CSE

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY
LONERE – RAIGAD – 402 103
Semester Examination – December – 2017

Branch: M. Tech. (Computer Engineering) **Semester: I**

Subject with Subject Code: Computer Algorithms [MTCE1101] **Marks: 60**

Date: 12/12/2017 **Time: 3 Hrs.**

Instructions: 1] Attempt any **5 Questions.**
2] Figures / structures to the right indicate full marks.
3] Each Question Carry **12 Marks.**
4] Assume suitable data, if necessary.
5] Neat diagrams must be drawn wherever necessary.

Solve the following:

Q.1a) Show the results of inserting the keys **(8M)**
C, N, G, A, H, E, K, Q, M, F, W, L, T, Z, D, P, R, X, Y, S
in order into an empty B-tree with minimum degree 3. Only draw the configurations of the tree just before some node must split, and also draw the final configuration.

b) Explain Binomial Heap. What are the properties of Binomial heap? **(4M)**
What are the different operations of it?

Q.2

a) Differentiate between Kruskal's and Prim's Algorithm. **(4M)**

b) Apply Ford-Fulkerson Algorithm for Maximum Flow for given a graph (Fig. 1)which represents a flow network where every edge has a capacity. Also given two vertices *source* 's' and *sink* 't' in the graph, find the maximum possible flow from s to t with following constraints: **(8M)**

i) Flow on an edge doesn't exceed the given capacity of the edge.

ii) Incoming flow is equal to outgoing flow for every vertex except s and t.

iii) What is its time complexity?

iv) Explain residual graph of flow network.

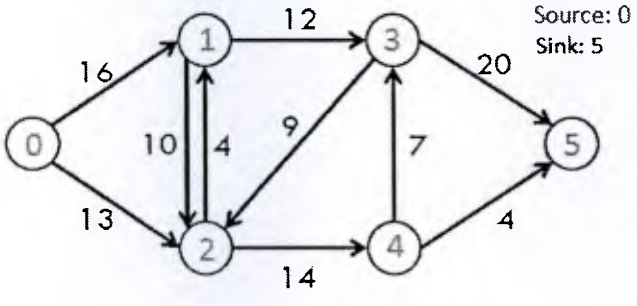

Fig. 1

Q.3

a) Given two segments a and b that are comparable at x, determine in O(1) time **(4M)**

b) What is convex hull? Why it is used? **(4M)**

c) Explain Graham's scan with example. What is its time complexity? **(4M)**

Q.4

a) How many spurious hits does the Rabin-Karp matcher encounter? **(6M)**
T = 2359023141526739921 and
P = 31415
modulo q = 11

b) Write Knuth- Morris -Pratt algorithm. Explain its running time analysis. **(6M)**

Q.5

a) Use Strassen's algorithm to compute the matrix product. What is its time complexity? **(4M)**

$$\begin{bmatrix} 1 & 3 \\ 7 & 5 \end{bmatrix} \qquad \begin{bmatrix} 6 & 8 \\ 4 & 2 \end{bmatrix}$$

b) Find the P A = LU **(8M)**

$$A = \begin{matrix} 10 & -7 & 0 \\ -3 & 2 & 6 \\ 5 & -1 & 5 \end{matrix}$$

Q.6

a) Find the inverse DFT for y(k) = {4, 0, 4, 0} **(4M)**

b) Compute the values (d, x, y) that the call EXTENDED-EUCLID(899, 493) **(4M)**

c) Prove that if a and b are any integers, not both zero, then gcd(a, b) is the smallest positive element of the set {ax + by: x, y ∈ Z} of linear combinations of a and b. **(4M)**

----- End of Paper -----

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Semester Examination – December - 2017

Branch: M.Tech. (CE / CS / CS&IT / CS&E) **Semester: I**

Subject with Subject Code: Machine Learning [MTCE1102] **Marks: 60**

Date: 14 / 12 / 2017 **Time: 3 Hrs.**

Instructions to the Students:

