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10CS71

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Object Oriented Modeling and Design

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. What is OO development? Explain its methodology and its themes. (10 Marks)
- b. What are Models? Discuss their classification. (05 Marks)
- c. What is Generalization? Illustrate and discuss with an example. (05 Marks)
- 2 a. List and explain various restructuring techniques used with respect to workarounds. (10 Marks)
- b. What is multiple inheritances? Explain different kinds of its with an example illustration. (10 Marks)
- 3 a. What is Aggregation concurrent? Illustrate with an example. (04 Marks)
- b. Discuss use case relationship and draw the use case diagram of stock brokerage system. (08 Marks)
- c. Explain activity diagram for an UML with an illustration showing stock trade processing. (08 Marks)
- 4 a. With neat diagram. Explain the process overview. (06 Marks)
- b. Explain the steps performed in constructing a domain state model with an example. (08 Marks)
- c. Explain the class model for an ATM system. (06 Marks)

PART – B

- 5 a. For an ATM example
 - i) Analyze the difference type use cases by designing a use case diagram. (12 Marks)
 - ii) Explain process transaction scenario. (08 Marks)
- b. What is system design? Explain steps involved in it. (08 Marks)
- 6 a. List and explain the steps involved in design of algorithms. (08 Marks)
- b. Write a brief note on Realizing algorithm. (08 Marks)
- c. Write a note on wrapping. (04 Marks)
- 7 a. With an illustration, explain the dynamics of client-dispatcher-server design pattern. (10 Marks)
- b. Explain communication and management patterns. (10 Marks)
- 8 Write short note on
 - a. Unified modeling Language
 - b. View handler pattern
 - c. Command processor pattern
 - d. Idioms and styles. (20 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Embedded Computing System

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART - A

- 1 a. What is an embedded system? Differentiate between a general purpose computer and an embedded system. (04 Marks)
- b. Explain the design of a requirement form for the beginning of project. (08 Marks)
- c. Discuss various challenges in embedded computing system design. (08 Marks)
- 2 a. Differentiate between:
 - i) Cache hit and cache miss with a neat diagram. (04 Marks)
 - ii) LDRH and LDRB of ARM instructions. (04 Marks)
- b. What is an interrupt? Explain the mechanism of interrupt vectors with a neat diagram. (08 Marks)
- c. Write ARM assembly code to implement the following C statement:
 $Z = (a \ll 2) | (b \& 15);$ (04 Marks)
- d. What is pipeline? Explain the stages in an ARM pipeline. (04 Marks)

- 3 a. Explain the following terms: i) Bus master; ii) Four-cycle handshake protocol; iii) Components/signals on a bus; iv) DMA. (12 Marks)
- b. Explain, how bridge can be used to connect different speeds systems. (08 Marks)
- 4 a. Explain three techniques used in loop optimization. (10 Marks)
- b. Explain the role of assembles and links in the compilation process with a neat diagram. (07 Marks)
- c. What is dead code elimination? Explain. (03 Marks)

PART - B

- 5 a. What is a process? What is Kernel? Explain any three services of the Kernel in an operating system. (08 Marks)
- b. Compare thread w/s process. (07 Marks)
- c. Define the following terms: i) CPU utilization; ii) Throughput; iii) Turnaround time; iv) Waiting time; v) Response time. (05 Marks)
- 6 a. Explain the working of a shared memory communication system with a neat diagram. (08 Marks)
- b. List various assumptions done during the evaluation of operating system performance. (04 Marks)
- c. Explain the following with respect to IPC: i) signals; ii) mail-boxes. (08 Marks)
- 7 a. With a neat diagram, explain CAN data frame format. (10 Marks)
- b. Explain the basic format of an IP packet. (10 Marks)
- 8 Explain the following file types generated during cross-compiling/assembling:
 - i) .obj File
 - ii) .Map File
 - iii) .Hex File
 - iv) .lst File. (20 Marks)

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10CS73

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Programming the Web

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Explain URL, MIME with proper examples. (06 Marks)
b. Explain HTTP request phase/header. (08 Marks)
c. Explain the following tags :
<p>,
, <pre>, <block quote>, , <a>. (06 Marks)
- 2 a. Write a program to illustrate the nested ordered list in XHTML. (07 Marks)
b. Explain the selector forms with an example. (06 Marks)
c. Write a XHTML program to illustrate a form which accepts buyer's Name, Address, City, State, zip, Product name (Book, Mobile, Pen drive), Price, Quantity, Payment method (Visa, master card, Discover, Check), submit button and clear form button. (07 Marks)
- 3 a. Explain the JavaScript screen output and keyboard input functions with neat diagrams. (06 Marks)
b. Explain object creation and modification in JavaScript (06 Marks)
c. Write a JavaScript program to check the validity of phone number. (08Marks)
- 4 a. Explain the document object model. (06 Marks)
b. Illustrate with JavaScript program handling of events from button element. (06 Marks)
c. Explain positioning of elements. (08Marks)

PART – B

- 5 a. Explain definition of XML name spaces with examples. (07 Marks)
b. List and write significance of XML datatypes. (07 Marks)
c. Write a note on XML processors. (06 Marks)
- 6 a. Explain arrays in Perl with examples. (08 Marks)
b. Explain pattern matching in Perl. (06 Marks)
c. Explain CGI linkage in client-server application. (06 Marks)
- 7 a. Explain the different control statements used in PhP with a PhP program. (07 Marks)
b. Explain session tracking in web applications. (06 Marks)
c. Write a note on PhP files. (07 Marks)
- 8 a. Write a note on methods in Ruby. (07 Marks)
b. Write a note on dynamic documents in Rails. (06 Marks)
c. Explain the layouts with respect to rails. (07 Marks)

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Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Advanced Computer Architecture

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. Define the term-instruction set architecture. In what way computer architecture is related to ISA? Correlate them. (04 Marks)
- b. Elaborate the different parameters that decide the cost of an IC. Give the equation of each parameter separately and explain them. (06 Marks)
- c. Define the term-CPI and derive the equation for finding the total number of processor cycles needed to execute a program. Consider the execution of an object code with 200,000 instructions on a 20MHz processor. The program consists of four major types of instructions. The instruction mix and the number of cycles (CPI) needed for each instruction is given below based on the result of a program trace experiment.

