



B.L.D.E Association's
VACHANA PITAMAHA DR.P.G.HALAKATTI
COLLEGE OF ENGINEERING AND TECHNOLOGY ,VIJAYPUR

LIBRARY AND INFORMATION CENTER

QUESTION PAPERS

1st,2nd & 4th SEMESTER

M.TECH COMPUTER SCIENCE

JUNE/JULY 2019

B.L.D.E. ASSOCIATION'S
VACHANA PITAMAHA
DR. P. G. HALAKATTI
COLLEGE OF ENGINEERING
LIBRARY, BIJAPUR.

INDEX

SL No	SUBJECT CODE	TITLE OF THE PAPER	PAGE No
01	16/17SCS/SCN/SC CE/LNI/SFC/SIT1 4	Probability, Statics and Queuing Theory	1-2
02	18SCS21	Managing Big Data	3-5
03	16/17SCS23	Advanced Algorithms	7-8
04	18SCS23	Cloud Computing	9-10
05	18SCS244	Data Mining and Data Warehousing	11
06	18SCS254	Advances in Digital Image Processing	12-13
07	16/17SCS41	Machine Learning Techniques	14-15
08	16SCS422	Business Intelligence and Its Applications	16

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16/17SCS/SCN/SCE/SSE/LNI/SFC/SIT14

First Semester M.Tech. Degree Examination, June/July 2019
Probability, Statistics and Queuing Theory

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of statistical table allowed.*

Module-1

- 1 a. What are the axioms of probability? State and prove Baye's theorem. (08 Marks)
b. For a certain binary communication channel the probability that a transmitted '0' is received as a '0' is 0.95 and the probability that a transmitted '1' is received as '1' is 0.90. If the probability that a '0' is transmitted is 0.4, find the probability that i) a '1' is received and ii) a '1' was transmitted given that a '1' was received. (08 Marks)

OR

- 2 a. What is a Random variable? Explain probability function, Pdf and Cdf. (08 Marks)
b. A random variable X has the following distribution.

X	-2	-1	0	1	2	3
P(x)	0.1	k	0.2	2k	0.3	3k

- i) Find K
ii) Evaluate $P(x < 2)$
iii) $F(x)$ when $-1 \leq x < 0$
iv) Evaluate mean of x. (08 Marks)

Module-2

- 3 a. Derive $E(x)$ and $Var(x)$ for binomial probability distribution function. (08 Marks)
b. The number of monthly break downs of the computer is a random variable having a Poisson distribution with mean equal to 1.8. Find the probability that this computer will function for a month i) Without a breakdown ii) With only one breakdown iii) With atleast one breakdown. (08 Marks)

OR

- 4 a. Define uniform, exponential, normal and standard normal continuous distributions. (08 Marks)
b. The time required, in hours, to repair a machine is exponentially distributed with parameter $\lambda = 1/2$.
i) What is the probability that the repair time exceeds 2h?
ii) What is the conditional probability that a repair takes at least 10h given that its duration exceeds 9h? (08 Marks)

Module-3

- 5 a. What is random process? How do you describe random process? What are the four types of random processes? (08 Marks)
b. Show that the random process $X(t) = A \cos(\omega_0 t + \theta)$ is wide sense stationary, if A and W_0 are constants and θ is a uniformly distributed random variable in $(0, 2\pi)$. (08 Marks)

OR

- 6 a. Define Poisson process. Show that the inter arrival time of a Poisson process with parameter λ has an exponential distribution with mean $1/\lambda$. (08 Marks)
- b. Define Markov Chain. What is homogeneous Markov Chain. Consider a Markov Chain with three possible states 1, 2 and 3 and the following transition probabilities \underline{P}

$$\begin{pmatrix} \frac{1}{4} & \frac{1}{2} & \frac{1}{4} \\ \frac{1}{3} & 0 & \frac{2}{3} \\ \frac{1}{2} & 0 & \frac{1}{2} \end{pmatrix}$$

- i) Find $P(x_4 = 3 / x_3 = 2)$
- ii) Find $P(x_3 = 1 / x_2 = 1)$
- iii) If we know $P(x_0 = 1) = 1/3$, find $P(x_0 = 1, x_1 = 2)$
- iv) If we know $P(x_0 = 1) = 1/3$, find $P(x_0 = 1, x_1 = 2, x_2 = 3)$ (08 Marks)

