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Department of Artificial Intelligence and Machine Learning

Date: 24.06.2025	Improvement Test	Max. Marks: 50+10
Semester: VI	UG	Duration: 1 $\frac{1}{2}$ Hrs + ½ Hr
Course Title: Natural Language Processing and Transformers		Course Code: AI363IA

Part A

Sl No	Questions	M	BT	CO
1.	Write the equation for the scalar dot product used in the attention mechanism	2	1	1
2.	What is the purpose of adding a classification head to a Transformer model?	2	2	1
3.	What does the feed-forward layer in a Transformer do?	2	2	2
4.	What is the difference between extractive and abstractive summarization?	2	2	1
5.	Given the following probabilities for 5 tokens from a language model output: If **k = 3**, which tokens will be considered for sampling?	2	3	3

Token	Probability
A	0.40
B	0.25
C	0.15
D	0.12
E	0.08

Part B

Sl No	Questions	M	BT	CO
1.a	Compare and analyse top-k and nucleus sampling techniques in text generation tasks. How do they balance diversity and coherence in generated text?.	5	4	3
1.b	Explain the concept of self-attention in transformer architecture and explain how the attention score is calculated	5	2	1
2.a	What are some common methods used for text summarization and how do models like T5,BART and PEGASUS contribute to improving the state of art in summarization tasks?	5	3	3
2.b	Describe the positional embedding's in the transformer model and how they help capture the sequential information in the input	5	2	1
3.a	Explain Character and Sub word tokenization, and also mention the importance of numericalization in tokenization process	5	3	1
3.b	What is layer normalization in Transformers? Explain why and where it is applied in the Transformer architecture	5	3	1
4	Explain the role of transformer models as feature extractors in training a text classifier. How does this approach differ from fine-tuning the transformer model?	10	4	2
5	Explain greedy search decoding and beam search decoding in the context of text generation using transformer models	10	2	3