M.S.(Software Engineering)
and
M.S.(Information Technology)

2nd Year I and II Semester

Model Question Papers

SCHEME OF INSTRUCTION AND EXAMINATION

With effect from 2007-08 admitted batch

Chairman
Board of Studies

Department of Computer Science & Systems Engineering
College of Engineering
Andhra University
Visakhapatnam

MASTER OF SCIENCE IN SOFTWARE ENGINEERING - M.S.(SE)
Course Structure and Scheme of Examination
With Effect From 2007-08 Admitted Batch
2nd year I Semester (Common with IT)

Sub. Ref. No.	Name of the Subject	Periods			Max. Marks			
		Theory	Tutorial	Lab	Exam.	Sessionals	Total	Credits
MSSE 2.1.1	Basic Electronics (Common with MSIT 2.1.1)	3	1		70	30	100	4
MSSE 2.1.2	Discrete Mathematical Structures (Common with MSIT 2.1.2)	3	1		70	30	100	4
MSSE 2.1.3	Data Structures (Common with MSIT 2.1.3)	3	1		70	30	100	4
MSSE 2.1.4	Digital Logic Design (Common with MSIT 2.1.4)	3	1		70	30	100	4
MSSE 2.1.5	Probability, Statistics and Queuing Theory (Common with MSIT 2.1.5)	3	1		70	30	100	4
MSSE 2.1.6	Electronics Lab (Common with MSIT 2.1.6)			3	50	50	100	2
MSSE 2.1.7	Data Structures Lab (Common with MSIT 2.1.7)			3	50	50	100	2
						TOTAL	700	24

MODEL PAPER
M.S. (SE) Degree Examination
Second Year – First Semester
MSSE 2.1.1 BASIC ELECTRONICS
(Common with MSIT 2.1.1)
Effective from the admitted batch of 2007-2008

Time : 3 hrs Max Marks: 70

First Question is
Compulsory
Answer any four from the remaining questions
All Questions carry equal
marks
Answer all parts of any question at one place

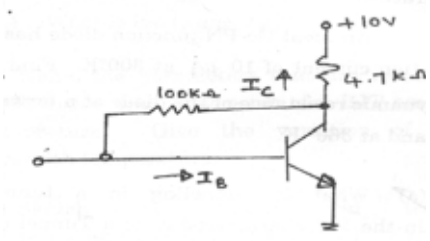
1. Answer the following (7x2=14)
(a) Distinguish between "transistion capacitance" and "diffusion capacitance" of a PN junction diode.
(b) Sketch the symbol and V-I characteristics of a varactor diode. List its applications.
(c) What is early effect in a BJT?
(d) A BJT has I_{co} =10 μA, β_o =99 and I_B =20 μA. What is its I_C and I_E ?
(e) Name the parameters that are responsible for the shift in the operating point of a BJT amplifier with temperature. Give the variation of these parameters with temperature.
(f) Sketch the output and transfer characteristics of an enhancement MOSFET.
(g) In a half wave rectifier circuit, the transformer has a secondary voltage of 184 V r.m.s The PIV rating of the diode is 250 V. Explain whether the diode can be used in this circuit.

2. (a) Differentiate between drift current and diffusion currents. Discuss in details the various current components in a i) forward biased PN junction in diode and ii) reverse biased PN junction diode.
(b) Sketch the V-I characteristics of a PN junction diode and explain how they vary with temperature.
(c) An ideal Ge PN junction diode has a reverse saturation current of 10 μA at 300^0 K. Find the static and dynamic resistance of the diode at a forward bias of 0.2 V and at 360^0 K.

3. (a) What is tunneling in a tunnel diode?
Explain the V-I characteristics of a Tunnel diode with the help of its energy band diagrams. List its applications.
(b) Show the two transistor analogous circuit of a SCR and explain its operation. Sketch its V-I characteristics. Discuss its turn-ON and turn-OFF mechanisms.

4. (a) Sketch the profiles of the currents entering (or leaving) the base region in an NPN transistor in active biased condition and hence explain the operation of the transistor.