Module-4

- 7 a. What are the tests of significance used for large samples and their test statistic? (08 Marks)
- b. What is the procedure for testing of hypothesis? A sample of 100 students is taken from a large population. The mean height of students is 160cm. Can it be reasonably regarded that, in the population, mean height is 165cm, and the SD is 10cm? (use $Z_{\alpha} = 2.58$). (08 Marks)

OR

- 8 a. What are the uses of t- and f- distributions? The mean lifetime of a sample of 25 bulbs is found is 1550 hours with SD of 120h. The company manufacturing the bulbs claims the average life of the bulbs is 1600h. Is the claim acceptable at 5% LOS (use $t_{0.05} = 1.71$). (08 Marks)
- b. What are the properties of χ^2 distribution? What are the uses of χ^2 distribution? Explain χ^2 test of goodness of fit. (08 Marks)

Module-5

- 9 a. Explain Birth-Death process and obtain expression for steady state probabilities. What are the values of P_r and P_n for Poisson queue system? (08 Marks)
- b. Arrivals at the telephone booth are considered to be Poisson with an average time of 12min between one arrival and the next. The length of a phone call is assumed to be distributed exponentially with mean and 4min.:
- i) Find the average number of persons waiting in the system
- ii) What is the probability that a person arriving at the booth will have to wait in the queue?
- iii) What is the probability that it will take him more than 10min altogether to wait for the phone and complete his call?
- iv) Estimate the fraction of the day when the phone will be in use. (08 Marks)

OR

- 10 a. Explain symbolic representation a/b/c : d/e of the queuing model. Show that the average number of customers in the system M/M/1 : ∞ "FIFO is $\frac{\lambda}{\mu - \lambda}$. (08 Marks)
- b. State the Little law. Give the proof for Little formulae. (08 Marks)

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Second Semester M.Tech. Degree Examination, June/July 2019
Advances in Computer Networks

Time: 3 hrs.

Max. Marks: 80

Note: Answer FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. With a neat diagram, explain de-multiple-xing in frame and network layers. (08 Marks)
 b. Describe the functions of TCP/IP layers. (08 Marks)

OR

- 2 a. Explain the performance metrics bandwidth X delay and RTT. What is the time taken to send a file of size 'L' MB over a 'R' Mbps link? (08 Marks)
 b. What are the three roles served by the sliding window protocol? Justify the answers. (08 Marks)

Module-2

- 3 a. Give the details of forwarding tables used in datagram and virtual circuit switching. Illustrate source routing with a diagram. (10 Marks)
 b. Write the spanning tree algorithm used in LAN bridges. (06 Marks)

OR

- 4 a. What is CIDR? What is the aggregated route of the following routes : X.Y.128/24, X.Y.129/24, X.Y.130/24 and X.Y.135/24? (08 Marks)
 b. Show IPv6 header and describe the significance of various fields. (08 Marks)

Module-3

- 5 a. Discuss count to infinity problem and the solutions. (08 Marks)
 b. Using the Fig. Q5 (b), illustrate link state routing algorithm at the router D. (08 Marks)

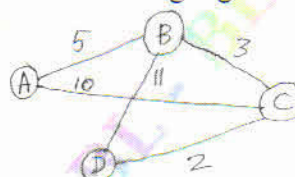


Fig. Q5 (b)

OR

- 6 a. Give an overview of mobile IP operation. (08 Marks)
 b. Explain four key BGP characteristics. (08 Marks)

Module-4

- 7 a. Explain TCP header and describe the significance of various fields. (10 Marks)
 b. How TCP timeout is estimated? (06 Marks)

OR

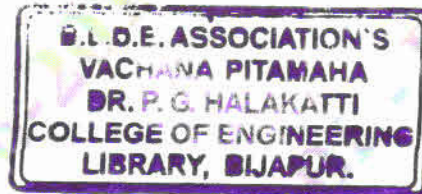
- 8 a. Outline TCP network Congestion control algorithm. What are the schemes for congestion avoidance? (10 Marks)
 b. Describe TCP connection setup and tear down procedures. (06 Marks)

Module-5

- 9 a. Describe domain name resolution scheme. Describe A, MX and NS record types. (08 Marks)
b. Describe web application architecture. (08 Marks)

OR

- 10 a. Write a note on: (i) WFQ (ii) RED. (08 Marks)
b. Explain SNMP MIB and the operations. (08 Marks)



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Second Semester M.Tech. Degree Examination, June/July 2019
Advanced Algorithms