1. *Attempt **any Five Questions** of the following.*
2. *Illustrate your answers with neat sketches, diagrams, examples etc. wherever necessary.*
3. *Necessary data is given in the respective questions. If such data is not given, it means that the knowledge of that part is a part of examination.*
4. *If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.*

(Marks)

Q.No.1 **a)** Define Machine Learning and explain its types in detail. **(08)**

b) Suppose your email program watches which emails you do or do not mark as spam, and based on that learns how to better filter spam. In this statement What is task T, performance P and Experience E? Choose options from below and justify your answer: **(04)**

i) Watching you label emails as spam or not spam.
ii) Classifying emails as spam or not
iii) The number of emails correctly classified as spam/not spam
iv) None of above—this is a machine learning problem

Q.No.2 **Write Short Note on any FOUR of Following:** **(12)**

a) Instance based learning
b) Feature reduction
c) Feature Selection
d) Collaborative filtering based recommendation
e) Hypothesis Testing
f) Probability and Bayes Learning

Q.No.3 **a)** **Explain Following Terms:** **(08)**

i) Linear Regression
ii) Logistic Regression

b) **Let us say you're running a company, and you want to develop learning algorithms to address each of two problems.** **(04)**

Problem1: *You have large inventory of identical items. You want to predict how many of these items will sell over the next 3 months.*

Problem2: *You'd like software to examine individual customer accounts, and for each account decide if it has been hacked / compromised.*

Should you treat these as classification or as regression problems? Choose options from below and justify your answer.

i) Treat both as classification problems.
ii) Treat Problem 1 as a classification problem, Problem 2 as a regression Problem.
iii) Treat Problem 1 as a regression problem, Problem 2 as a classification Problem.
iv) Treat both as regression problems

Q.No.4 a) Explain Support Vector Machine in detail. **(06)**

b) Write Backpropagation algorithm with example. **(06)**

Q.No.5 a) What is Perceptron ? How it is represent? State training rule for it. **(06)**

b) Of the following examples, which would you address using an *Unsupervised Learning* Algorithm? Choose multiple options if applicable and justify your answer. **(04)**

i) Given email labeled as spam /not spam, learn a spam filter
ii) Given a set of news articles found on the web, group them into set of articles about the same story
iii) Given Database of customer data, automatically discover market segment and group customers into different market segments.
iv) Given a dataset of patients diagnosed as either having diabetes or not, learn to classify new patients as having diabetes or not.

c) Define Decision Tree. **(02)**

Q.No. 6 Attempt any TWO of following: **(12)**

a) What is VC dimension? Illustrate with Example.

b) In hierarchical clustering, how can we have locally adaptive distances? What are the advantages and disadvantages of this?

c) What is differentiable threshold unit for multilayer networks?

----- END OF PAPER -----

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
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Semester Examination – November – 2017

Branch: M. Tech. (CE / CSE / CS&IT / CS) **Semester: I**

Subject with Subject Code: Advanced Computer Network (MTCE1103) **Marks: 60**

Date: 16 / 12 / 2017 **Time: 3 Hrs.**

Instructions: 1] Attempt any **5 Questions**.
2] Figures / structures to the right indicate full marks.
3] Each Question Carry **12 Marks**.
4] Assume suitable data, if necessary.
5] Neat diagrams must be drawn wherever necessary.

Q. No. 1 Attempt the following questions:

A) Why optical switching is required? Enlist and explain different optical switching techniques in the optical domain. **[6]**

B) What are the different delays in the network? If, 1 MB file is send over STS – 1 channel, then calculate transmission time. **[6]**

Q. No. 2 Attempt the following questions:

A) What is send and receive window? A TCP connection is using a window size of 10,000 bytes and the previous acknowledgment number was 22,001. It receives a segment with acknowledgment number 24,001 and window size advertisement of 12,000. Draw a time-line diagram to show the situation of the window before and after. **[6]**

B) What is UDP? Enlist and explain typical applications of UDP protocol. **[6]**

Q. No. 3 Attempt the following questions:

A) Draw and explain TCP state transmission diagram. **[6]**

B) What is optical WDM network? Explain different characteristics of the optical networks. **[6]**

