Total No. of Printed Pages:02

SUBJECT CODE NO:- H-296
FACULTY OF SCIENCE & TECHNOLOGY
T.E. (CSE/IT)
Software Engineering
(OLD)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
i) Q.No.1 and Q.No.6 are compulsory.
ii)Attempt any two questions from each section
iii) figures right indicates full marks
iv)assume suitable data if necessary

Section A

Q.1 Attempt any five questions 10

a. State any two rules of UI design
b. Explain any two requirement engineering tasks
c. What is QFD?
d. Explain size oriented matrix
e. What is process framework?
f. Draw suitable diagram for linear sequential model
g. What is LOC?
h. Give the guidelines for estimating the cost

Q.2
a. Explain in brief process framework 07
b. What are the components of s/w explain in detail 08

Q.3
a. Explain classical life cycle of software 07
b. List software management myths and explain in detail 08

Q.4
a. Compare the waterfall model with evolutionary process model 07
b. Explain the process steps in requirement engineering 08

Q.5
a. Explain basic COCOMO model and calculate the effort, development time, average staff and productivity for the project size of 400KLOC. Consider software development team has very high experience on similar type of project & the project schedule is very tight. 07
b. What is modularity? Explain by giving example 08

Section B

Q.6 Attempt any five questions 10

a. What is use case analysis?
b. Give the notation used for use case diagram
c. Explain the term project scheduling
d. What is agile planning?
e. Enlist software testing principles
f. What is unit testing? Explain
g. What is object oriented design?
h. Mention basic building blocks of UML.

Q.7
a. What are the software testing strategies for object oriented system 07
b. Explain things and relationship in UML 08

Q.8
a. Write a case study on result management system by using UML diagrams such as use case, class and sequence diagram 07
b. Explain in brief requirement gathering for web app. 08

Q.9
a. Explain class diagram with suitable example 07
b. Enlist and explain objectives of software testing 08

Q.10 Write short note on (any three): 15

a. Change management
b. Verification and validation
c. Scenario based testing
d. Project scheduling
e. Sequence diagram

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-196
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Theory of Computation
[OLD]

[Time: Three Hours] **[Max.Marks:80]**

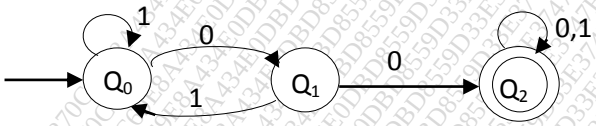
Please check whether you have got the right question paper.

N.B i) Q. No.1 and Q. No.6 are compulsory.
ii) Attempt any two Questions from Q.No.2 to Q.No.5 and any two Questions from Q.No.7 to Q. No.10 of each section.
iii) Figures to the right indicate full marks.

SECTION – A

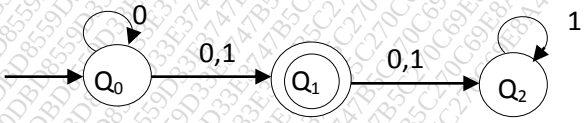
Q.1 Attempt any five Questions from the following 10

a) What is relation between DFA & RE.
b) List applications of Finite Automata
c) What is use of pumming lemma, Give its formal Statement.
d) Give formal definition of finite Automata.
e) Find Regular expression for given DFA



f) Define mealy and moore machine
g) Give restriction rules for CNF & GNF

Q.2 a) Construct DFA to find 2's complement of Binary input 07
b) Convert the following NFA into an Equivalent DFA 08



Q.3 a) Construct moore machine Equivalent to mealy machine given below 08

Present State	Next State	O/P	Next State	O/P
Q_1	Q_3	0	Q_2	0
Q_2	Q_1	1	Q_4	0
Q_3	Q_2	1	Q_1	1
Q_4	Q_4	1	Q_3	0

b) Minimize the following DFA 07

	INPUT		
	0	1	
Present State	Next State	Next State	Output
Q_0	Q_0	Q_1	0
Q_1	Q_2	Q_0	1
Q_2	Q_3	Q_0	1
Q_3	Q_3	Q_0	1

Q.3 a) Obtain the regular expressions for the language's given below 08

a) $L_1 = \{a^{2n+1} | n > 0\}$

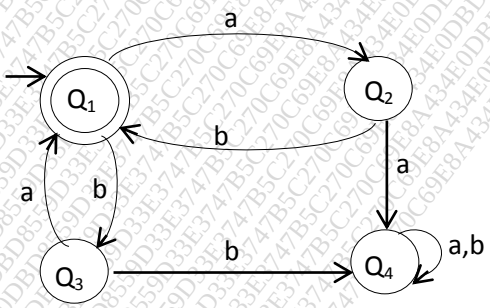
b) $L_2 = \{a, bb, aa, abb, ba, bbb \ldots\ldots\ldots\}$

c) $L_3 = \{W \in \{0,1\}^* |$W has no pair of Consecutive zero's$\}$

d) $L_4 = \{strings\ of\ 0's$ & $1's$ ending in 00$\}$

b) Show that $L = \{a^{2^n} | n \geq 0\}$ not Regular 07

Q.4 a) Find the Regular expression for given DFA using Arden's theorem. 08



b) Define ambiguity in CFG. Prove that the given grammar is ambiguous 07
$E \rightarrow E + E, E \rightarrow E * E, E \rightarrow E, E \rightarrow id$

Q.5 Write short notes on following 15

a) Closure properties of Regular expression
b) Chomasky classes of languages
c) Pummping Lemma

SECTION – B

Q.6 Attempt any five Questions from following 10

a) Define null production in CFG with an example.
b) What is halting problem of TM?
c) List different varients of TM?
d) Explain the language of a PDA
e) Explain acceptance of PDA
f) Explain parse tree.
g) What is difference in the following production $\longrightarrow$ and $\overset{*}{\Longrightarrow}$

Q.7 a) Simplify the following grammar by removing useless and unit productions 08

S $\longrightarrow$ aS
S $\longrightarrow$ a
S $\longrightarrow$ C
A $\longrightarrow$ a
B $\longrightarrow$ aa
C $\longrightarrow$ aCb

b) Prove that $L = \{a^n b^n C^n | n \geq 1\}$ is not Context free 07

Q.8 a) Explain PDA with block diagram and Instantaneous Description (ID) 08
b) Construct PDA that accept equal number of a's & b's, 07

Q.9 a) Construct TM to add two unary numbers 08
b) Convert following CFG into PDA 07

S $\longrightarrow$ aSa
S $\longrightarrow$ B
b $\longrightarrow$ bB
B $\longrightarrow \in$

Q.10 a) Explain Halting problem in detail. 07
b) Construct TM that accept all strings containing even number of 1's 08

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-126
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Design & Analysis of Algorithm
(OLD)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 from section A & Q.No.6 from section B are compulsory.
2. Solve any two questions from the remaining questions of each section.

