4. a) What is Layout Manager and what are the different Layout Managers available in java.awt? (6)

b) What is package? Explain it with example. (6)

5. a) Explain method overloading and method over riding with suitable example. (6)

b) What is constructor in Java? Explain it with proper example. (6)

6. a) Write a Java program to check whether a number is prime or not. (6)

b) Write a Java program to read a text file and display the content of text file. (6)

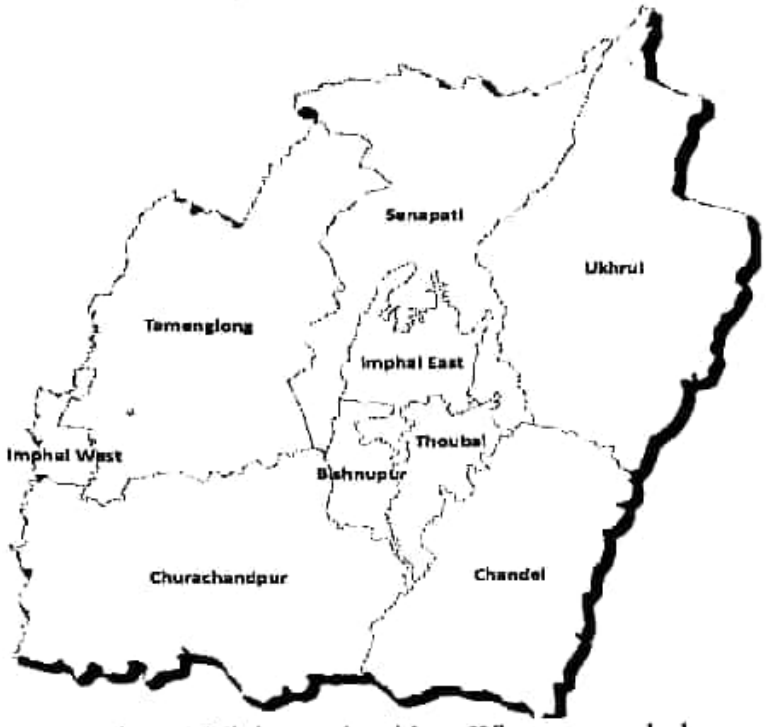
7. **Write short note on any three:** (3x4=12)

i) Java AWT Controls.
ii) Garbage Collector.
iii) Nested Class.
iv) Interface.

8. a) Diffferentiate between Byte Stream and Character Stream. Write a program to check whether the input file exists or not, if it exists append character given from the keyboard. (4+4=8)

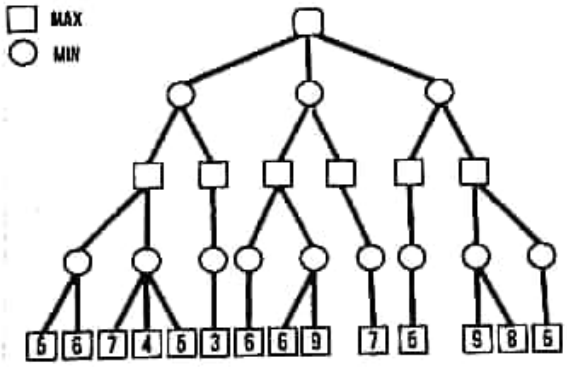
b) What is deadlock ? how can it be avoided? (2+2=4)

**********V/MCA/501/2**********



6. Give the properties of Minimax algorithm. What approach do we use to overcome the resource limitations in alpha-beta pruning? Apply Minimax algorithm and alpha-beta pruning on the graph below.

(2+2+3+5=12)



2017

(Fifth Semester)

MASTER OF COMPUTER APPLICATIONS

Paper No: MCA 503

(Software Engineering & CASE Tools)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer Question No 1 and **any four** from the rest