Q. No. 4 Attempt the following questions:

A) Explain with neat diagram fiber optic data communication system. **[6]**

B) What is DHCP? What is necessity of DHCP server in the network? **[6]**

Q. No. 5 Attempt the following questions:

A) What are the different optical network generations? Also discuss the various optical devices used in each generation. **[6]**

B) What is MPLS Technology? Compare and Contrast MPLS and GMPLS technologies? **[6]**

Q. No. 6 Attempt the following questions:

A) What is an Optical Fiber? Discuss the different layers of fiber cable. **[6]**

B) What are the different SONET electrical transport signal and their bit rates? **[6]**

----- END OF PAPER -----

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
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Winter Semester Examination – December – 2017

Branch: M. Tech. (CSE / CE / CS / CS&IT) **Semester: I**

Subject with Subject Code: Cloud Computing [MTCE1104] **Marks: 60**

Date: 18 / 12 / 2017 **Time: 3 Hrs.**

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Instructions to the Students

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Q.1. Attempt the following: **(12)**

a) Enlist and explain in brief the benefits of network centric computing and content sharing.

b) Compare Peer-to-peer system and cloud computing system with respect to architecture, resource management, scope and security.

Q.2.Answer the following: **(12)**

a) Enlist and explain different levels of parallelisms used in parallel computer architecture?

b) Enlist in brief different desirable properties for middleware required for a distributed system.

Q.3. Attempt the following **(12)**

a) What are the different companies are supporting cloud paradigm? Explain in brief with their service profile.

b) What is Hypervisor in Cloud Computing and enlist different types of it?

Q.4. Answer the following: **(12)**

a) For development of a cloud application explain different challenges need to overcome.

b) What is MapReduce programming model? Explain the philosophy behind it with a case study.

Q.5.Attempt the following: **(12)**

a) What are the main objectives of virtualization? Enlist and explain in brief.

b) Explain full virtualization and paravirtualization with suitable example.

Q.6. Answer the following: **(12)**

a) Explain with suitable elaboration the limitations of virtualizations.

b) Explain different scheduling algorithms for cloud computing.

----- END OF PAPER -----

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Winter Semester Examination – December – 2017

Branch: M.Tech. (CS / CE / CSE / CS&IT) **Semester: I**

Subject with Subject Code: Artificial Intelligence and Knowledge Reasoning [MTCE1105] **Marks: 60**

Date: 20 / 12 / 2017 **Time: 3 Hrs.**

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Instructions to the Students:

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Q.1. **A)** How logic is used in knowledge representation? **(12)**
B) Explain Conceptual Dependency Theory.

Q.2. Which is the Negation Normal Form of the statement? Explain step by step **(12)**

¬ (∃hasChild.(Female ⊓ ∃ hasDegree.Doctor))

i. (∀ hasChild. ¬ (Female ⊓∃hasDegree.Doctor))
ii. (∀ hasChild. (¬ Female ⊓∃hasDegree.Doctor))
iii. (∀ hasChild. (¬ Female ⊔ ∀hasDegree. ¬ Doctor))
iv. (∀ hasChild. (Female ⊔ ∀hasDegree. ¬ Doctor))

Q.3. Convert following sentence in to First Order Logic **(12)**

i. Jack owns a dog.
ii. Every dog owner is an animal lover.
iii. No animal lover kills an animal.
iv. Either Jack or Curiosity killed the cat, who is named Tuna.

Did Curiosity kill the cat? Proof by resolution.

Q.4. How does top down & bottom up reasoning used in plan applier mechanism? **(12)**

Q.5. **A)** Explain multi agent scenario in Epistemic logic. **(12)**
B) Write a notes on:

i) Axiomatic System
ii) Recourse Description Framework
iii) Semantic Net

Q.6. **A)** Explain default logic in default reasoning. **(12)**
B) Using propositional logic, prove (d) from (a, b, c):

i. P ⇒ (Q ⇔ R)
ii. ¬(Q ⇔ R)
iii. (S ∧ Q) ⇒ P
iv. ¬P ∧ (S ⇒ ¬Q)
