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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS-2022

B.Tech - VI Semester (ECE)

COURSE CODE: 18B11BI611   MAX. MARKS: 25

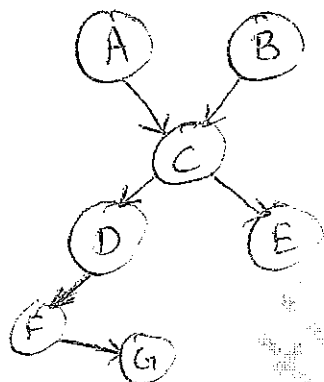COURSE NAME: Machine learning for Bioinformatics

COURSE CREDITS: 03   MAX. TIME: 1.5 Hours

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

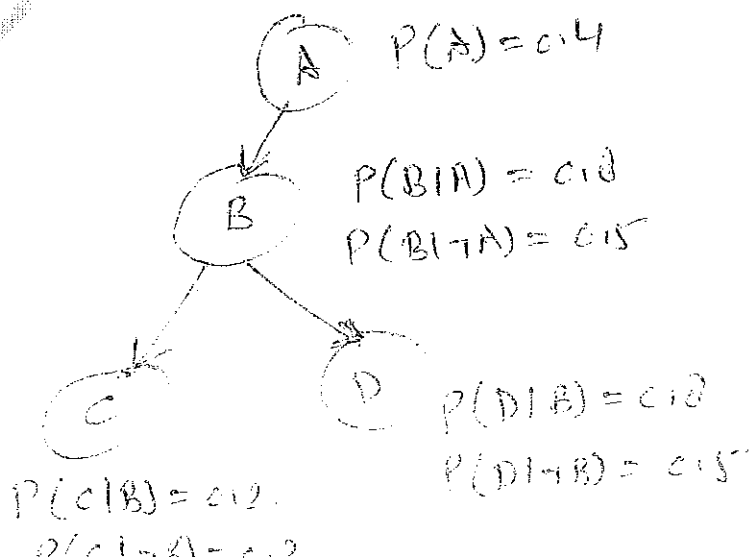**Q1.** Answer following questions related to given Bays Net:.   [CO3]

i.	Are A and B independent, given D and F?	[1]
ii.	Are A and B independent, given C?	[1]
iii.	Are D and E independent, given C?	[1]
iv.	Are D and E independent, given A and B?	[1]
v.	Are F and E conditionally independent?	[1]

Q2. Given the network below, calculate $P(A|B, \neg C)$:   [5]   [CO3]

$P(A) = 0.4$

$P(B|A) = 0.8$

$P(B|\neg A) = 0.15$

$P(D|B) = 0.8$

$P(D|\neg B) = 0.15$

$P(C|B) = 0.2$

$P(C|\neg A) = 0.3$

Q3. **a)** Write shots notes on: [CO1]

    i. Overfitting [1]

    ii. Underfitting [1]

    iii. Decision tree [1]

b) In terms of the bias-variance tradeoff, which one (Bias or Variance) is substantially more harmful to the test error that the training error and why? [1]

c) What are the limitations of Naive Bayes Classifier? [1]

Q4. Consider the following data set: [5] [CO3]

price	maintenance	capacity	airbag	profitable
Low	Low	2	No	Yes
Low	Med	4	Yes	No
Low	Low	4	No	Yes
Low	High	4	No	No
Med	Med	4	No	No
Med	Med	4	Yes	Yes
Med	High	2	Yes	No
Med	High	5	No	Yes
High	Med	4	Yes	Yes
High	High	2	Yes	No
High	High	5	Yes	Yes

Use Naïve Bays Classifier, to classify given data example:

price	maintenance	capacity	airbag	profitable
Med	Low	2	No	?

Q5. **a)** Define support vectors in SVM model. [1] [CO1]

    b) What is the difference between hard SVM and soft SVM? [1]

    c) Write the dual optimization equation of linear SVM. [1]

    d) What is Kernel trick in SNM? Explain in detail. [2]