Section A

Q.1 Attempt any five question 10

a) Explain any one tree traversal technique with an example.
b) Define divide and conquer method.
c) Define minimum cost spanning tree.
d) What are algorithm design techniques?
e) What is job sequencing with deadline
f) State single source shortest path problem.
g) Write iterative algorithm to find factorial of a numbers.
h) Explain space complicity.

Q.2
a) Explain head sort with an example 08
b) Explain matrix multiplication using divide and conquer. 07

Q.3
a) Explain quick sort using the given data and comment on its time complexity. 08
$\{50, 50, 60, 60, 40, 40, 30, 30, 20, 20\}$

b) Explain knapsack problem and define objective function, constraints, fesible and optimal solution 07

Q.4
a) Explain how to find maximum and minimum elements in an array using divide and conquer. 07
b) Find an optimal solution for Knapsack instance n=8, m=20 $\{P_1\ P_2\ P_3\ P_4\ P_5\ P_6\ P_7\ P_8\} = \{10, 5, 15, 20, 15, 7, 3, 2\}$ 08
$\{W_1\ W_2 W_3\ W_4\ W_5\ W_6\ W_7\ W_8\} = \{1, 2, 4, 7, 5, 7, 3, 2\}$

Q.5
a) Explain Huffman coding with suitable example. 07
b) Explain strassen's matrix multiplications. 08

Section B

Q.6 Attempt any five questions 10

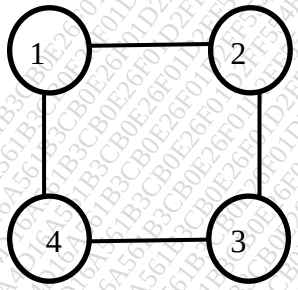
a) State any two difference between dynamic and back tracking
b) Explain implicit and explicit constraints of back tracking.
c) What are the requirements that are needed for performing backtracking.
d) State sum of subsets problem
e) Define principle of optimality
f) Define answer states taking example of 4- Queen's
g) State travelling sales person problem
h) Define chromatic number of a graph.

Q.7 a) Determine optimal binary search tree for [END, GOTO, PRINT, STOP] with given probabilities as 10

$P(1:4) = (3, 3, 1, 1)$
$Q(0:4) = (2, 3, 1, 1, 1)$

b) Explain connected and disconnected components. 05

Q.8 a) Explain graph coloring problem and solve it for the following graph considering three colors. 08



b) Write an algorithm for all pairs shortest path problem. 07

Q.9 a) Let $W = \{5, 7, 0, 12, 15, 18, 20\}$ m=35 08
Solve sum of subsets and draw state space tree.

b) Write an algorithm for tree traversal method 07

Q.10 a) Solve the following TSP using branch and bound for the given cost matrix X 10

$$\begin{bmatrix} \infty & 10 & 15 & 20 \\ 5 & \infty & 9 & 10 \\ 6 & 13 & \infty & 12 \\ 8 & 8 & 9 & \infty \end{bmatrix}$$

b) Define 15-puzzle problem with example. 05

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-352
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (IT)
Multimedia Computing
(OLD)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
1) Q.No.1 and Q.No.6 are compulsory.
2) Assume suitable data if required.
3) Attempt any three questions in each Section.

Section A

Q.1 Solve any five:- 10

1) Define multimedia
2) Aspect ratio
3) Types of text
4) Advantages of graphics
5) Audio file format
6) Define author and audience.

Q.2
a) What is multimedia? Explain emerging application of multimedia. 08
b) What are the categories of data stream? Explain synchronous transmission mode. 07

Q.3
a) What is sound? Explain representation of computer sound. 08
b) What are the component of MIDI interface? Explain devices used in MIDI. 07

Q.4
a) Explain architecture of raster display device. 08
b) What is animation? Explain the method of controlling the animation. 07

Q.5
a) Explain radio signal format used for video transmission. 08
b) Explain CMYK models in details. 07

Section B

Q.6 Solve any five:- 10

1) What is mean by compression?
2) Enlist video formats.
3) Define CD-R and CD-RW.
4) DPCM
5) Steps of image processing
6) Multimedia database

Q.7	a)	What are MPEG standard?	08
	b)	Compare simple and complex features of content analysis.	07
Q.8	a)	Explain JPEG image compression Technique.	08
	b)	Explain image prepation in H-26.	07
Q.9	a)	Explain compact disk interactive in detail.	08
	b)	Explain video encoding.	07
Q.10	Write a short note on:-		15
	1)	TWAIN encoding	
	2)	Audio analysis	
	3)	Multimedia application work flow.	

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-489
FACULTY OF SCIENCE & TECHNOLOGY
T.E.(CSE)
Digital Image Processing
(OLD)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Q. No.1 from Section A and Q.No.6 from Section B are compulsory.
2. Attempt any two questions from the remaining questions in each section.
3. Assume suitable data if necessary.

Section – A

Q.1 Solve any five. 10
a) Define an Image.
b) Define connectivity and its type.
c) Define high boost filtering and write mask of it.
d) Give transfer function of low pass Butterworth filter.
e) What is interpixel Redundancy?
f) What is need of image transform? Define DFT.
g) What is compression ratio and relative data redundancy?
h) Write four applications of digital image processing.

Q.2 a) With the neat diagram, explain the fundamental steps involved in digital image processing. 08
b) Explain histogram equalization with example. 07

Q.3 a) Explain image compression model with neat diagram. 08
b) Explain the basic steps involved in frequency domain filtering. 07

Q.4 a) What are different image sharpening filters? How derivatives are useful for deriving different sharpening filter masks. 08
b) Explain Huffman coding with example. 07

Q.5 Write short note on (Any three) 15
a) Neighbors of pixels
b) Distance Measures
c) Application of Image transform
d) Fidelity criterion

Section – B

Q.6 Solve any five. 10
a) What is an edge?
b) Define chain code.
c) Define image description.
d) Explain line detection method.
e) Write a mask of sobel operator in all directions.
f) What is threshold?
g) What is need of structuring element?
h) What is pruning?