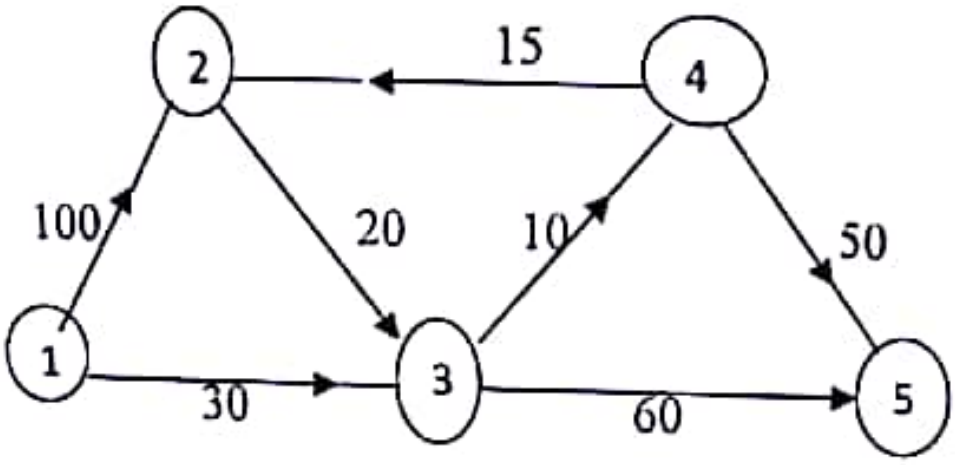
1. Answer the following questions: **(2x6 =12)**

a) What is Software process?
b) Define agile software engineering.
c) Name the four software engineering layers.
d) State the two characteristics of risk .
e) Distinguish between reactive and proactive risk.
f) Define white-box testing.

2. a) Explain the categories of computer software. **(6)**
b) With the help of diagram, explain waterfall model. **(6)**

3. a) Discuss each of the requirement engineering tasks. **(6)**
b) Explain extreme programming (XP) in agile process models . **(6)**

6. a) For the network given below,determine the shortest routes between city 1 and each of the remaining four cities. (8)



b) Solve the following 2 person zero sum game (4)

PLAYER B

PLAYER A $\begin{pmatrix} 15 & 2 & 3 \\ 6 & 5 & 7 \\ -7 & 4 & 0 \end{pmatrix}$

7. a) A TV repairman finds that the time spent on his jobs has an exponential distribution with mean 30 minutes. If he repair's sets in the order in which they came in and if the arrival of sets is approximately Poisson with an average rate of 10 per 8 hour day, what is repairman's expected idle time each day ? How many jobs are ahead of the average set just brought in ?

(4)

b) What are DFDs and data dictionaries? Explain the method of structured analysis. 5

3. a) Describe in brief some cost estimation techniques used in software development. 8

b) Discuss the importance of system documentation. 4

4. a) Differentiate between top-down and bottom-up design strategies. 5

b) Define error, fault and failure in software system. 2

c) Write short note on Project Monitoring? 5

5. a) Explain Risk Management. 6

b) Mention any two SQA activities. 2

c) Explain COCOMO model. 4

6. a) With neat and labelled diagrams, explain Waterfall Model and Prototyping. 6

b) What reliability metrics are used to quantify the reliability of software products? 6

7. a) What are the desirable characteristics of a good Software Requirement Specification(SRS) document? 6

7. (a) What do you mean by monotonic and non-monotonic reasonings? Explain briefly the different forms of non-monotonic reasoning. (2+3=5)

(b) Discuss speech recognition with a diagram. (4)

(c) Explain syntactic analysis with suitable example. (3)

8. (a) Describe minimax search procedure with an example. (6)

(b) Explain Dempster's Rule of combination and give an example with high conflicting evidence. (6)

**********V/MCA/502**********

2014

(Fifth Semester)

MASTER OF COMPUTER APPLICATIONS

Paper No: MCA 529

(Pattern Recognition)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer Question No 1 and **any four** from the rest

1. Answer **briefly** the following questions: (2x6=12)

   a) Explain *preprocessing*.

   b) What is priori probability?

   c) What is supervised learning?

   d) What is *likelihood ratio*?

   e) What do you mean by *segmentation*?

   f) What is *feature extraction*?

2. What is Pattern Recognition? What are the applications of pattern recognition? (4+8=12)

4. (a) Solve, by using dominance property, the following game: (6)

		Player B		
		I	II	III
Player A	I	1	7	2
	II	6	2	7
	III	6	1	6

(b) Find the initial basic feasible solution to the following transportation problem by, (6)

(i) Minimum cost Method,

(ii) North West Corner Rule.

State which of the methods is better.