(b) For the circuit shown in below, determine, I_C and V_{CE}. Assume for BJT β_0 =99 and V_{BE} = 0 V.



5. (a) Explain the reasons for shift in the operating point of a BJT amplifier with temperature. Describe briefly the bias stabilization circuits used.

(b) Design a shelf bias (emitter bias) circuit for an CE amplifier using a BJT having β_0 =99 and V_{BE} =0V. The desired operating point is V_{CE} =4V and I_C =2mA. Assume V_{CC} =10 V and R_C =2KΩ and S≤ 8. Show the circuit with all the component values.

6. (a) Explain why a JFET is called a unipolar device. Describe its operation with a neat sketch and its input and transfer characteristics. What is punch off voltage and mark it on the characteristics?
(b) Deduce the small signal equivalent circuit for a JFET and prove that

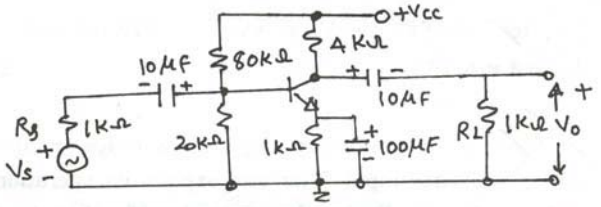
$$g_m = \frac{2}{|V_P|}\sqrt{I_{DSS} \cdot I_{DS}}$$

(c) AJFET has V_P = -4V, I_{DSS} =12 mA and I_{DS} =3 mA. What is its 'V_{as}' and `gm'?

7. (a) Draw the circuit diagram of a bridge rectifier with a capacitor input filter and explain its operation with waveforms. Derive the expressions for its output d.c. voltage and ripple voltage.
(b) A 50 Hz., bridge rectifier power supply is required to provide a d.c. voltage of 100 volts to a load of 5 kilo ohms. The minimum r.m.s. ripple voltage is to be 500 mV. Find the minimum value of the capacitance `C" required and the r.m.s. value of the secondary voltage of the secondary voltage of the transformer.

8. (a) Explain with a neat circuit diagram how a zener diode can be used as a voltage regulator.

(b) For the CE amplifier circuit shown in below, determine:
(i) the mid-band voltage gain V_o/V_s and (ii) the lower 3-dB cut off frequency `f_z'. Assume for BJT, h_{re} =0 and h_{oe} =25 μ A/V as parameters.

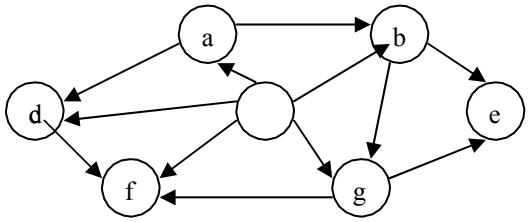


MODEL PAPER
M.S.(SE) Degree Examination
Second Year – First Semester
MSSE 2.1.2 DISCRETE MATHEMATICAL STRUCTURES
(Common with MSIT 2.1.2)
Effective from the admitted batch of 2007-2008

Time : 3 hrs Max Marks: 70

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Answer all parts of any question at one place

1. Answer the following
   a) Write the elements of the set P(P(P(φ))) where P(A) denotes the power set of the set A and φ denotes the empty set.
   b) Write the following statement in predicate calculus:
      There is a brother for every person.
   c) How many ways can 12 people have their birthdays in different calendar months?
   d) Find the number of divisors of 400.
   e) Write the characteristic equation of $S_k - 7S_{k-2}+6S_{k-3} = 0$.
   f) Write the adjacency matrix of the following digraph.



   g) Draw all possible binary trees with three nodes.

2. a) Check whether $((P\rightarrow Q)\rightarrow R)\rightarrow((P\rightarrow Q)\rightarrow(P\rightarrow R))$ is a tautology.
   b) Write the following sentences into predicate logic statements and verify the conclusion.
      All trees are graphs.
      Some graphs are trees.
      AND – OR graph is a graph.
      MST is a tree.
      Therefore, MST is a graph.