Q.7	a)	How can hit or miss transformation is used for extracting specific pixel configuration in an image? Give suitable example.	08
	b)	Explain RGB and CMY color model.	07
Q.8	a)	Explain detection of discontinuities in detail.	08
	b)	Elaborate region growing method for image segmentation. How it differ from thresholding?	07
Q.9	a)	Differentiate between boundary descriptor and regional descriptor.	08
	b)	How topological descriptor can be used for region description.	07
Q.10	Write short note on (Any three)		15
	a)	Region split and Merge	
	b)	Dilation and Erosion process	
	c)	Chain code	
	d)	Applications of image segmentation.	

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-421
FACULTY OF SCIENCE AND TECHNOLOGY
T.E (CSE/ IT)
Operating System
(Old)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Q. No. 1 from section A & Q. No. 6 from section B are compulsory.
2. Solve any two questions from each section from the remaining questions.
3. Assume suitable data if necessary.

Section A

Q.1 Solve any five 10

a) List structure of O.S.
b) Explain Smart Card O.S.
c) Define 1. Turnaround time 2. Throughput
d) State dinning philosopher problem.
e) Differentiate between threads and process.
f) Explain file naming.
g) Enlist any four file operations.

Q.2 a) Explain the terms: 08
i. Real Time System
ii. Distributed System
b) Explain role of OS as resources manager. 07

Q.3 a) Explain process states and process control block in details. 07
b) What is dinning philosopher problem? Explain its solution with Semaphore. 08

Q.4 a) Consider following processes with length of CPU burst time in millisecond 08

Process	Burst time	Priority
P1	12	4
P2	5	2
P3	3	1
P4	8	3
P5	4	3

All processes arrived in order p1, p2, p3, p4, p5 all at time zero.
i. Draw Gantt charts illustrating execution of these processes for SJF, non preemptive priority (smaller priority number implies a higher priority) & round robin (quantum = 1)
ii. Calculate waiting time for each scheduling algorithm in part (1).
b) Explain different techniques for achieving mutual exclusion. 07

Q.5 a) Explain the following techniques to improve file system performance. 08
   a. Block read ahead and
   b. Reducing disk arm motion
   b) Explain file system consistency in detail. 07

Section B

Q.6 Solve any five 10
   a) What is relocation problem?
   b) Enlist the memory management requirements?
   c) What is compaction?
   d) What are Device drivers?
   e) Define 1. Seek time 2. Rotational Latency
   f) What is deadlock?
   g) Write data structure of Bankers algorithm.

Q.7 a) Explain the following page replacement algorithm with example. 08
   i. Optimal page replacement
   ii. Least recently used page replacement.
   b) Explain following memory allocation algorithm with example. 07
      i. First fit
      ii. Best fit
      iii. Worst fit

Q.8 a) Explain RAID in detail. 08
   b) Consider a request queue 98, 183, 37, 122, 14, 124, 65, 67 with current head pointer at 53 and cylinder are (0-199). Find total head movement for 07
   i. FCFS ii. SSTF

Q.9 a) Explain system structure of WINDOWS-7. 07
   b) What are the conditions for deadlock? Explain deadlock detection and recovery in detail. 08

Q.10 a) What is virtual memory? How it is implemented? 08
   b) Explain various methods for recovery from deadlock. 07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-554
FACULTY OF SCIENCE & TECHNOLOGY
T.E. (CSE/IT)
Elective-I: Digital Image Processing
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Q. No.1 and Q.No.6 are compulsory.
2. Attempt any two questions from the remaining question from each section.
3. Assume suitable data if necessary.

Section – A

Q.1 Solve any five. 10

a) What is image sensing and digitization?
b) What is mean by illumination and reflectance?
c) What is digital path & region?
d) What is image transform?
e) Give the mask used for high boost filtering.
f) Differentiate between low pass and high pass filters.
g) Define DCT and its inverse.
h) What is entropy?

Q.2
a) Elaborate the components of digital images processing along with its block diagrams. 08
b) Explain image sampling and quantization process in detail. 07

Q.3
a) Explain histogram equalization with example. 07
b) Consider an image that uses a window of size 5×5, the gray level values inside the 5×5 sub image are 08
[15, 17, 15, 17, 16, 10, 8, 9, 18, 15, 16, 12, 14, 16, 12, 14, 11, 15, 14, 15, 11, 10, 15, 14, 13].
Evaluate values assigned for central pixel
a) A local averaging filter
b) A median filter
c) A mode filter
d) A max filter
e) A min filter

Q.4
a) Explain binary and continuous tone still images compression standard in detail. 07
b) What do you mean by loss-less compression? Explain LZW coding technique with suitable example. 08

Q.5 Write short note on (Any three) 15

a) Interpixel Redundancy
b) Noise models
c) Contrast stretching
d) Fidelity criteria

Section B

Q.6 Solve any five 10

a) Differentiate between region and boundary.
b) Write a mask of sobel operator and Laplacian operator.
c) What is global thresholding?
d) Define Image segmentation.
e) What is difference between full color and pseudo color image processing?
f) What is need of structuring element?
g) What is hue and saturation?
h) Define pattern.

Q.7 a) Elaborate region growing method for image segmentation. How it differ from thresholding. 08

b) Discuss edge detection process in image segmentation. 07

Q.8 a) How can Hit-or-MISS transformation be used for extracting specific pixel configuration in an image? Give suitable example. 08

b) Explain RGB and HSI color model in brief. 07

Q.9 a) Perform dilation and erosion operation in between A and B. 08

$$A = \begin{matrix} 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 \end{matrix} \qquad B = \begin{matrix} 1 \\ \boxed{1} \\ 1 \end{matrix}$$

b) What is the use of descriptors in DIP? How can shape numbers and Fourier descriptors be used for boundary description? 07

Q.10 Write short note on(any three) 15

a) Chain code
b) Boundary representation techniques
c) Color Transformations.
d) Applications of image segmentation

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-106
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Advanced Java
(OLD)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Question.No.1 and Questions.No.6 are compulsory.
2. Attempt any two questions from each section.
3. Figures right indicates full marks.
4. Assume suitable data if necessary.

