×3 input image and a 2×2 filter, compute the feature map using: • Stride = 1 • Padding = 0 (valid convolution) Input Image (3×3): $I = \begin{bmatrix} 2 & 1 & 0 \\ 1 & 3 & 2 \\ 0 & 1 & 1 \end{bmatrix}$ Filter (2×2): $F = \begin{bmatrix} 1 & 0 \\ -1 & 1 \end{bmatrix}$	5 marks	CO4	Evaluating
7	What are Large Language Models (LLMs)? Describe their structure and applications in AI systems.	5 marks	CO3, CO5	Analysing
8	Describe the role of AI in healthcare and education. Provide two examples from each domain.	5 marks	CO4	Applying
9	Explain how AI contributes to business optimization and marketing through predictive analytics and automation.	5 marks	CO5	Analysing
10	Explain the architecture and use cases of ChatGPT as a conversational AI model.	5 marks	CO5, CO6	Creating

END OF QUESTION PAPER