3. a) Find the number of integer solutions to the equation
   $x_1 + x_2 + x_3 + x_4 + x_5 = 20$ where $x_1 \geq 3$, $x_2 \geq 2$, $x_3 \geq 4$, $x_4 \geq 6$ and $x_5 \geq 0$.
b) A simple code is made by permuting the letters of the alphabet of 26 letters with every letter being replaced by a distinct letter. How many different codes can be made in this way?

4. a) Find the number of ways of placing 20 similar balls into 6 numbered boxes so that the first box contains any number of balls between 1 and 5 inclusive and the other 5 boxes must contain 2 or more balls each.

b) Solve $a_n - 6a_{n-1} + 12a_{n-2} - 8a_{n-3} - 0$ by generating functions for $n \geq 3$.

5. a) Find the transitive closure of the digraph whose adjacency matrix is

$$\begin{pmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

b) Prove that a graph G is a tree if and only if G has no cycles and the number of the edges of G is one less than the number of vertices of G.

6. a) Write Kruskal's algorithm for finding the minimum spanning tree of a graph

b) Find the minimum spanning tree of the graph given by the adjacency matrix

$$\begin{pmatrix} 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \end{pmatrix}$$

7.a) State and prove the Euler's formula for planar graphs

b) How many different Hamiltonian cycles are there in a complete graph of n vertices? Justify your answer.

8.a) What is graph coloring? State the four-color theorem.

b) Prove that every simple planar graph is 5-colorble.

MODEL PAPER

M.S.(SE) Degree Examination

Second Year – First Semester

MSSE 2.1.3 DATA STRUCTURES

(Common with MSIT2.1.3)

Effective from the admitted batch of 2004-2005

Time : 3 hrs Max Marks: 70

First Question is Compulsory

Answer any four from the remaining questions

All Questions carry equal marks

Answer all parts of any question at one place

1. Briefly answer the following questions: (7*2=14)
   a. Define `Abstract Data Type' ? How are they used in program development. b. Write the primitive operations of ADT queue.
   c. Write the prefix and postfix equivalents to the infix expression A/B+C-D *(E+F).
   d. Write the best, worst and average case time complexity estimates of Quick Sort algorithm.
   e. What is an Almost Complete Binary Tree? Write an application that makes use of it. f. Write the applications of depth first traversal of a graph.
   g. When does interpolation search performs better than binary search ?
2. a. Assume that each element of an array 'A' stored in row-major order occupies four bytes of memory . If 'A' is declared as: int a [10][20][5]. And the address of the first element of 'A' is 2000, find the address of the array element A[5][12][4]. (6)
   b. Write a C program to evaluate a given postfix expression using stack and explain it with an example. (8)
3. a. Write a recursive function in C to find the nth Fibonacci number. (5)
   b. Write a non – recursive function for the above problem. (5)
   c. Compare the efficiencies of the above two functions. (4)
4. a. Compare and contrast the ADTs Queue and Priority Queue. (6)
   b. Write a C function to concatenate two singly linked circular list without traversing either of them and explain it. (8)
5. a. Discuss different ways of representing a binary tree and suggest an application for each of the representations. (8)
   b. Explain how the threads are used to simplify the traversal of a binary tree. (6)
6. a. Construct a binary search tree to accommodate the given list of integers. (5)
   47,56,23,17,64,36,29,22
   b. Find the in order, preorder and post order sequence of nodes of the above tree. (6)
   c. Explain the process of deletion of node '23' from the above tree and draw the resultant tree.(4)
7. Write a C function to arrange the elements of an array in ascending order using Radix sort algorithm and explain it with a suitable example. (14)

8. a. Discuss the Dijkstra's algorithm for finding the shortest paths from a source to all other vertices in a directed graph. What is its time complexity. (7)
   b. Apply Kruskal's algorithm to find the minimal spanning tree for a weighted undirected graph whose adjacency/weight matrix is given below.
      i) Draw the graph. (3)
      ii) Show different stages of development of the above spanning tree. (8)
      iii) Find the cost of the minimal spanning tree. (3)

