THIRD SEMESTER

MCA-310 THEORY OF COMPUTATION

Maximum Time : 3 Hrs. University Examination : 70 Marks
Total Marks : 100 Continuous Internal Assessment : 30 Marks
Minimum Pass Marks : 40%

(A) Instructions for the Paper setter:
The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will
cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:
1. Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Mealy, Moore machine, conversion of Moore machine to mealy machine and vice-versa, equivalence of NFA and DFA, minimization of states in DFA.

SECTION B
Regular expression, Removal of Null transitions, Arden's Theorem, Construction of Finite automata, equivalence of regular expression, Equivalence of two finite automata, Pumping lemma of Regular languages, closure properties of regular languages.

SECTION C
Ambiguity in CFG, Construction of reduced grammars, Elimination of NULL and Unit production, CNF, GNF, Pumping lemma for CFL, Properties of CFL, Construction of Push-Down Automata.

SECTION D
Turing machine model, construction of turing machines, Multitape – TM, Multi-track TM, Multi-head TM.
Post correspondence problem, Turing machine Halting problem.

Reference:-

1. Mishra Chandrasekran "Theory of computer Science"(3rd Edition), PHI
2. Hopcroft Motwani ullman "Introduction to Automata Theory Languages & Computation"(2nd Edition), Pearson Edition.
3. Kulkarni Sani, "A Mathematical Introduction to Automata Theory", Dhanpat rai & Co.

MCA-320 SOFTWARE ENGINEERING

Maximum Time : 3 Hrs. University Examination : 70 Marks
Total Marks : 100 Continuous Internal Assessment : 30 Marks
Minimum Pass Marks : 40%

(A) Instructions for the Paper setter:
The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will
cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:
1. Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A
Software : Characteristics, Components, Application, S/W Process, Software Process Models : Waterfall, spiral, Prototyping, Fourth Generation Techniques, Roll of Metrics & Measurements, S/W inspection : Communication skills for the system analyst.
Preview/Inspection Procedure : document, composition of inspection team, Checklist.

SECTION B
S/W Project Planning : Objectives, Decomposition techniques : S/W sizing, Problem-based estimation, Process based estimation, Cost estimation models : COCOMO Model, The S/W equation.
System Analysis : Structured analysis, Characteristics and components of SRS, DFD, Entity relationship diagram, Data dictionary, and metrics.

SECTION C
S/W Design : Objectives, Principles, Concepts, Design methodologies : structured design, Object-oriented approach, Design specification, Verification metrics.
User Interface Design: Design issues, Features of a Modern GUI : Metrics, Scaling Windows, Icons, Panels, Error manage etc.

SECTION D
User Manual: Contents, User profile, S/W Configuration management, Baseline, SCM process, Version control, changes control.
Computer aided S/W Engineering: CASE, Building Blocks, and Tools for project management, Support, Analysis, design and maintenance, Future of CASE.

References:
1. P. Jalota, "An Integrated Approach to Software Engineering", Narosa Publishing House, 1992
2. R.E.Fairley, “Software Engineering Concepts”, McGraw-Hill, 1985
3. G.Meyers, “The Art of Software Engineering”, Wiley-inter-Science, 1979
4. M. Shooman, “Software Engineering”, McGraw-Hill, 1983

MCA-330 ANALYSIS & DESING ALGORITHM

Maximum Time : 3 Hrs. University Examination : 70 Marks
Total Marks : 100 Continuous Internal Assessment : 30 Marks
Minimum Pass Marks : 40%

(A) Instructions for the Paper setter:
The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:
1. Candidates are required to attempt one question each from the section A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A
Complexity & Recurrences :- Space complexity, Time complexity, Asymptotic notation ((Ω,θ, O, ω,○), Solution of recurrence relations : recursion tree method, master method, Iteration method.

SECTION B
Divide & Conquer : General method, Binary search (Iterative & recursive), Merge sort, Quick sort, Selection, Strassen's matrix multiplication.

SECTION C
Greedy method :- General method, Fractional knapsack, Job sequencing with deadline, Prim's algorithm, Kruskal's algorithm, Dynamic Programming: General method, All pair shortest path, 0/1 Knapsack problem, Traveling salesman problem, Longest common subsequence, Matrix chain multiplication.

