

Time: 3 Hours

Marks : 80

- N.B. (1) Question one is Compulsory.
(2) Attempt any 3 questions out of the remaining.
(3) Assume suitable data if required.**
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- Q. 1 Solve any Four out of the following (5 marks each) 20M
- a) Explain Scrum Methodology with suitable diagram.
 - b) Write short note on FTR
 - c) Explain Project Tracking
 - d) Write a short note on UML diagrams
 - e) How risk analysis is important in project, can it harm budgets or project deployment status?
- Q. 2 a) Design the test cases for Medical Management Application 10M
- b) Explain COCOMO model in detail 10M
- Q.3 a) Write an SRS for University Management Website 10M
- b) Design the DFD for Library Management System 10M
- Q.4 a) How User Interface Design helps web technology or IT Industry? 10M
- b) What are different metrics used for software measurement? Explain function Point-based estimation technique in detail 10M
- Q5 a) List out different software testing strategies? Compare White box testing & Black box testing 10M
- b) What are different categories of risks? Explain RMMM plan with suitable example 10M
- Q6 a) Explain Cohesion & Coupling? Explain different types of cohesion 10M
- b) Explain SQA in detail. 10M
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[Time: 3 Hours]

[Marks:80]

N.B

- (1) Question no. 1 is compulsory.
- (2) Attempt any 3 from the remaining questions.
- (3) Assume suitable data if necessary.
- (4) Figures to right indicate full marks.

- | Q.1 | Attempt any four of the following | Marks |
|-----|--|-------|
| a) | What is subnetting? Compare subnetting and supernetting | [5] |
| b) | What are three reasons for using layered protocols? What is two possible disadvantages of using layered protocols? | [5] |
| c) | Explain the count to infinity problem in detail. | [5] |
| d) | List two ways in which the OSI reference model and the TCP/IP reference model are the same. Now list two ways in which they differ. | [5] |
| e) | 4-bit data bits with binary value 1010 is to be encoded using even parity Hamming code. What is the binary value after encoding? | [5] |
| | | |
| Q.2 | Attempt the following | |
| a) | Define guided transmission media? Illustrate with diagram the details for coaxial cable? State any 5 comparative characteristics of coaxial cable with fiber optics and twisted pair cables. | [10] |
| b) | Explain how collision handled in CSMA/CD? A 5 km long broadcast LAN uses CSMA has 10^7 bps bandwidth and uses CSMA/CD. The signal travels along the wire at 5×10^8 m/s. What is the minimum packet size that can be used on this network? | [10] |
| | | |
| Q.3 | Attempt the following | |
| a) | An organization has granted a block of addresses starting with 105.8.71.0/24, organization wanted to distribute this block to 11 subnets as follows <ol style="list-style-type: none"> 1. First Group has 3 medium size businesses, each need 16 addresses 2. The second Group has 4 medium size businesses, each need 32 addresses. 3. The third Group has 4 households, each need 4 addresses. Design the sub blocks and give slash notation for each subblock. Find how many addresses have been left after this allocation. | [10] |
| b) | Explain classful IP addressing scheme in detail? List the advantages and disadvantages of classless IP addressing scheme. | [10] |

Q.4 Attempt the following

- a) Explain the open loop congestion control and closed loop congestion control policies in detail [10]
- b) Explain the TCP connection establishment and Connection release. [10]

Q.5 Attempt the following

- a) Explain the concept of sliding protocol? Explain the selective repeat protocol with example? Compare the performance of Selective repeat & Go-back-N protocol. [10]
- b) Explain the link state routing algorithm with example? [10]

Q.6 Write a short note on following

- a) ARP & RARP [10]
- b) DNS [10]

Duration:(3 Hours)

[80 Marks]

N.B. 1) Question No. 1 is compulsory.

2) Attempt any Three questions out of the remaining.

3) Assume suitable data wherever necessary and state them clearly.

Q.1 Solve any four of the following

(20)

- A. Compare OLTP vs OLAP systems.
- B. Explain the KDD process of data mining.
- C. Explain any two methods of evaluating the accuracy of a Classifier.
- D. Explain K-means clustering algorithm and draw flowchart.
- E. Explain multilevel association rule mining with example.
- F. Write a short note on web usage mining.

Q.2 A. Consider the following transaction database with minimum support 50% and minimum confidence 66%. Find the frequent patterns and strong association rules. (10)

Tid	Items
10	A,C,D
20	B,C,E
30	A,B,C,E
40	B,E

Q.2 B. Explain different steps involved in data preprocessing. (10)

Q.3 A. Find the clusters for the following dataset using a single link technique. Use Euclidean distance and draw the dendrogram. (10)

Sample No	X	Y
P1	0.40	0.53
P2	0.22	0.38
P3	0.35	0.32
P4	0.26	0.19
P5	0.08	0.41
P6	0.45	0.30

Q.3.B. The college wants to record the Marks for the courses completed by students using the dimensions: I) Course, II) Student, III) Time & a measure Aggregate marks .