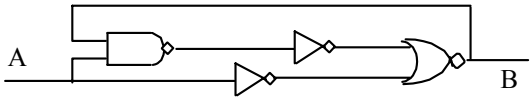
$$\begin{bmatrix} 0 & 6 & 1 & 5 & \infty & \infty \\ 6 & 0 & 5 & \infty & 3 & \infty \\ 1 & 5 & 0 & 5 & 6 & 4 \\ 5 & \infty & 5 & 0 & \infty & 2 \\ \infty & 8 & 6 & \infty & 0 & 6 \\ \infty & \infty & 4 & 2 & 6 & 0 \end{bmatrix}$$

MODEL PAPER
M..S (SE) Degree Examination
Second Year – First Semester
MSSE 2.1.4 DIGITAL LOGIC DESIGN
(Commn with MSIT 2.1.4)
Effective from the admitted batch of 2007-2008

Time : 3 hrs Max Marks: 70

First Question is
Compulsory
Answer any four from the remaining questions
All Questions carry equal
marks
Answer all parts of any question at one place

1. a) Given that $(79)_{10} = (142)_b$ determine the value of b.
   b) Rewrite the following expression in a form that requires as few inversions as possible
   b'c + acd' +a'c +c(a+c)(a'+d')
   c) Represent the function (x,y,z)=y using Karnangh Map.
   d) Explain the behavior of the following logic circuit with input A and output B



   e) Realize an Inverter and Buffer using Half-Adder
   f) Explain clearly how a Flip-Flop is used as a memory unit g) Draw the waveforms for a 3-bit ripple down counter

2. a) In a certain number system, X and Y are two successive digits. When written as XY, it is equal to
   25 and when written as YX, it is equal to 31 in decimal system. Find the base of the system. Also
   find the values of X and Y.
   b) Construct one of the error detecting codes for single digit BCD numbers and Hexadecimal numbers.

3. Demonstrate, without using perfect induction, whether or not each of the following is valid. a) (x+y) (x+y')(x'+y)(x'+y')=0 b) a'b+b'c+c'a=ab'+bc'+ca' c) ab+a'c +bcd = ab + a'c
   b) Wrute the HDL description of the circuit specified by the following Boolean functions:

x = A(CD + B) +

BC' Y = (AB' +

A'B)C + D') z = [A +

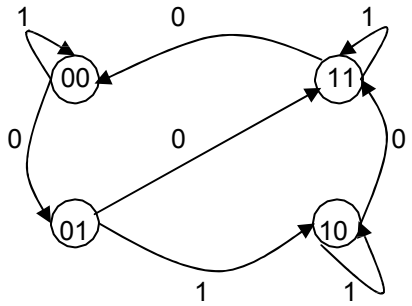
B)(C' + D'B)]'

4. Given the function T (w,x,y,z) = $\sum$ (1,3,4,5,7,8,9,11,14,15)

   a) Use the K – map to determine the set of all prime implicants. Indicate specifically the essential ones. Find three distinct minimal expressions for T.
   b) Assume that only unprimed variables are available. Construct a circuit which realizes T.

5. a) Design a combinational circuit that multiplies two 2-bit numbers, a_1a_o and b_1b_o, to produce a 4-bit product $c_3c_2c_1c_o$. Use AND gates and half-adder.
   b) Design a combinational circuit that has four inputs and four outputs. The output generates the 2;s complement of input binary number.

6. Design a sequential circuit specified by the state diagram given below using T filp-Flops.



b) Draw and explain the logic diagram of a master-slave D flip-flop using NAND gates.

