

Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

2022 SCHEME

USN

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Course Code

22CA/CD814

Eighth Semester B.E. Degree Examinations, May 2026

GENERATIVE AI

(CSE-AI & CSE-DS)

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTl:CO: PI)</u>
<u>Module-1</u>			
1.	a. Discuss major applications of Generative AI in real-world domains such as healthcare, finance, education, media, and cybersecurity.	10	(2 :1: 1.6.1)
	b. Explain the rules of probability relevant to generative modeling, including joint probability, conditional probability, Bayes' theorem, and marginalization. Illustrate how these concepts are applied in generative models	10	(2 :1: 1.6.1)
(OR)			
2.	a. Demonstrate how VS Code and Docker can be used together to create a reproducible and lightweight machine learning development environment. Explain the advantages of containerization in AI projects.	10	(3 :1: 2.6.3)
	b. Explain the role of Kubernetes in managing multi-container applications. Discuss its architecture and how it supports scalability, orchestration, and fault tolerance in ML workflows.	10	(2 :1: 1.6.1)
<u>Module-2</u>			
3.	a. Explain the concept of “Drawing Data from Models” in Generative AI. Discuss how generative models learn probability distributions and generate new data samples with suitable examples.	10	(2 :2: 1.6.1)
	b. Demonstrate the concept of Style Transfer and Image Transformation in Generative AI and describe its practical applications.	10	(3 :2: 2.6.3)
(OR)			
4.	a. Demonstrate the Perceptron model as “a brain in a function.” Describe its architecture, mathematical formulation, learning rule, and limitations	10	(3 :2: 2.6.3)
	b. Demonstrate the following neural networks with their architectures and applications: (i) Convolutional Neural Networks (CNNs) (ii) Recursive/Recurrence-based Networks (RNNs)	10	(3 :2: 2.6.3)

Note: (RBTl - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI- Performance Indicator)

Module-3

5. a. What is meant by “creating separable encodings of images” in VAEs? 10 (2 :3: 1.6.1)
Explain latent space representation and its significance in image generation.
- b. Demonstrate how CIFAR dataset is used in training generative models. 10 (3 :3: 2.6.3)
Discuss pre-processing steps and challenges involved.

(OR)

6. a. Explain the taxonomy of generative models. Describe Position GANs and VAEs within this taxonomy with suitable comparisons. 10 (2 :3: 1.6.1)
- b. (i) Explain Vanilla GAN and its training procedure. 10 (2 :3: 1.6.1)
(ii) Discuss the minimax game formulation and loss function.

Module-4

7. a. (i) Describe the process of text generation using LSTMs. 10 (2 :4: 1.6.1)
(ii) Explain how sequential dependencies are captured. Illustrate with an example.
- b. Discuss the use of Convolutional Neural Networks (CNNs) for text processing and discuss how do CNNs differ from LSTMs in handling sequential data? 10 (2 :4: 1.6.1)

(OR)

8. a. Discuss the evolution of GPT models (GPT-1, GPT-2, GPT-3) and compare them in terms of architecture, scale, and capabilities. 10 (2 :4: 1.6.1)
- b. Describe the architecture transformer models and explain encoder-decoder structure with a neat diagram. 10 (2 :4: 1.6.1)

Module-5

9. a. Analyze the challenges in music generation using deep learning models with issues like temporal coherence, diversity, and evaluation metrics. 10 (3 :5: 2.6.3)
- b. What is MuseGAN? Explain its architecture and how it enables polyphonic music generation. 10 (2 :5: 1.6.1)

(OR)

10. a. Illustrate how deep learning models are used to generate recipes. 10 (2 :5: 1.6.1)
- b. Analyze the merits and demerits of generative AI in emerging applications. 10 (3 :5: 2.6.3)

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