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the various types of asymptotic notations with an example. (08 Marks)
b. What is recurrence? Solve the recurrence using substitution method. (08 Marks)

$$T(n) = \begin{cases} 1, & \text{if } n = 1 \\ 2T\left(\frac{n}{2}\right) + n, & \text{if } n > 1 \end{cases}$$

(08 Marks)

OR

- 2 a. Use recursion tree method to solve the recurrence $T(n) = 3T\left(\frac{n}{4}\right) + Cn^2$. (06 Marks)
b. State the Master theorem and solve the following recurrence relations using Master theorem.
 $T(n) = 3T\left(\frac{n}{4}\right) + n \lg n$. (04 Marks)
c. What is amortized analysis? What are the common techniques used in amortized analysis? Explain any two techniques with an example. (06 Marks)

Module-2

- 3 a. Using Bellman - Ford algorithm, find the shortest path from the source vertex '5' to the remaining vertices in the graph shown in the Fig.Q3(a). (08 Marks)

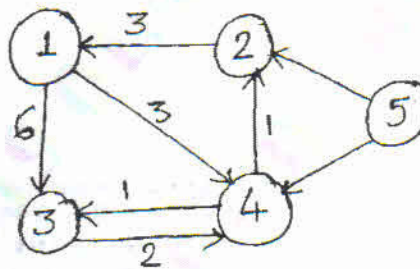


Fig.Q3(a)

- b. Write the Johnson's algorithm to solve all - pair shortest path problem for sparse graphs with example. (08 Marks)

OR

- 4 a. Write and explain the algorithm for recursive FFT. Also determine its running time. (08 Marks)
b. Explain Ford-Fulkerson method for solving the maximum flow problem. (08 Marks)

Module-3

- 5 a. Write Extended_Euclid algorithm and compute the values (d, x, y) that call the Extended_Euclid(299, 221). (08 Marks)
b. Write and explain algorithm to solve modular linear equation. Also find all solutions to the equation : $35x \equiv 50 \pmod{55}$. (08 Marks)

OR

- 6 a. Use Chinese remainder theorem to find all solutions to the equation : $x \equiv 3 \pmod{5}$ and $x \equiv 4 \pmod{7}$. (08 Marks)
- b. Consider an RSA key set with $p = 11$, $q = 29$, $n = 319$ and $e = 3$, what value of 'd' should be used in the secret key? What is the encryption of the message $M = 100$? (08 Marks)

Module-4

- 7 a. Write and explain the Rabin-Karp string matching algorithm. working modulo $q = 11$, how many spurious hits does the Rabin-Karp matcher encounter in the text :
 $T = 3\ 1\ 4\ 1\ 5\ 9\ 2\ 6\ 5\ 3\ 5\ 8\ 9\ 7\ 9\ 3$ when looking for the pattern $p = 26$? (08 Marks)
- b. Construct the string matching automation for the pattern $p = a\ a\ b\ a\ b$ and illustrate its operation on the text string $T = a\ a\ a\ b\ a\ b\ a\ a\ b\ a\ b\ a\ b\ a\ a\ b$. (08 Marks)

OR

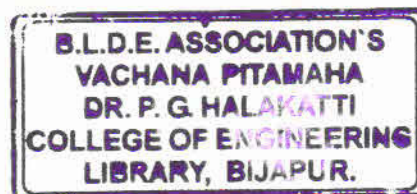
- 8 a. Write the Knuth – Morris – Pratt algorithm for string matching. Compute the prefix function π for the pattern $a\ b\ a\ b\ b\ a\ b\ b\ a\ b\ b\ a\ b\ a\ b\ b\ a\ b\ b$. (08 Marks)
- b. Write the Naïve string matching algorithm. Show the operation of the same, for the pattern in the text $T = 0\ 0\ 0\ 0\ 1\ 0\ 0\ 0\ 1\ 0\ 1\ 0\ 0\ 0\ 1$. (08 Marks)

Module-5

- 9 a. Explain randomizing deterministic algorithms taking linear search algorithm as an example. (08 Marks)
- b. Write an algorithm for testing polynomial equality using Monte Carlo algorithm (08 Marks)

OR

- 10 a. Explain Monte Carlo and Las Vegas algorithms with appropriate examples. (08 Marks)
- b. Write a note on probabilistic numerical algorithms. (08 Marks)



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18SCS23

Second Semester M.Tech. Degree Examination, June/July 2019
Cloud Computing

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. With a neat diagram, explain the structure of the 3 delivery models and different types of cloud. (10 Marks)
- b. Write short notes on the following : (10 Marks)
- i) Cloud Vulnerabilities ii) Ethical issues in Cloud Computing.