7.. a) Design a synchronous BCD counter with JK flip-flops.
b) Design a shift register with parallel load that operates according to the following function table:

SHIFT	LOAD	REGISTER OPERATION
0	0	No Change
0	1	Load Parallel data
1	X	Shift Right

8. write short notes on the following
a) Programmable Array Logic b) Asynchronous Sequential Logic
c) HDL for registers and Counters d) D-latch and D-Flip-Flop

MODEL PAPER
M.S. (SE) Degree Examination
Second Year – First Semester
MSSE 2.1.5 PROBABILITY, STATISTICS & QUEUEING THEORY
(Common with MSIT 2.1.5)
Effective from the admitted batch of 2007-2008

Time : 3 hrs Max Marks: 70

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Answer all parts of any question at one place

1. Answer the following
   i. State the axioms of probability.
   ii. Explain confident intervals in estimation.
   iii. Explain the method of least squares.
   iv. What is rank correlation?
   v. Explain Type I and II errors.
   vi. State the properties of Regression coefficient?
   vii. Explain conditional probability.

2. a) State and prove Baye's formula on conditional probability.
   b) We are given three urns as follows:
   Urn A contains 3 red and 5 white marbles
   Urn B contains 2 red and 1 white marble
   Urn C contains 2 red and 2 white marbles.
   An urn is selected at random and a marble is drawn from the urn. If the Marble is red, what is the probability that it came from urn A?

3. a) Derive the Recurrence relation for finding the moments of a Binomial distribution.

b) If $(x_1, x_2) = 4 x_1 x_2 e^{-(x_1^2 + x_2^2)}$ $x_1, x_2 > 0$
$= 0$ Otherwise.
Find the marginal distributions of x_1 and x_2.

4. a) Show that a Poisson distribution is a limiting case of Binomial. Also Derive the Moment generating function of a Poisson random variable.
   b) Probability of a Vehicle having an accident at a particular intersection is 0.0001. Suppose that 10,000 Vehicles perday travel through this intersection. What is the Probability of no accidents occurring? What is the Probability of two or more accidents.

5. a) Define a Normal distribution.
   b) State and prove the properties of a Normal distribution.

6. a) Derive normal equations to fit $y = a + bx$ by the method of least squares.
   b) Fit a least squares parabola having the form $y = a + bx + cx^2$ to the following data:

X :	1.2	1.8	3.1	4.9	5.7	7.1	8.6	9.8
Y :	4.5	5.9	7.0	7.8	7.2	6.8	4.5	2.7

7. a) Show that the correlation coefficient lies between x and y -1 and +1.
   b) Calculate the correlation coefficient between x and y for the following data.

X :	65	66	67	67	68	69	70	72
Y :	67	68	65	68	72	72	69	71

8. Arrivals at a telephone booth are considered to be Poisson with an average time of 12 min. between one arrival and the next. The length of a phone call is assumed to be distributed exponentially with mean 4 min.

   a) Find the average number of persons waiting in the system.
   b) What is the probability that a person arriving at the booth will have to wait in the queue?
   c) What is the probability that it will take him more than 10 min. altogether to wait for the phone and complete his call?
   d) Estimates the fraction of the day when the phone will be in use.
   e) The telephone department will install a second booth, when convinced that an arrival has to wait on the average for at least 3 min. for phone. By how much the flow of arrivals should increase in order to justify a second booth?

MASTER OF SCIENCE IN SOFTWARE ENGINEERING - M.S.(SE)
Course Structure and Scheme of Examination
With Effect From 2007-08 Admitted Batch

2nd year II Semester (Common with M.S.(IT))

Sub. Ref. No.	Name of the Subject	Periods			Max.Marks			
		Theory	Tutorial	Lab	Exam	Sessionals	Total	Credits
MSSE2.2.1	File Structures	3	1		70	30	100	4
MSSE2.2.2	Operating Systems Principles	3	1		70	30	100	4
MSSE2.2.3	Computer Organisation	3	1		70	30	100	4
MSSE2.2.4	Object Oriented Programming	3	1		70	30	100	4
MSSE2.2.5	Formal Languages & Automata Theory Theory	3	1		70	30	100	4
MSSE2.2.6	File Structures Lab			3	50	50	100	2
MSSE2.2.7	Object Oriented Programming Lab			3	50	50	100	2
						TOTAL	700	24

MODEL PAPER
M.S. (SE) Degree Examination
Second Year – Second Semester

MSSE 2.2.1 FILE STRUCTURES
(Common with MSIT 2.2.1)
Effective from the admitted batch of 2007-2008

Time : 3 hrs Max Marks: 70

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Answer all parts of any question at one place

1. a) Define the term Stream of bytes and Stream of records
   b) What is rotational delay? What is the reason to delay?
   c) When could be disks become bottleneck?
   d) Write B-tree properties
   e) What is multiple buffering? What is its use?
   f) What are the limitations of key sort?
   g) What are the limitations of binary search?

