

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2026

B.Tech-VIII Semester (CSE/IT)

COURSE CODE (CREDITS): 19B1WCI832 (3)

MAX MARKS: 25

COURSE NAME: PROBABILISTIC GRAPHICAL MODELS

COURSE INSTRUCTOR: Prof. Vivek Kumar Sehgal

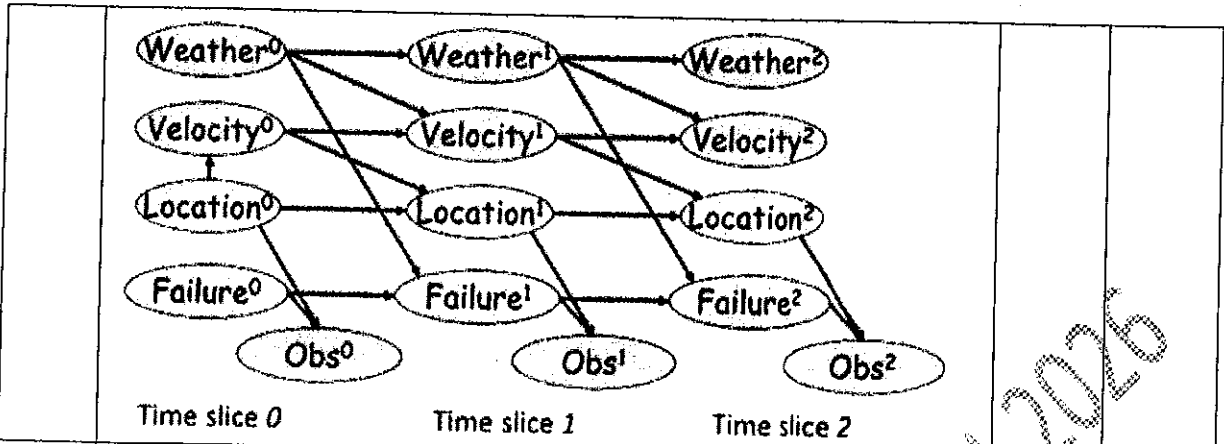
MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory.

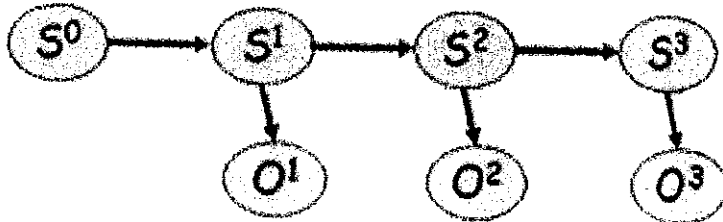
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is not allowed

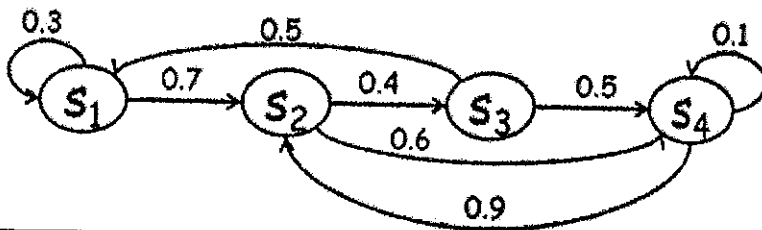
Q.No	Question	CO	Marks
Q1	<p>(a)What is an Independency Map (I-map)? Explain its significance in probabilistic graphical models. Write the order of following minimal I-maps</p> <p>(a) (b) (c)</p> <p>(b)Write an algorithm to build a minimal I-map given an ordering</p>	CO-2,3	5
Q2	<p>(a)Write an algorithm for Recovering the undirected skeleton for a distribution P that has a P-map and also explain the role of the witness set U in this algorithm?</p> <p>(b)Write a procedure to mark immoralities in the construction of a perfect map</p>	CO-2,3	5
Q3	<p>(a)Explain the following Templet Models using:</p> <ol style="list-style-type: none"> Dynamic Bayesian networks Object-relational models The Difficulty variable ranges from courses (C_1 to C_n) and Intelligence from students (S_1 to S_m) <p>(b) What are the Markov assumptions for a temporal model after discretizing it? Explain the following 2-time -slice Bayesian Network with its conditional distribution.</p>	CO-3	5



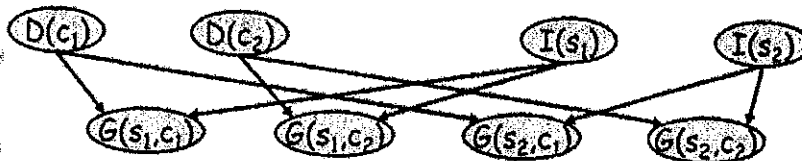
Q4 (a) Explain the structure of a Hidden Markov Model (HMM). Clearly distinguish between hidden states and observations using the given diagram.



(b) What is meant by the Markov property in HMMs? How is it reflected in the transition $P(s^i | s)$ in following Markov chain?



Q5 (a) Explain the plate dependency model for following overlapped plates.



(b) What is Context-Specific Independence Explain with Example