Section – A

Q.1 Attempt any five questions. 10
- i) What is container? Enlist it's types.
- ii) What are cookies?
- iii) What is XML
- iv) What is ServletContext?
- v) Enlist different technologies of J2EE?
- vi) What is JSP? Enlist JSP directives?
- vii) Differentiate page Vs. request Scope in JSP?
- viii) Enlist any four methods of HTTP?

Q.2
a) What are JSP implicit object? Explain with suitable example? 07
b) Explain steps to create RMI application? 08

Q.3
a) What is Servlet? Explain the life cycle of Servlet in details? 07
b) Write a Servlet program to read parameter from HTML and display request header information? 08

Q.4
a) With programming example discuss about JSP action tags? 07
b) What is AJAX? Explain the Ajax request processing steps with example? 08

Q.5 Write a note on (any three) 15
a) JSP Exception Handing
b) N-tier architecture
c) JSP custom tags
d) Deployment descriptor

Section – B

Q.6 Attempt any five questions. 10

1) Enlist the components of Hibernate?
2) What is entity bean?
3) What is the role of SOAP in SOA?
4) What is Action class in Struts?
5) Differentiate SMTP and POP3?
6) What is the use of UDDI?
7) Enlist the components of Java Mail API?
8) What is ORM?

Q.7 a) Explain the Struts architecture in details? 08
b) Explain the JSF components? 07

Q.8 a) Explain accessing and packaging of beans? 07
b) Write a program to read mail using Java Mail API? 08

Q.9 a) What is Web service? Explain the role of SOAP and WSDL? 07
b) Explain following elements of HQL 08
i) Sub queries
ii) Aggregate functions

Q.10 a) Explain stateless and stateful session beans? 07
b) Explain the architecture of Hibernate? 08

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-317
FACULTY OF SCIENCE AND TECHNOLOGY
T.E (CSE/IT)
Database Management System
(OLD)

[Time: Three Hours] **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B
1) Q.No.1 from Section A and Q.No.6 from Section B are compulsory.
2) Solve any two questions from remaining from Section A and B each.
3) Assume suitable data.

Section A

Q.1 Attempt any five questions:- 10

i) Define candidate key and primary key.
ii) Differentiate between simple and composite attribute.
iii) What is distributed and client server architecture in DBMS?
iv) What is mean by relational database schema?
v) List out different types of end users in DBMS.
vi) Define tuple and domain in relation.
vii) Define foreign key with example.
viii) Differentiate between strong and weak entity with example.

Q.2 a) Explain in detail advantages and disadvantages of DBMS. 08
b) Define and discuss the role of data administrator in detail. 07

Q.3 a) Explain the three-schema architecture. Why do we need mapping between schema levels? 07
b) Construct ER diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars, and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received. 08

Q.4 a) Explain specialization and generalization with example. 07
b) What is type inheritance? How does super class relationship represent type inheritance? 08

Q.5 a) Explain mapping of ER to relational model? 07
b) What is a relation? Discuss the properties of relation. 08

Section B

Q.6 Attempt any five questions:- 10

i) Define First Normal Form.
ii) What is multi-valued dependency?
iii) What is nested query in SQL?
iv) Define intersection and minus operation in relational algebra.
v) List out aggregate function in SQL.
vi) Define serializability.
vii) List out various DDL Command in SQL.
viii) What is database backup recovery?

Q.7 a) What is Normalization? Explain BCNF with example. 08

b) What is Functional Dependency? Explain Second Normal Form with example. 07

Q.8 a) Consider the following schema. 08

Employee (person_ name, street, city)
Works (person_ name, company_ name, salary)
Company (company_ name, city)
Manages (person_ name, manager_ name)
Write following Queries using SQL.

i) Find names of all employees who work for Infosys.
ii) Find name and cities of residence of all employees who work for Infosys.
iii) Find the name of all employees who live in the same city as the company for which they work.
iv) Find the names of person whose salary is greater than Rs. 35,000.

b) Consider the following relational schema of banking example. 07

branch(branch_ name, branch_ city , assets)
customer (customer_ name, customer_ city, customer_ street)
account (account_ number, branch_ name, balance)
loan (loan_ number, branch_ name, amount)
depositor (customer_ name, account_ number)
borrower (customer_ name, loan_ number)
Write down following queries using relational algebra?

i) Find the names of all customers who have a loan and account at bank.
ii) Find the names of customer who have loan at bank and the loan amount.
iii) Find all customers who have an account from at least downtown and uptown branches.
iv) Find the branches of Bangalore city.

Q.9 a) Explain views in Structure Query Language. 07

b) Explain recursive Queries in Structure Query Language. 08

Q.10 a) What is transaction? Explain ACID properties of transaction. 07

b) What is deadlock? What are different ways of handling deadlock? 08

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-268
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Software Testing and Quality Assurance
(Old)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
i) Q.No.1 and 6 are compulsory.
ii) Attempt any two questions from each section.
iii) Figures right indicates full marks.
iv) Assume suitable data if necessary.

Section A

Q.1	a)	Explain Software Testing Life Cycle.	05
	b)	Explain elements of Software Quality Assurance.	05
Q.2	a)	Explain Statistical Quality Assurance.	07
	b)	Explain Verification and Validation Model.	08
Q.3	a)	Explain Integration Testing in detail.	08
	b)	Explain Security testing in detail.	07
Q.4	a)	Explain Beta testing in detail.	07
	b)	Explain Equivalence Partitioning.	08
Q.5	a)	Explain Data flow testing.	07
	b)	Explain Decision Table Testing.	08

Section B

Q.6	a)	Explain guidelines for selecting testing tool.	05
	b)	Explain advantages and disadvantages of selecting tool.	05
Q.7	a)	Explain static and dynamic testing tools.	07
	b)	Explain testing strategy in detail.	08
Q.8	a)	Explain test cases in detail.	07
	b)	Explain Risk analysis in detail.	08
Q.9	a)	Explain operational test management.	08
	b)	Explain defect classification.	07
Q.10	a)	Explain Test Reporting.	07
	b)	Explain Defect life cycle.	08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-386
FACULTY OF SCIENCE & TECHNOLOGY
T.E. (CSE/IT)
Programming in Java
(Old)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
i) Question No.1 and 6 are compulsory.
ii) Attempt Any two questions from each section.
iii) Figures right indicates full marks.
iv) Assume suitable data if necessary.