OR

- 2 a. Explain the different types of Service offered by AWS which are accessed through AWS Management Console. (10 Marks)
- b. Explain the different Open – Source platforms for Private Cloud. (05 Marks)
- c. Explain the use of energy use and Ecological impact of large scale data centre. (05 Marks)

Module-2

- 3 a. List and explain the different challenges in Cloud Computing. (06 Marks)
- b. What is a Workflow? Explain the life cycle of the workflow. (08 Marks)
- c. With neat sketch, explain in detail the Zookeeper Co-ordination Service. (06 Marks)

OR

- 4 a. With neat diagram, explain in detail the Map Reduce Programming model. (08 Marks)
- b. What are the different high performance computing that can be performed on the cloud? (06 Marks)
- c. With neat diagram, explain the execution of loosely coupled workloads using the Azure platform. (06 Marks)

Module-3

- 5 a. What is Virtualization? Explain what is hypervisor and its features with steps to show how it virtualizes CPU and memory. (08 Marks)
- b. Differentiate between Full Virtualization and Para Virtualization. (06 Marks)
- c. Explain with neat diagram, the different types of hypervisor and consideration to be taken while executing privileged and unprivileged instructions. (08 Marks)

OR

- 6 a. Explain the Case study of XEN hypervisor with suitable diagrams. (10 Marks)
- b. Briefly explain the darker side of virtualization. (05 Marks)
- c. Briefly explain how virtualization is done for X86 Architecture. (05 Marks)

Module-4

- 7 a. List and explain the different policies for Cloud Resource Management. (06 Marks)
- b. Explain with a neat sketch a 2 – level Allocation Architecture based on control theory for cloud. (08 Marks)
- c. Explain in detail the pricing and Allocation Algorithm. (06 Marks)

OR

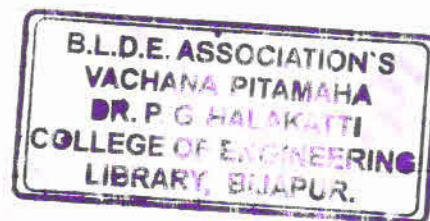
- 8 a. Using start – time fair queing Scheduling Algorithm to compute the virtual start – up and the virtual finish time for 2 threads a and b with weight $W_a = 1$ and $W_b = 5$. When the time quantum is $q = 15$ and thread b blocks at time $t = 24$ and wakes up at time $t = 60$. Plot the virtual time of the scheduler function of the real time. (12 Marks)
- b. Explain how the Resource is managed and Application is scaled dynamically in Cloud. (08 Marks)

Module-5

- 9 a. With neat diagram, explain the different surface of Attacks in Cloud Computing Environment. (10 Marks)
- b. Explain the different Security risks faced by Cloud Users. (10 Marks)

OR

- 10 a. Write a note on Service for Adaptive data streaming and Cloud based optimal FPGA synthesis. (10 Marks)
- b. With neat diagram, explain the Virtual Security Services provided by VMM and dedicated security VM. (10 Marks)



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18SCS244

Second Semester M.Tech. Degree Examination, June/July 2019

Data Mining and Data Warehousing

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.**Module-1**

- 1 a. List and explain the major tasks in data preprocessing. (10 Marks)
 b. Define the following : Data mining and Data warehousing. (04 Marks)
 c. Explain the various aspects of mining technology. (06 Marks)

OR

- 2 a. Explain the various data transformation strategies. (06 Marks)
 b. Describe the ways used to handle missing values. (06 Marks)
 c. Define the following : i) Classification ii) Decision tree iii) Data discrimination
 iv) Regression analysis. (08 Marks)

Module-2

- 3 a. Explain the major distinguishing features of OLTP and OLAP. (10 Marks)
 b. Define the following : i) Enterprise warehouse ii) Data mart iii) Virtual warehouse
 iv) Full materialization v) Data generalization. (10 Marks)

OR

- 4 a. Outline the basic algorithm for attributed oriented induction. (10 Marks)
 b. Explain the different types of data warehouse applications. (06 Marks)
 c. Write detail notes on meta data repository. (04 Marks)

Module-3

- 5 a. Briefly outline the major steps of decision tree classification. (06 Marks)
 b. Explain basic sequential covering algorithm. (08 Marks)
 c. Write detail notes on Cross validation. (06 Marks)