2. a) What are the operations required to maintain an indexed file
   b) How do you retrieve special subset of records from a data file using combination of secondary key?

3. What is abstract data model? Why did the early file processing programs does not deal with abstract data model? What are the advantages of using abstract data models in applications?
4. What do you mean by data compression? Explain about the data compression. What are various techniques of data compression? What are its uses?
5. What is hashing? Explain the various methods of hashing algorithms.
6. What is collision? Explain the various collision "resolution techniques".
7. a) Explain why the number of comparisons is not adequate for measuring performance in sorting large files.
   b) Construct a B^+ tree for the set of key values (21, 33, 41, 49, 54, 63, 70)_under the assumption that the number of search key values that fit in a one node is 5
   Show the steps involved in the following tasks:
   i) fond record 49 ii) Insert record 45 iii) Delete record 41

8. a) Explain how extendible hashing works. Show how it combines tries with conventional static hashing technique
   b) In extendible hashing procedure, the directory can occasionally point to empty bucket. Describe two situations that can produce empty bucket.

MODEL PAPER

M.S. (SE) Degree Examination

Second Year – Second Semester

MSSE 2.2.2 OPERTING SYSTEMS PRINCIPLES

(Common with MSIT 2.2.2)

Effective from the admitted batch of 2007-2008

Time : 3 hrs Max Marks: 70

First Question is Compulsory

Answer any four from the remaining questions

Answer all parts of any question at one place

1.	Briefly explain the following		7x2=14
	a.	Client-Server model of Computing	
	b.	Preemptive scheduling	
	c.	User level threads	
	d.	Thrashing	
	e.	Device drivers	
	f.	Fork system call	
	g.	Asynchronous I/O	
2.	a.	Discuss the role of operating system as a resource manager.	7
	b.	Explain the concept of virtual machine	7
3.	a.	Write and explain monitor solution for producer – consumer problem	10
	b.	Explain the role of size of time quantum on round robin scheduling w.r.t. response time.	4
4.	a.	Explain about swapping and swapping overheads.	4
	b.	Discuss how paged segmentation is implemented	10
5.	a.	Explain how access control lists and capability lists are used as a means of protection.	6
	b.	Explain different file allocation methods.	8
6.	a.	Explain about different disk scheduling algorithms.	7
	b.	Explain about deadlock detection and recovery .	7
7.	a.	Explain Unix file system implementation	10
	b.	Explain the difference between character and block devices.	4
8.	a.	Briefly explain about process management in MS-DOS.	8
	b.	Explain about different directory structures.	6

MODEL PAPER
M.S. (SE) Degree Examination
Second Year – Second Semester

MSSE 2.2.3 COMPUTER ORGANIZATION

(Common with MSIT 2.2.3)
Effective from the admitted batch of 2007-2008

Time : 3 hrs Max Marks: 70

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Answer all parts of any question at one place

1. (a) What is the arithmetic shift and how to identify the over flow?
   (b) What is firmware?
   (c) What is asynchronous transmission?
   (d) Define hit ratio?
   (e) What is handshaking?
   (f) Define index addressing mode?
   (g) What is write back procedure in cache memory?

2. (a) Show the hardware including logic gates for the control function that implements the statement

$$xy^1T + T_1 + x^1yT: \quad A \leftarrow A + 1$$

   (b) Describe the register transfer language operation illustrating with one example?