Section – A

Q.1 Attempt any five questions. 10

i) Write a short note on constructor overloading with suitable example.
ii) How to use system defined package. Explain with suitable example.
iii) How exceptions are handled in java.
iv) Explain difference between method overloading and method overriding.
v) What is error? Give a difference between error & bug.
vi) Write a java code to demonstrate the use of try catch & finally block.
vii) What is naming conventions in java?
viii) Why java is called compiled & interpreted language?

Q.2
a) Write in brief use of public, private & protected keyword using java code. 07
b) Explain following terms: i) Throw/ Throws ii) Finally Block 08

Q.3
a) How properties of one class is used by another class in java explain in detail. 07
b) What is thread? Write a java code to demonstrate the use of thread class. 08

Q.4
a) Explain in detail runnable interface in java with a suitable java code. 07
b) Write a java code to give menus to users using switch case & perform operations of addition, subtraction, multiplication & division by taking input from user. (Use different classes for each menu) 08

Q.5
a) How abstract classes are used in java. Explain with suitable example. 08
b) Explain life cycles of thread with suitable diagram. 07

Section – B

Q.6 Attempt any five questions. 10

i) List & explain different AWT components.
ii) List & explain in short JDBC drivers.
iii) Explain difference between server socket & socket.
iv) Describe the term JApplet.
v) List and explain event classes.
vi) Describe JButton class in java.
vii) Write a java code to display oval with greencolour using applet.
viii) What is AWT? List AWT classes.

Q.7 a) Write a java to insert a record into employee database. (Assume suitable fields) 08
b) What are sources of events? Explain key listener interface. 07

Q.8 a) Write a java code to passing integer parameters to applet and perform multiplication. 08
b) Explain radio control in detail? Write a java code to demonstrate the use of checkbox control. 07

Q.9 a) Explain AWT hierarchy in detail. 08
b) What is HTTP protocol explain in detail. 07

Q.10 a) Explain in detail stream classes in java. 07
b) Explain following terms: i) Client server architecture in java. ii) Reserved Sockets. 08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-523
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Operating System
(Revised)

[Time:Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Solve 3 questions from each section.
2. Q.No.1 from Section A and Q.No.6 from Section B, are compulsory.
3. From the remaining questions in Section A and B, solve any two questions.

Section A

Q.1	a)	What are the two main functions of an operating system? Discuss any five operating systems.	05
	b)	List the main differences and similarities between threads and processes.	05
Q.2	a)	Explain the 11 steps in making the system call read (fd, buffer, nbytes).	07
	b)	Explain different system calls for process management.	08
Q.3	a)	State and explain need and advantages of inter process communication.	07
	b)	Discuss various states of processes in detail.	08
Q.4	a)	Discuss directories and various operations that can be performed on them.	07
	b)	Discuss different issues involved in managing disks.	08
Q.5	a)	Explain and differentiate between user level and kernel level threads.	07
	b)	Write a note on a round robin scheduling algorithm.	08

Section B

Q.6	a)	What are internal and external fragmentations? Which one occur in paging and which one occur in segmentation?	05
	b)	Explain multiprogramming with a fixed partition.	05
Q.7	a)	Explain how virtual memory can be implemented via: Demand paging and Demand segmentation.	07
	b)	Consider the following page reference string: 7 2 3 1 2 5 3 4 6 7 7 1 0 5 4 6 2 3 0 1. Assuming decimal paging with three frames, how many page faults would occur for following page replacement algorithms: FIFO, LRU.	08

Q.8	a)	Explain Goals of the I/O software in detail.	07
	b)	Explain how I/O can be performed using DMA.	08
Q.9	a)	Explain Hashed Page table techniques for structuring the page table.	07
	b)	For a deadlock to occur, which four conditions must hold?	08
Q.10	Write short notes on:		
	a)	Differentiate between logical and physical addresses?	05
	b)	Deadlock prevention	05
	c)	Resource allocation graph	05

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-530
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Theory Of Computation
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.6 are compulsory.
2. Attempt any two questions from Q.No.2 to Q.No.5 and from Q.No.7 to Q.No.10 of each section.
3. Figures to the right indicate full marks.

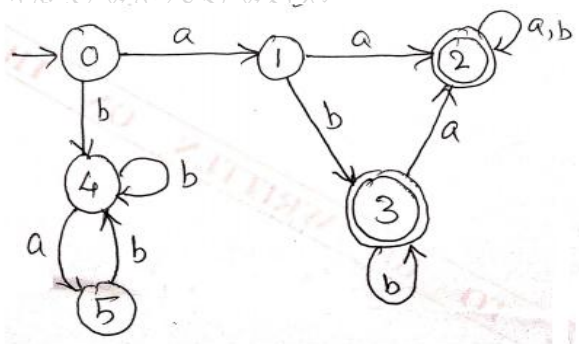
Section A

Q.1 Attempt any five questions from following. 10

a) Give the applications of FA.
b) What is relation between FA and RE?
c) Differentiate NFA with epsilon transitions and NFA without epsilon transition.
d) Construct transition diagram for given regular expression $a^*b + b^*a$
e) Explain types of derivation tree in CFG.
f) Define alphabet and string in the concept of finite automata.
g) Define mealy and Moore machine with an example.
h) Explain any two algebraic laws for RE.

Q.2 a) Design a Finite Automata that reads strings over letters in the word CHARIOT and recognize those strings that contain the word CAT as a substring. 08

b) Minimize following DFA. 07



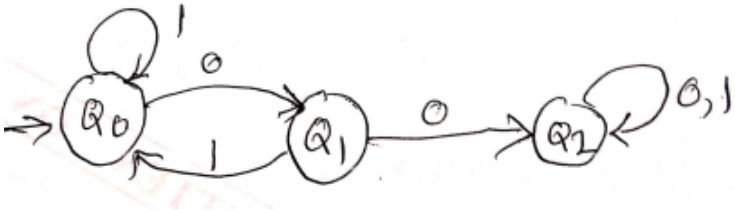
Q.3 a) Design mealy machine accepting the language over $\sum = \{0,1\}$ and ending with double zero's or double one's 08

b) Consider Moore machine described by the transition table given below, construct Equivalent mealy machine. 07