				Supply
	2	7	4	5
	3	3	1	8
	5	4	7	7
	1	6	2	14
Demand	7	9	18	

5. (a) Show using matrix vector notation that the following system of linear equations has degenerate solutions. (6)

$2x_1 + x_2 - x_3 = 2,$
$3x_1 + 2x_2 + x_3 = 3.$

(b) Explain briefly characteristic and deterministic and probabilistic dynamic programming. (6)

b) Explain structured coding techniques. 6

3. a) Discuss the difference between verification and validation process in software development. 3

b) Explain project planning. Why a plan should be continually reviewed during a software project? 2+4=6

c) What is project scheduling? 3

**********IV/MCA/401**********

2017

(Fifth Semester)

MASTER OF COMPUTER APPLICATIONS

Paper No: MCA 502

(Artificial Intelligence)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer Question **No 1** and **any four** from the rest.

1. Answer the following questions: **(2x6=12)**

a) Define agent.

b) Define Genetic algorithm.

c) Define entailment.

d) What are the two varieties of Constraint Satisfaction problems?

e) Define simulated annealing search.

f) Define ensemble learning.

2017

(Fifth Semester)

MASTER OF COMPUTER APPLICATIONS

Paper No: MCA 501

(Java Programming)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer Question **No 1** and **any four** from the rest

1. Answer the following questions: **(2x6 =12)**

a) What is the difference between Integer and int in JAVA?
b) What are the four principles of OOP?
c) What is abstract class?
d) What are the various access specifier for java class?
e) Java is platform independent, how?
f) What do you mean by JDK and JRE?

2. a) What is exception in Java? How exceptions are handled in Java? **(6)**
b) Discuss the concept of inheritance with suitable example. **(6)**

3. a) What is Multithreading? Explain life cycle of thread. **(6)**
b) What is Applet in Java? Explain life cycle of Applet. **(6)**

2017

(Fifth Semester)

MASTER OF COMPUTER APPLICATIONS

Paper No: MCA 592

(Java Programming Laboratory)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer 2 questions from Set A and 1 question from Set B.

SET – A

Answer *any two (2)* questions from the following: **(2x10=20)**

1. Write a program that displays the number of characters, lines and words in a text / text file. **(10)**

2. Write a program that illustrates how runtime polymorphism is achieved. **(10)**

3. Write a program that prompts the user for an integer and then prints out all the prime numbers upto that integer. **(10)**

(b) Describe the similarities and differences of CPM and PERT construction of network (6)

(c) Explain "artificial variable" and its significance in linear programming. (3)

8. (a) A self service store employs one cashier at its counter. Nine customers arrive on an average every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service rate, find (6)

(v) Average number of customers in the system.

(vi) Average number of customers in queue or average queue length.

(vii) Average time a customer spends in the system.

(viii) Average time a customer waits before being served.

(b) Give a mathematical formulation of the transportation and simplex methods. What are the differences in the nature of problems that can be solved by these methods. (6)

2014

(Fifth Semester)

MASTER OF COMPUTER APPLICATIONS

Paper No: MCA 521

(Operation Research)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer Question No 1 and **any four** from the rest

1. (a) Define event float in CPM. **2**

(b) Define objective function and constraints in LPP. **2**

(c) How do you convert an unbalanced assignment problem into a balanced assignment problem? **2**

(d) Define surplus variables. **2**

(e) Distinguish between pure strategy and mixed strategy. **2**

(f) What is network? **2**

2. (a) Solve by algebraic method the game whose payoff matrix is given by the table: **(8)**

		Player B		
		I	II	III
Player A	I	5	50	50
	II	1	1	0.1
	III	10	1	10

Verify that the strategies (1/6, 0, 5/6) for player A and (49/54, 5/54, 0) for B are optimal and find the value of the game.

4. (a) Discuss the performance of A* Algorithm when the heuristic function either underestimate of overestimate the value of states. (8)

(b) Differentiate between modus ponens and modus tollens with suitable example. (4)

5. (a) Since the mid 1960's, work began on what is now called Expert Systems. What are the conclusions which are being made from the experience gained in these efforts? Also give a brief view of the four major problems facing current Expert Systems. (3+4=7)

(b) Discuss image processing in detail. Give one example of image processing with AI. (5)

6. (a) What is fuzzy set? Describe with an example, biomedical application of AI in context of fuzzy sets. (5)

(b) Consider any English sentence and represent it in three ways of knowledge representation. (4)

(c) What are the different points needed to satisfy for any of the AI techniques? (3)