OR

- 6 a. Explain decision tree induction algorithm. (10 Marks)
 b. Write detail notes on the following : i) Bagging ii) Boosting and AdaBoost. (10 Marks)

Module-4

- 7 a. What is Cluster Analysis? Explain the typical requirements of clustering in data mining. (12 Marks)
 b. Explain the various clustering methods. (08 Marks)

OR

- 8 a. Write detail notes on grid – based methods. (10 Marks)
 b. Outline the major tasks of clustering evaluation. (06 Marks)
 c. Write short note on Density – based methods. (04 Marks)

Module-5

- 9 a. Outline the major components of time series data. (04 Marks)
 b. Explain the privacy preserving data mining methods. (08 Marks)
 c. Write detail notes on graph pattern mining and interactive visual data mining. (08 Marks)

OR

- 10 a. Explain the various scientific applications of data mining. (08 Marks)
 b. Explain intrusion detection and prevention system in detail. (12 Marks)

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Second Semester M.Tech. Degree Examination, June/July 2019
Advances in Digital Image Processing

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is digital image processing? Explain any two fields that uses digital image processing (10 Marks)
 b. With a Block diagram, explain the fundamental steps in digital image processing. (10 Marks)

OR

- 2 a. Describe the Image sampling and Quantization process. (05 Marks)
 b. Explain simple Image formation model. (05 Marks)
 c. Consider the two image subsots S_1 and S_2 shown in the following Fig Q2(c). For $V = \{1\}$, determine whether these two subsots are i) 4-adjacent ii) 8-ajacent or iii) m-adjacent

	S_1					S_2			
0	0	0	0	0	0	0	1	1	0
1	0	0	1	0	0	1	0	0	1
1	0	0	1	0	1	1	0	0	0
0	0	1	1	1	0	0	0	0	0
0	0	1	1	1	0	0	1	1	1

Fig Q2(c)

- d. Explain the different relationship between pixels in digital image processing. (05 Marks)

Module-2

- 3 a. How arithmetic and logical operations are applicable in an image enhancement? (08 Marks)
 b. Explain spatial image smoothing operations, why it is Required. (06 Marks)
 c. Describe image histogram and histogram equalization and use of equalization. (06 Marks)

OR

- 4 a. What is spatial filtering? Compare smoothing and sharpening in spatial domain. (10 Marks)
 b. Derive and explain the two dimensional discrete Fourier transform and its inverse?(10 Marks)

Module-3

- 5 a. Explain the image degradation model, with a neat diagram. (05 Marks)
 b. Explain Weiner filter (minimum mean square error). (05 Marks)
 Describe the various noise model available, Draw the noise probability density function. (10 Marks)

OR

- 6 a. Explain in brief, the three principal ways to estimate the degradation function for use in image restoration. (10 Marks)
 b. Explain the brief Inverse filtering and geometric mean filter. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Discuss the functional block diagram for pseudocolor image processing. (10 Marks)
 b. Explain RGB and HSI color models, how HSI to RGB conversion is done? (10 Marks)

OR

- 8 a. Explain a general image compression system with a functional block diagram. (08 Marks)
 b. What are different image compression methods? Explain two different image compression models. (08 Marks)
 c. i) Compute the Haar transform of the 2×2 image $f(x, y) = \begin{bmatrix} 2 & -3 \\ 5 & 4 \end{bmatrix}$
 ii) The inverse Haar transform is $F = H^T T H$, where T is the Haar transform of F and H^T is the matrix inverse of H . Show that $H_2^{-1} = H_2^1$ and use it to compute the inverse Haar transform of the result in (i) (04 Marks)

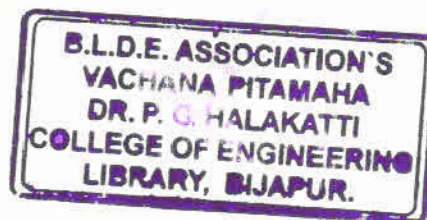
Module-5

- 9 a. Explain dilation and erosion process in image morphology. (06 Marks)
 b. Explain matching scheme for edge detection. (06 Marks)
 c. Explain region growing and region splitting merging scheme of region based segmentation. (08 Marks)

OR

- 10 a. Discuss with neat diagram, the important operations opening and closed in morphological. (10 Marks)
 b. Explain the Hit – or – miss transformation. (05 Marks)
 c. Explain Boundary extractions in brief. (05 Marks)