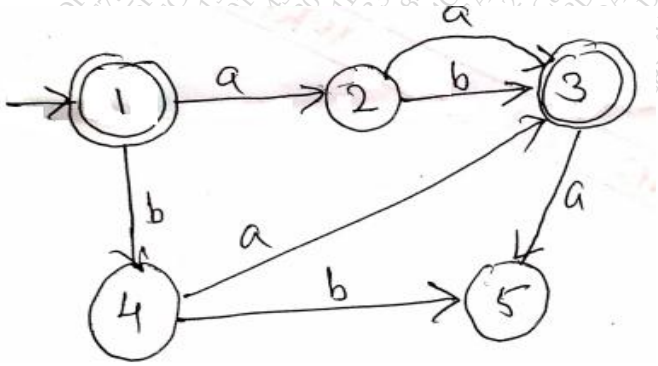
Present state	Next state		Output
	0	1	
Q_1	Q_1	Q_2	0
Q_2	Q_1	Q_3	0
Q_3	Q_1	Q_3	1

Q.4 a) Find Regular expressions for following DFA's 08

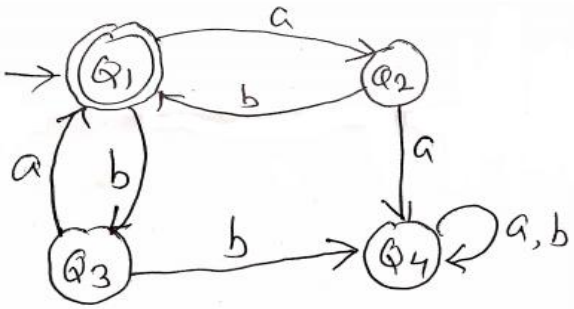
a.



b.



b) Construct Regular expression from following DFA using Arden's theorem. 07



Q.5 a) Show that the Grammar given with productions is ambiguous. 08

$S \rightarrow a|aAb|\ abSb$

$A \rightarrow aAAb|\ bS$

b) Explain Chomsky classes of CFL. 07

Section B

Q.6 Attempt any five questions from following 10

a) Define formaly TM.
b) Explain acceptance of PDA.
c) Give restriction rules on productions for CNF and GNF.
d) Define universal TM.
e) Explain decidable and undecidable problems.
f) Explain Unit and Null productions in CFG.
g) Define Church-Turing thesis.
h) Explain instantaneous description of PDA.

Q.7 a) Design PDA accepting language 08
$L = \{a^n b^n | n \geq 0\}$

b) Explain closure properties of CFL. 07

Q.8 a) Prove that $L = \{a^{n!} | n > 1\}$ is not in CFL. 08

b) Convert given CFG into PDA 07
$S \rightarrow aAA$
$A \rightarrow aS | bS | a$

Q.9 a) Design Turing machine to accept a strings containing equal number of a's and b's. 08

b) Explain Halting problem in detail. 07

Q.10 a) Design TM to accept a strings of odd numbers of a's. 08

b) Explain post correspondence problem show that following Dominos problem is undecidable. 07

	A	B
1	10	101
2	011	11
3	101	011

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-537
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Database Management System
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Question No.1 from Section A and Q.No.6 from Section B are compulsory.
ii) Solve any two from remaining from Section A and Section B from each.
iii) Assume suitable data.

Section – A

Q.1 Attempt any five Questions 10

i) List out the purpose of DBMS

ii) List out different types of end users in DBMS.

iii) Differentiate between DDL and DML.

iv) Define Relational Database schema.

v) What is the use of primary key.

vi) What is participation constraints.

vii) What is an attribute and tuple in relational model.

viii) What is cordinality of relation.

Q.2 a) Explain in detail data abstraction in DBMS. 08

b) Explain the role of Data administrator in DBMS. 07

Q.3 a) Construct ER diagram for college administration 08

- Identify attribute, entities and relations.
- Identify primary key and foreign keys
- Specify constraints.

b) Differentiate between aggregation versus Ternary Relationship with example. 07

Q.4 a) Explain key constraints and constraints on NULL values in relational Model. 08

b) What is relation. Explain the characteristics of relations. 07

Q.5 a) Explain Entity integrity and referential integrity with example. 08

b) Explain the features of class Hierarchies of ER Mode. 07

Section B

Q.6 Attempt any five Questions 10

i) What is deadlock.

ii) What is the purpose of two phase locking protocol.

iii) What is mean by atomicity in transaction.

iv) Define Union and minus operations in relational algebra.

v) List out DDL commands in SQL.

vi) Define primary and foreign key.

vii) What is full functional dependency and partial dependency.

viii) What is third normal form.

Q.7 a) What is normalization. Explain first normal form with example. 07

b) What is Join dependency. Explain Fifth normal Form. 08

Q.8 a) Consider the following relational schema of banking example. 08

branch(branch_name, branch_city, assets)

customer(customer_name, customer_city, customer_street)

account(account_number, branch_name, balance)

loan(loan_number, branch_name, amount)

depositor(customer_name, account_number)

borrower(customer_name, loan_number)

Write Following Queries in SQL.

i) Find the names of branches located in Aurangabad city.

ii) Find the customer name who have an account at bank.

iii) Find account balance of customer whose account number is 2002.

iv) Find the names of depositor who have balance less than Rs. 34,000.

b) Consider the following relation. 07

Instructor (ID, name, dept_name, salary)

Department (dept_name, building, budget)

Classroom(building, roomno, capacity)

teaches (ID, course_id, sec_id, semester)

course(course_id, title, dept_name, credit)

student(ID, name, dept_name, tot_credit)

takes(ID, course_id, sec_id, semester, year, grade)

Write down queries express in relational algebra.

i) Find all courses taught in either full 2002 or spring 2003 semester.

ii) Find average salary of chemical department.

iii) Find the names of student who takes the courses in Fall 2014.

iv) Find the names of all the students whose total credits are greater than 100.

Q.9 a) Explain selection, projection, and division operator in relational algebra. 07

b) What is transaction. Explain ACID properties of transaction. 08

Q.10 a) What is concurrency control. Explain serial schedule and equivalent schedule with example. 08

b) What is database Recovery. Explain recovery techniques in detail. 07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-544
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Programming In Java
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.6 are compulsory.
2. Attempt any two questions from remaining questions of each section.
3. Assume suitable data wherever necessary.