3. (a) Describe the mechanism of an instruction fetching, decoding and execution using flow chart?
   (b) What are data manipulation instructions BASIC computer? Explain with examples

4. (a) Compare hardware control and micro programmed control?
   (b) Show how nine bit micro operation field in a micro instruction can be divided into sub fields? Explain with an example

5. (a) With flow charts explain how floating point addition is performed in a computer?
   (b) What are the functions performed by an I/O interface? Explain with an example

6. (a) Compare and contrast isolated I/O and memory mapped I/O.
   (b) Why does I/O interrupt make more efficient use of the CPU?

7. (a) Explain the need of the memory hierarchy?
   (b) What is the associate memory and what kind of operation it is more suitable?

8. Write short notes on
   (i) Virtual Memory (ii) Instruction formats. (iii) DMA
   (iv) Memory Reference Instructions of BASIC Computer

MODEL PAPER
M.S. (SE) Degree Examination
Second Year – Second Semester

MSSE 2.2.4 OBJECT ORIENTED PROGRAMMING

(Common with MSIT 2.2.4)
Effective from the admitted batch of 2007-2008

Time : 3 hrs Max Marks: 70

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Answer all parts of any question at one place

1. Answer the following
 a) Write about Data Encapsulation.
 b) What is Dynamic binding?
 c) Give an example of an Inline function.
 d) When do you use Friend functions?
 e) What are Pure virtual functions?
 g) Write about Garbage collection.

2.a)Explain concepts of Object Oriented Programming.
 b) Discuss Operator overloading concept with complex number addition example.

3.a)Explain all kinds of inheritance with examples.
 b) Write a program using class templates to sort an array of integers and an array of float numbers.

4.a)What is polymorphism? Explain compile-time polymorphism.
 b)Write a program using virtual functions.Your program contains two classes, Base class by name college,derived class by branch derived both will contain a function display() that displays their respective details.

5. a)Write a short note on
 i)Class diagrams ii)State chart diagrams.
 b)What is UML?Discuss interaction diagrams.

6.a)Discuss Exception Handling mechanism in C++.
 b) Write a program for file copying using file streams in C++..

7.a)Write a short notes on File Handling in Java.
 b)Write a program that implements an interface containing methods describing student information.

8.a)Define multi-threading.How threads are created in JAVA?
 b)What is a package?Write a program that shows scope of all kinds of variables inside and outside a package.

MODEL PAPER

MODEL PAPER

M.S. (SE) Degree Examination

Second Year – Second Semester

MSSE 2.2.5 FORMAL LANGUIAGES AND AUTOMATA THEORY

(Common with MSIT 2.2.5)

Effective from the admitted batch of 2007-2008

Time : 3 hrs Max Marks: 70

First Question is Compulsory

Answer any four from the remaining questions

All Questions carry equal marks

Answer all parts of any question at one place _____

1 a) Define Moore and Mealy machines with examples
b) State Pumping lemma for regular sets
c) What is an ambiguous grammar? Give examples How to eliminate ambiguity?
d) What is Post Correspondance Problem?
e) Define a Turing Machine with example.
f) Define the different types of grammar according to Chomsky Classification.
g) Define Push Down Automata with example

2 Find minimal DFA's for the language L = { $a^n b^m$, n>= 2,m>=1}

3 Discuss the prove that the Closure properties of regular sets are closed.

4 a) State and Prove pumping lemma for CFL's
b) The language defined as L= {$a^n b^n c^n$ / n>=1} is context free or not. Prove it.

5 a) S.T APDA that accepts by final state and PDA that accepts by empty store are quivalent.
b) Construct a PDA equivalent to the grammar S/aAA,A/aS/b

6 a) Design aTuring machine that can compute proper subtraction i.e., m ·_ n where m & n are positive integers

m & n = m-n if m>n
= 0 if m<=n

7 a) Find a Greibach normal form equivalent to the following CFG
S/AB/a, A/BS/b, B/SA/c
b) Remove all unit productions,all useless productions and all ε-productions for the grammar
S/aA/aBB,
A/aaA/ε,
B/bB/bbC, C/B.

8 Write notes on the following:
a) Myhill-Nreode Theorem
b) Chomsky Normal form
c) Recursively enumerable sets
d) DFA and NFA