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16/17SCS41

Fourth Semester M.Tech. Degree Examination, June/July 2019
Machine Learning Techniques

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the steps in designing a learning system. (06 Marks)
b. Explain Find-S algorithm using enjoyspent concept and training instances given below. (10 Marks)

Example	Sky	Air temp	Humidity	Wind	Water	Forecast	Enjoyspent
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Warm	Change	Yes

OR

- 2 a. Explain ID3 algorithm for decision tree learning. (08 Marks)
b. Give the decision tree to represent the following Boolean function:
i) $A \wedge \neg B$ ii) $A \text{ XOR } B$ iii) $A \vee [B \wedge C]$ iv) $[A \wedge B] \vee [C \wedge D]$. (08 Marks)

Module-2

- 3 a. What is artificial neural network? Explain the derivation of gradient descent rule (08 Marks)
b. Explain the stochastic gradient descent back propagation algorithm for feed forward networks. (08 Marks)

OR

- 4 a. What is genetic algorithm [GA]? Explain the prototypical genetic algorithm. (08 Marks)
b. Use crossover and mutation operators on the following strings:
 $S1 = 11101001000$ $S2 = 00001010101$ (08 Marks)

Module-3

- 5 a. Explain Brute force's Baye's concept learning. (10 Marks)
b. Explain Naïve Baye's classifier. (06 Marks)

OR

- 6 a. Explain probably approximately correct [PAC] learning model. (10 Marks)
b. Prove that, if the hypothesis space H is finite, D is a sequence of $m \geq 1$. Independent randomly drawn examples of some target concept C for $0 \leq \epsilon \leq 1$. The probability that version space $VS_{H,D}$ is not ϵ exhausted is less than or equal to $|H|e^{-m\epsilon}$. (06 Marks)

Module-4

- 7 a. Explain K-nearest neighbor algorithm for a discrete valued function. (08 Marks)
b. Explain locally weighted linear regression. (08 Marks)

OR

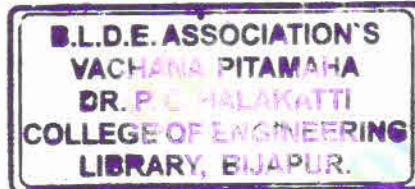
- 8 a. Explain learn one rule algorithm. (10 Marks)
b. Explain basic FOIL algorithm. (06 Marks)

Module-5

- 9 a. What is analytical learning? Explain the analytical learning problem for safe to stack (x, y) . (08 Marks)
b. Explain regression using a single Horn's clause. (08 Marks)

OR

- 10 a. Explain Q function and Q learning algorithm. (10 Marks)
b. Explain temporal difference learning. (06 Marks)



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Fourth Semester M.Tech. Degree Examination, June/July 2019
Business Intelligence and its Applications

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the parallel development trades with neat diagram. (08 Marks)
b. Discuss the four components of business justification. (08 Marks)

OR

- 2 a. What is cross organizational development approach? Explain BI application release concept with neat diagram. (08 Marks)
b. Discuss the business case assessment activities with neat diagram. (08 Marks)

Module-2

- 3 a. Discuss the project planning activities with neat diagram. (08 Marks)
b. Explain the deliverables resulting from project planning activities. (03 Marks)
c. Explain the various roles involved in project planning activities. (05 Marks)

OR

- 4 a. Explain the interviewees for general business requirements and project specific requirements. (08 Marks)
b. Explain the interviewing process in the business intelligence project. (08 Marks)

Module-3

- 5 a. State the differences between operational databases and BI target databases. (08 Marks)
b. Explain the multidimensional design techniques, the star schema and the snowflake schema. (08 Marks)

OR

- 6 a. Discuss the security management used for the BI application. (08 Marks)
b. Explain the database design activities with diagram. (08 Marks)

Module-4

- 7 a. What are the three key growth areas? Explain. (08 Marks)
b. Explain the port implementation review process in growth management with diagram. (08 Marks)

OR

- 8 a. Explain the information asset and data valuation (any four). (08 Marks)
b. Explain actionable knowledge-return on investment in business intelligence. (08 Marks)

Module-5

- 9 a. Explain the key purpose of using IT in business. (08 Marks)
b. What is structured data? Explain the characteristics and sources of structured data and managing them. (08 Marks)

OR

- 10 a. Explain report standardization, common report layout and report delivery format. (08 Marks)
b. Why BI in ERP? Explain the benefits of BI in ERP. (08 Marks)