Section A

Q.1	Solve any two.		10
	a)	Explain OOP principles.	
	b)	What are control structures in Java? Explain.	
	c)	Define bytecode.	
Q.2	a)	Explain steps to create package.	07
	b)	How to create static class, inner class in Java.	08
Q.3	a)	List and explain wrapper classes in Java.	07
	b)	Write a java program that takes students id, name, branch as input & display.	08
Q.4	a)	What is interface? Write a java program contains "fees" interface and its implementation classes such as "Tuitionfees", "Examfees" deposits payments.	07
	b)	How to create user defined exception in java.	08
Q.5	a)	Write a java program to handle multiple exceptions.	07
	b)	What is abstract class? Write a java program to demonstrate abstract class & its implementation subclasses.	08

Section B

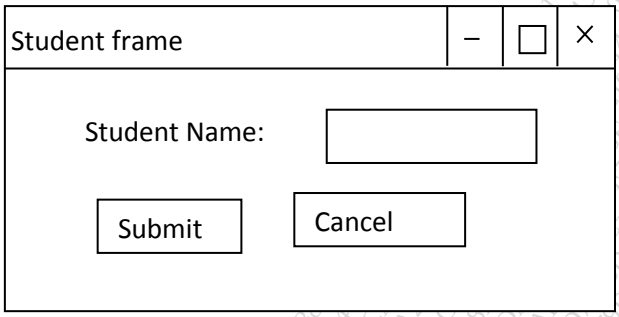
Q.6	Solve any two.		10
	a)	How to start thread in java?	
	b)	What is event handling?	
	c)	What is stream?	
Q.7	a)	How do we synchronize thread?	07
	b)	Write a java program to read a "myfile.txt" file & display the contents on screen.	08
Q.8	a)	Explain thread-life cycle.	07
	b)	Write a applet program which shows the message "Hello world".	08

Q.9 a) Explain applet life cycle. 07

b) Write a java program for object serialization. 08

Q.10 a) Write a java program for creating Thread class attaching thread to that class. 07

b) Write a java program that shows following output:- using AWT 08



Total No. of Printed Pages:2

SUBJECT CODE NO:- H-553
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Elective –I: Computer Network Architecture And Protocols
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 from section A and Q.No.6 from section B, 10 marks each, will be compulsory.
2. From the remaining questions in section A & B, solve any two questions, 15 marks each.

Section A

Q.1 Attempt any five questions:- 10
a) What are Sending & Receiving Buffers?
b) What is traffic shaping?
c) What is an autonomous system?
d) What is CIDR?
e) What are the services provided by SCTP? Explain any one.
f) What is congestion control?
g) What is NAT?

Q.2 a) Explain Network layer design issues in detail, and address the problems with IPv4. 07
b) What is DHCP? Explain its operations in detail. 08

Q.3 a) Explain OSPF Algorithm in detail. 07
b) What is the need of Routing Algorithm? Explain Path-Vector Routing in detail. 08

Q.4 a) Draw a Neat labeled diagram of Three-Way Handshaking and explain in detail. 07
b) Explain flow control & error control in SCTP in detail. 08

Q.5 Write short note on (any three) 15
a) RIP
b) Error control in TCP
c) BGP
d) Encapsulation & Decapsulation
e) ICMP

Section B

Q.6 Attempt any five questions:- 10

a) What is AAL 5?
b) Difference between PVC & SVC.
c) What is SMI?
d) What is remote logging?
e) What is WAP?
f) What is Quality of service in an ATM Network?
g) What are BSS & ESS?

Q.7 a) With a neat diagram, explain ATM Architecture in detail. 07

b) What is the role of Quality of service & congestion control in ATM network? Explain in detail. 08

Q.8 a) Explain PCF in detail. 07

b) What is TELNET? Explain & compare it with SSH in detail. 08

Q.9 a) Explain CSMA/CA in detail. 07

b) What is SNMP? Explain it in detail. 08

Q.10 Write short note on (any three) 15

a) LAN Emulation
b) RTP
c) SIP
d) H.323
e) Resource Allocation & management in Wireless Networks

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-555
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Elective -I : Embedded System
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
i. Q. No. 1 & Q. No. 6 are compulsory
ii. Solve any 2 questions from remaining from each section.

Section A

Q.1 Solve any 2 questions from following. 10
a) Explain Assembly language vs embedded C.
b) Explain difference between microprocessor and microcontrollers.
c) State features of Ardvino uno & Raspberry P_i.

Q.2 a) Compare RISC & CISC architecture and discuss features of ARM7wrt. RISC/ CISC. 08
b) Explain communication protocols in detail. 07

Q.3 a) Explain design metrics and its optimization in Embedded System. 08
b) Discuss in detail components of Embedded System. 07

Q.4 a) Explain following I/O devices with respect to Embedded system 08
1) ADC ii) keypad

b) Explain 8-bit 8051 microcontroller architecture. 07

Q.5 Solve any 3 from following 15
a) State features of 8051 and ARM7.
b) Write short note on CPSR & SPSR
c) Explain in detail serial communication vs parallel communication.
d) Explain classification of embedded system & it's characteristics.

Section B

Q.6 Solve any 2 questions from following 10
a) Discuss in detail RTOS services in contrast with traditional OS.
b) Explain $\mu \cos -II$ in detail.
c) Enlist different directories in Linux and explain in detail.

Q.7 a) Explain in detail RTOS Kernel architecture. 07
b) Discuss in detail the following with respect to RTOS. 08
1) Message Queues
2) Mailbox

Q.8	a)	Explain different types of file system in Linux.	08
	b)	Discuss in detail synchronization in μ cos $-II$	07
Q.9	a)	Explain in detail Linux Kernel.	08
	b)	Discuss in detail Inter-task communication in μ cos $-II$	07
Q.10	Write short notes on (any 3)		15

a) Semaphore in RTOS
b) Interrupt Service Routine (ISR)
c) TCP/IP networking
d) Feature of μ cos $-II$

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-161
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Computer Networks - II
[OLD]

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
1) Question no. 1 and Question no. 6 are compulsory.
2) Answer any two questions each. From section A and section B from remaining questions.

SECTION – A

Q.1 Answer any five. 10
a) What is QOS?
b) What is choke packet?
c) What is split horizon?
d) Difference between UNI cell and NNI cell.
e) Enlist congestion control close loop policies.
f) List out possible application of ATM.
g) Explain interdomain routing.

Q.2 a) Explain different techniques to improve QoS. 08
b) Explain ATM layers with neat diagram. 07

Q.3 a) What is traffic shaping? Explain in detail. 08
b) Explain count – infinity in DVR. 07

Q.4 a) Explain Bellman – Ford routing algorithm. 07
b) Explain leaky bucket algorithm. 08

Q.5 Write short note on any three. 15
a) RIP
b) IGRP
c) Scheduling
d) Lan Emulation

SECTION – B

Q.6 Answer any five. 10
a) What is process to process delivery?
b) What is resolution?
c) What is IANA?
d) What is a primitive transport service?
e) What is E-mail?
f) Difference between primary. Secondary server.
g) Explain need of DNS.

