

## JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- April 2023

B.Tech. CSE/IT 8th Semester

COURSE CODE: 19B1WCI832

MAX. MARKS: 25

COURSE NAME: PROBABILISTIC GRAPHICAL MODELS

COURSE CREDITS: 03

MAX. TIME: 1.5Hrs

COURSE COORDINATOR: Prof. (Dr.) Vivek Kumar Sehgal

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

1. (a) For Joint distribution  $P(X,Y)$  given by table: Define  $I(P)$  to be the set of conditional independence assertions of the form  $(X \perp Y \mid \phi) \in I(P)$  CO- 2 [2.5]

Table-1

X	Y	$P(X,Y)$
$x^0$	$y^0$	0.08
$x^0$	$y^1$	0.32
$x^1$	$y^0$	0.12
$x^1$	$y^1$	0.48

- (b) Find Local Conditional Independence Assertions (starting from leaf nodes) in Fig.-1. CO- 2 [2.5]

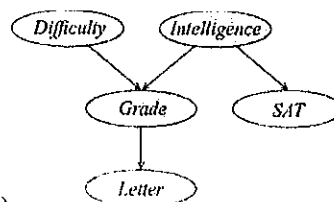


Fig.-1

2. (a) Define I Map, D-Map, and Perfect Map with illustrations. CO- 2 [2.5]  
 (b) Calculate the factorization into local probability models in Fig -1 CO- 2 [2.5]

3. Going from given distribution to Bayesian network, explain the following tasks in model building. CO- 3 [5]

- Picking variables.
- Determining structure
- Determining probabilities

4. (a) Evaluate the Joint Probability for  $P(i^1, d^0, g^2, s^1, l^0)$  in Fig.-2. CO- 3 [2.5]

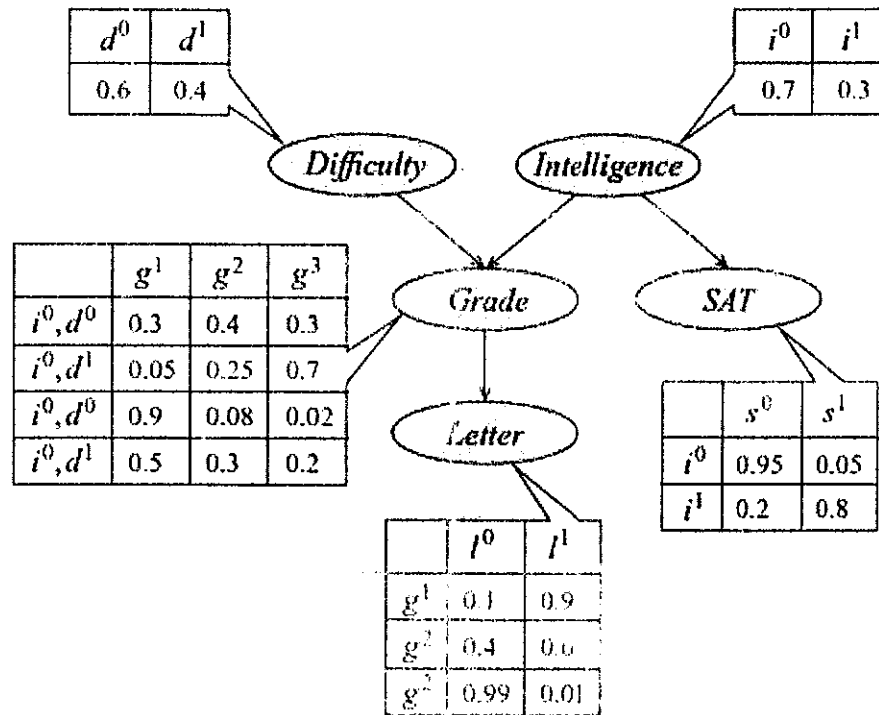


Fig.-2

(b) Find out the Causal Reasoning in Fig.-2 for following scenarios. CO- 3 [2.5]

- How likely Student will get a strong Letter?
- Knowing Student is not so Intelligent ( $i^0$ )
- Knowing Subject is not Difficult ( $d^0$ )

5. Write a Algorithm for finding nodes reachable from X given Z via active trails

CO- 4 [5]