Create a cube and describe following OLAP operations :

I) Slice II) Dice III) Roll up IV) Drill Down V) Pivot (10)

Q.4.A. What is dimensional modeling? Design the data warehouse dimensional model for a wholesale furniture Company. The data warehouse has to analyze the company’s situation at least with respect to the Furniture, Customer and Time. Moreover, the company needs to analyze: The furniture with respect to its type, category and material. The customer with respect to their spatial location, by considering at least cities, regions and states. The company is interested in learning the quantity, income and discount of its sales.. (10)

Q.4 B. A data sample is given below. Find whether Patient X has flu or not using Naïve Bayes classifier.

If X= (chills=Y, runny nose=N, headache=Mild, fever=Y, flu=?) (10)

chills	Runny nose	headache	fever	Flu
Y	N	Mild	Y	N
Y	Y	No	N	Y
Y	N	Strong	Y	Y
N	Y	Mild	Y	Y
N	N	No	N	N
N	Y	Strong	Y	Y
N	Y	Strong	N	N
Y	Y	Mild	Y	Y

Q.5 A.Explain Page Rank algorithm with example. (10)

B. Explain different data visualization techniques. (10)

Q.6. Write short notes on following: (20)

- A. Applications of Data Mining.
- B. FP Tree
- C. Web content Mining
- D. Techniques of data Loading

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[Max Marks: 80]

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 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

- 1 [20]
- a Differentiate Finite Automata, Push Down Automata and Turing Machine.
- b Discuss different applications of Finite Automata
- c Design DFA that accepts Strings with at least 3 a's. over $\Sigma = \{a,b\}$.
- d Simplify the given grammar
 $S \rightarrow ASB \mid \epsilon$
 $A \rightarrow aAS \mid a$
 $B \rightarrow SbS \mid A \mid bb$
- 2 a Compare and Contrast Moore and Mealy Machines. Design Moore machine for $\Sigma = \{0,1\}$,
 print the residue modulo 3 for binary numbers. [10]
- b Design Push Down Machine that accepts $L = \{a^m b^n c^n d^m \mid m, n > 0\}$ [10]
- 3 a i) Construct CFG for given language. $L = \{0^i 1^j 0^k \mid j > i+k\}$ [10]
 ii) The grammar G is $S \rightarrow aB \mid bA$ $A \rightarrow a \mid aS \mid bAA$ $B \rightarrow b \mid bS \mid aBB$
 Obtain parse tree for the following string "aababb" and check if the grammar is
 ambiguous.
- b Explain Pumping Lemma with the help of a diagram to prove that given language is not a
 regular language. $L = \{0^m 1^{m+1} \mid m > 0\}$ [10]
- 4 a i) Design DFA that accepts Strings that ends in either "110" or "101" over $\Sigma = \{0,1\}$. [10]
 ii) Design NFA that accepts strings starting with "abb" or "bba"
- b Given NFA with epsilon, Find equivalent DFA. q1 is the initial state, q3 is final state [10]
- | | | | | |
|------------------|------|------|------|------------|
| | 0 | 1 | 2 | ϵ |
| $\rightarrow q1$ | {q1} | - | - | {q2} |
| q2 | - | {q2} | - | {q3} |
| *q3 | - | - | {q3} | - |
- 5 a Find Equivalent Greibach Normal Form (GNF) for given CFG. [10]
 $S \rightarrow AA \mid a$
 $A \rightarrow SS \mid b$
- b Define and design Turing Machine to accept $0^n 1^n 2^n$ over $\Sigma = \{0,1,2\}$. [10]
- 6 Write Short notes (Any Two) [20]
- a Explain with example Chomsky Hierarchy.
- b Post Correspondence Problem.
- c Recursive and Recursive enumerable languages.
- d TM-Halting Problem.

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- 1 Attempt any **FOUR** [20]
a State features of React js.
b What is DTD? Explain internal DTD and external DTD.
c Give characteristics of RIA
d What is session tracking? Show how session tracking is achieved using cookies.
e Differentiate between JSON and XML
- 2 a What is JSX? Explain its attributes with example. [10]
b Explain any 5 semantic tags of HTML5 with example [10]
- 3 a Write a JavaScript that reads ten numbers and displays the count of negative numbers, the count of positive numbers and the count of zero from the list. [10]
b What is JSP? Explain life cycle of JSP [10]
- 4 a Explain the event handling in JavaScript with suitable example. [10]
b Explain CSS3 Animation with example. [10]
- 5 a Write short notes on JDBC [10]
b What is HTTP? Describe structure of HTTP request and response message [10]
- 6 a Discuss about various control structures used in PHP. Give suitable example for each. [10]
b What is AJAX? Explain its role in web application. [10]