Q.7	a)	At same degree both UDP and IP unreliable? If Yes why or No, then why?	08
	b)	What is MIME? Explain in detail.	07
Q.8	a)	Draw neat labeled diagram of UDP packet.	07
	b)	What is the need of PoP3 or IMAP?	08
Q.9	a)	Explain SNMP Protocol in detail.	07
	b)	Explain stream control transmission protocol in detail.	08
Q.10	Write short note (Any three)		15
	a)	Connection oriented services	
	b)	TCP congestion control	
	c)	H – 323	
	d)	Socket address.	

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-573
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Software Engineering
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Question no.1 and Question no.6 is compulsory.
ii) Attempt any two questions from the remaining from each section.
iii) Assume suitable data if necessary.

Section A

Q.1 Answer the following. (any five) 10
a) What are the attributes of good software?
b) What are the fundamental of software engg. Activities?
c) List software management myths.
d) List out software characteristics.
e) What is process framework?
f) Explain spiral model.
g) Write software engg communication principles.

Q.2 a) Explain software engineering code of ethics and professional practice. 08
b) What are the key challenges face software engg? 07

Q.3 a) With neat sketch. Explain the waterfall model. 08
b) Compare the prescriptive with evolutionary process model. 07

Q.4 a) Write software engineering planning principles. 08
b) List types of nonfunctional requirement and explain. 07

Q.5 a) Draw use case diagram for ATM system and explain. 08
b) Explain scenario based elements. 07

Section B

Q.6 Answer the following. (any five) 10
a. Explain scenario based modeling.
b. List all notations used in class diagram.
c. Define design process.
d. Explain CRC models.
e. Explain art of debugging.
f. Explain configuration management.
g. List metric for software process.

Q.7	a)	Explain elements of requirement analysis.	08
	b)	With an example explain about DFD.	07
Q.8	a)	Explain the analysis and design model in detail.	08
	b)	Explain user interface design with example.	07
Q.9	a)	Explain advantages and disadvantages of automation testing tool.	08
	b)	Explain software validation testing.	07
Q.10	a)	Explain seven principles of risk management.	08
	b)	Explain COCOMO model in detail.	07

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-580
FACULTY OF SCIENCE & TECHNOLOGY
T.E. (CSE/IT)
Design & Analysis of Algorithms
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B 1. Q.1 & Q. 6 are compulsory.
2. Solve any two questions from the remaining each Section.

SECTION – A

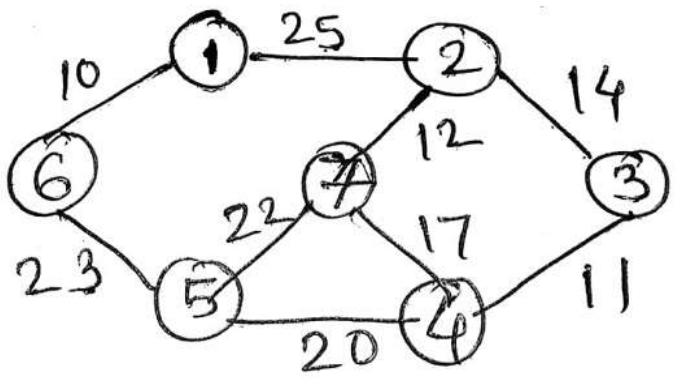
Q.1 Solve any five questions: 10

a) Define an algorithm & write an algorithm for linear search.
b) Define optimal solution & objective function.
c) State any two characteristics of divide & conquer.
d) State single source shortest path problem.
e) State any two difference between Prim's Algorithm & Kruskal Algorithm.
f) Write the significance of asymptotic notation.

Q.2 a) Explain binary search method. Taking list of elements calculate time complexity for successful & unsuccessful search. 08
b) Sort the given data using quick sort: 07
35,20,25,30,15,10,40,45

Q.3 a) Explain optimal merge pattern with example. 07
b) Write an algorithm to find smallest & largest number in an array using divide & conquer. 08

Q.4 a) Perform analysis of selection sort for best, worst & average case. 07
b) Compute minimum cost spanning tree for the following graph using Kruskal's Algorithm. 08



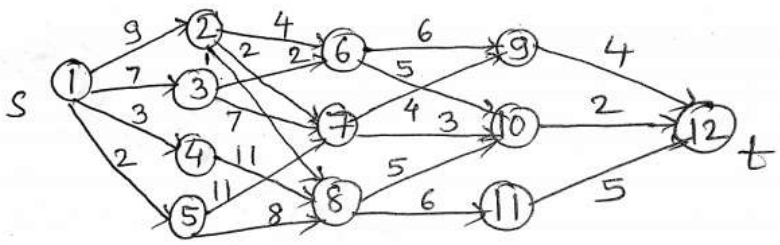
Q.5 a) Explain heap sort with example. 08
b) Write merge sort algorithm using divide & conquer. 07

Section-B

Q.6 Solve any five questions: 10

a) Define state space & bounding function.
b) Differentiate between backtracking & branch & bound.
c) Define Hamiltonian cycle.
d) State 8-queen problem.
e) Define chromatic number of graph.
f) Explain implicit & explicit constraints of backtracking.

Q.7 a) Find a minimum cost path from S to t in multistage graph using forward approach. 10



b) Explain graph coloring using backtracking. 05

Q.8 a) Solve sum of subset problem using backtracking for n=4, $(w_1,w_2,w_3,w_4)=(11,13,24,7)$& m=31. 08

b) Explain FIFO branch & bound with example. 07

Q.9 a) Solve 15 puzzle problem using branch & Bound Initial arrangement is 09

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & & 8 \\ 9 & 10 & 7 & 11 \\ 13 & 14 & 15 & 12 \end{bmatrix}$$

b) Explain graph traversal technique with example. 06

Q.10 a) Determine optimal binary search tree for n=4, $(a_1, a_2, a_3, a_4) = (\text{do}, \text{if}, \text{int}, \text{while})$. 10
P(1:4) = (3,3,1,1), q(0:4) = (2,3,1,1,1)

b) Explain connected & bi-connected components with example. 05