2. a) What is monile computing? Explain the structure of the mobile phone celluar network. (2+4 = 6)

b) Mention the four spread spectrum techniques with their advantages and disadvantages. (3+3 = 6)

3. a) Define Fresnel Zone? Describe The Fresnel zone for the Concept of Diffraction Loss. (2+4 = 6)

b) What is Handover / Handoff? Mention the different type of it (2+4 = 6)

4. a) Explain the concept of the following orbital mechanics system: (2x3 = 6)
1. GEO system 2. MEO system 3. LEO system

b) Write a short notes on cellular concept. Mention the different types of cells according to their size and function in mobile communication system. (3+3 = 6)

5. a) Define Doppler Shift. Write down the Doppler Effect formula for Apparent frequency for different condition. (6)

b) What is Switching Technique? Write short notes on Circuit switching . (3+3 = 6)

2015

(Fifth Semester)

MASTER OF COMPUTER APPLICATIONS

Paper No: MCA 521(OC)

(Operations Research)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

Question ***No.1*** and ***any Four*** from the rest.

1. a) What is a saddle point in game theory ? **(2)**

   (b) Define slack and surplus variable. **(2)**

   (c) What is degeneracy in simplex method ? **(2)**

   (d) Define optimality and feasibility condition in simplex Method . **(2)**

   (e) Define critical path. **(2)**

   (f) Write the dual for the following LPP **(2)**

   Maximize $Z = 5x_1+12x_2+4x_3$

   Subject to $x_1+2x_2+x_3 \leq 10$

   $2x_1-x_2+3x_3 = 8$

   $x_1, x_2, x_3 \geq 0$

SET - B

Answer *any one (1)* from the following .

4. Write a program to show the workingof a default constructor, parameterized constructor and overloading constructor. **(20)**

5. Write a program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable/writable, the type of file and the length of the file in bytes and display the content of the file using FileInputStream Class . **(20)**

6. **VIVA VOCE** **(10)**

7. **PRACTICAL RECORDS** **(10)**

2014

(Fourth Semester)

MASTER OF COMPUTER APPLICATIONS

Paper No: MCA 401

(Software Engineering and CASE Tools)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer Question No 1 and **any four** from the rest

1. a) What is black box testing? **2**

   b) What is cohesion? **2**

   c) List out two(2) major problems in achieving complete and consistent set of specification. **2**

   d) What is software reliability? How will you measure reliability? **2**

   e) What is critical path? **2**

   f) Distinguish between a program and a software product. **2**

2. a) With the help of a neat and labelled diagram, explain Software Development Life Cycle. **7**

4. a) Describe the basic principles of Project Scheduling. (6)
   b) Explain the layered elements of the Design Model. (6)

5. a) Explain the task set of software design. (6)
   b) Explain software reviews. (3)
   c) Define software quality assurance. Who are the people involved with software quality assurance? (3)

6. a) Explain data modeling concepts. (4)
   b) Discuss each of the different testing strategies. (8)

7. a) Describe software maintenance. (4)
   b) Discuss the levels of software testing. (8)

8. a) Explain Quality Control. (3)
   b) Why do we need software re-engineering? (3)
   c) Discuss the steps involved in software re-engineering (6)

**********V/MCA/503/2**********

3. What is Bayesian decision theory? Explain Two Category Classifications. (6+6=12)

4. What is Gaussian density? Explain K-means Clustering (4+8= 12)

5. What is Maximum Likelihood estimation? Explain in details. (12)

6. Describe Hidden Markov Model (HMM) giving examples. (12)

7. What is K-nearest classification? Explain Fuzzy Classification. (6+6=12)

8. What is hierarchical clustering? Explain Bayes Decision for missing and noisy features. (4+8=12)

**********V/MCA/529**********

b) In a factory, there are six jobs to perform, each of which should go through two machines 'A' and 'B' in the order A, B. The processing time (in hours) for the jobs are given below. Determine the sequence for performing the jobs that would minimize the total elapsed time, T. **(8)**

What is the value of T ?

Job :	J_1	J_2	J_3	J_4	J_5	J_6
Machine A :	1	3	8	5	6	3
Machine B :	5	6	3	2	2	10

Find the starting basic solution **(12)**

By (1) Northwest corner method
(2) Least – cost method
(3) VAM

	1	2	3	SUPPLY
1	0	2	1	6
2	2	1	5	9
3	2	4	3	5
DEMAND	5	5	10	