SECTION D
Backtracking Method : General method, 8-Queen's problem, Sum of subset, Graph coloring, Knapsack problem, Branch and Bound, LIFO search, FIFO search, LC search, 0/1 Knapsack, Traveling salesman problem, Comparison Trees : Ordered searching, sorting, selection, oracles and adversary arguments : Merging, Longest & Second longest selection.
Lower bound through reduction : Disjoint set on-line medium, Multiplying triangular matrices.

Reference:-

1. Horowitz Sahni Rajasekaran, "Fundamentals of computer Algorithms", Galgotia.
2. LipSchutz, "Theory and problems of Data Structures"(Schaum's outline series), TMH.

MCA-340 VISUAL PROGRAMMING WITH VB

Maximum Time : 3 Hrs. University Examination : 70 Marks
Total Marks : 100 Continuous Internal Assessment : 30 Marks
Minimum Pass Marks : 40%

A) Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates
1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

SECTION A
Introduction
- Ø Visual Basic
- Ø Visual Studio

SECTION B
Visual Basic Language and Syntax :- The Basics
- Ø Data Types
- Ø Variables
- Ø Functions
- Ø Subroutines
- Ø Methods
- Ø Properties
- Ø Events

SECTION C
Visual Basic Language and Syntax (Continued)
- Ø Program control
- Ø File Input and Output
- Ø Exception Handling
- Ø Security Issues
- Ø Database Access
- Ø Report Writing
- Ø Nomenclature specific for .NET and in relation to some other OO language.

SECTION D
Windows Forms
- Ø Overview including Dynamic Windows forms
- Ø Architecture and Design considerations: Create, Read, Insert, Update, Archive and Delete.
- Ø Use of Windows forms V/s Web forms and Web services controls.

Reference:-
1. Sams Techmedia, “Visual Basic 6 in 21 days SAMS”, Techmedia.
2. Noel Jerbe, “The complete reference Visual Basic 6.”, Tata McGraw hill

MCA - 350 . NET FRAME WORK & C#

Maximum Time : 3 Hrs. University Examination : 70 Marks
Total Marks : 100 Continuous Internal Assessment : 30 Marks
Minimum Pass Marks : 40%

(A) Instructions for the Paper setter:
The question paper will consist of five sections: A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% of the total marks (12 marks) each. Section E will consist of 10 short answer type questions, which will
cover the entire syllabus uniformly and will carry 40% of the total marks (32 marks) in all.

(B) Instructions for the Candidates:
Candidates are required to attempt one question each from the section A, B, C and D of the
question paper and the entire section E.

SECTION A
. Net framework, Common language runtime, Framework Base classes, User and Program Interfaces, Visual Studio. NET, NET languages, Benefits of . NET Application C# and . NET.

SECTION B

Name Spaces, Main Returning a value , Passing string objects write line method. Command line arguments, using mathematics functions, Literals, Variables, Operators, Expressions.
Decision making (if, if…..else, Nested if, else…. If ladder, Switch , ? : Operator) Looping (
While, do , for , for each Jumps in loops)
SECTION C
Methods, Parameters, Pass by value, Pass by reference, Methods overloading, Arrays, Strings, Structures, Enumerations, Difference between class & structure.
Classes, access modifiers, accessing class members, constructors, overloaded constructors, copy constructors, destructors.

SECTION D
Classical Inheritance, Containment inheritance, Subclasses constructors, Multilevel, Hierarchical Inheritance, Abstract classes, Defining and Implementation of Interfaces, Interfaces and Inheritances, Overloading unary and binary operators.

Delegates and events, exceptions, multiple caches, finally statement, throwing and own exception.

Reference:-
1. E. Balguru swami, “Programming in C# :”, TMH.
2. Shibi Panikkar and Kumar Sangeev, “Magic of C# with .NET FrameWork”, Laxmi Publication
3. Dev Prakash, “Understanding C#”, Gbe Tech Publications.

MCA-360 P PROGRAMMING LAB- (PROGRAMMING IN JAVA)

Maximum Time : 3 Hrs.
Total Marks : 100
Minimum Pass Marks : 40%

University Examination : 70 Marks
Continuous Internal Assessment : 30 Marks

This laboratory course will mainly comprise of exercises on what is learnt under paper : MCA-340(Java Programming).