Sl. No.	Instruction type	C.P.I.	Instruction mix
1	Arithmetic and logic	1	68%
2	Load/store with cache hit	2	8%
3	Branch	4	14%
4	Memory reference with cache hit	8	10%

- i) Find the total number of cycles required to execute the program.
- ii) Calculate the average C.P.I. when the program is executed on a uniprocessor system with the above trace results.
- iii) Calculate the corresponding MIPS rate based on the CPI obtained in (i) above. (10 Marks)
- 2 a. Discuss the various kinds of data dependencies that can cause problems to the smooth flow of instructions through pipelines. Give supporting example in each case and explain with an example how these dependencies can be eliminated. (10 Marks)
- b. Explain the principles of loop unrolling. Demonstrate the normal loop execution and loop unrolling concepts for the following C-code segment by translating the given code segment given below, to MIPS assembly language code.
 C – code: for (i = 1000; i > 0; i = i – 1) X[i] = X[i] + s where s = scalar value.
- i) Calculate the number of clock cycles required per element for both unscheduled and scheduled loops in normal case considering stalls/idle clock cycles.
- ii) Repeat the above step for loop unrolled execution case with and without schedule.
- iii) Calculate the average value of clock cycles per element for the (i) and (ii). (10 Marks)
- 3 a. With reference to Branch Target Buffers (BTBs) explain.
- i) The purpose of each B.T.B. entry and
- ii) The meaning of the following terms and the subsequent action taken for each of the following occurrence of events.
 Case(1): Branch entry found in BTB entry and predicted branch not taken. Case(2): Branch entry found in BTB entry and predicted branch not taken. (08 Marks)
- b. Name the different techniques used for getting high performance of pipelines with multiple delivery techniques. What are integrated instruction Fetch units (IIFU)? Highlight on the basic function of such fetch units. (08 Marks)
- c. Compare register Re-naming technique with that of Re-order buffer technique in speculation concept. (04 Marks)

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- 4 a. With appropriate timing diagrams, explain the concept of delayed branch technique used in RISC processors. What are its limitations and demonstrate the scheduling of branch delay with suitable examples. (10 Marks)
- b. Explain what is branch penalty? Discuss the different techniques used to reduce branch penalties. (06 Marks)
- c. Consider a non-pipelined processor in RISC. Assume that it has 1ns clock cycle and that it uses 4 cycles for ALU operations and branches and 5 cycles for memory operations. Assume that the relative frequencies of these operations are 40%, 20% and 40% respectively. Suppose that due to clock skew and set up, pipelining the processor adds 0.2ns of overhead to the clock. Ignoring any latency impact, how much speed up in the instruction execution rate is achieved from this pipeline? (04 Marks)

PART – B

- 5 a. Explain with the help of appropriate pseudo statements the principle of spinlocks with EXCH synchronization primitive, highlight on its demerits. Explain the modified spinlock primitive pseudocode and its merits. (10 Marks)
- b. Explain the meaning of the following terms used in cache controlled state transition diagram: i) Exclusive; ii) Shared and iii) invalid.
Draw the state transition diagram for:
i) Processor (C.P.U.) requests for each cache block.
ii) Bus requests for each cache block and list all the responds to the events for (i) and (ii) in tabular form. (10 Marks)
- 6 a. Explain the different compiler optimization techniques used to reduce miss rate. (10 Marks)
- b. Explain the process of:
i) Protection via virtual memory.
ii) Protection via virtual machines. (10 Marks)
- 7 a. Explain any four memory hierarchy questions in detail. (08 Marks)
- b. Explain the different techniques used to improve memory performance inside a DRAM chip. (08 Marks)
- c. A parallel processing system – C is having a degree of parallelism = 10. If f = fraction of the operations performed by C and are strictly scalar (cannot be processed in parallel), speed up for the tasks under consideration = 6.5, assuming that all other operations are processed at the maximum possible rate (vector),
i) What is f ?
ii) By how much f be reduced to increase the speed to 9.0? (04 Marks)
- 8 Write short notes on any Four:
a. Benchmarks.
b. Detecting and enhancing loop level parallelism.
c. Hardware support for compiler speculation.
d. Memory consistency models.
e. What makes pipelining hard to implement? (20 Marks)

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10IS72

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Information Systems

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. What is fundamental role of information systems in business? (05 Marks)
b. What is meant by cybernetic system? Explain. (05 Marks)
c. Elaborate the types of information system, with neat diagram. (10 Marks)
- 2 a. List and describe the five basic competitive strategies, with a neat diagram. (10 Marks)
b. How customer focused business builds a customer value and loyalty using internet technologies? Explain. (10 Marks)
- 3 a. Illustrate with a neat diagram, the different stages of a transaction processing cycle and explain them. (08 Marks)
b. Briefly explain the component of target marketing. (08 Marks)
c. State the objectives of computer integrated manufacturing. (04 Marks)
- 4 a. What is SCM? Explain benefits and challenges of SCM. (06 Marks)
b. What is CRM? Explain different phases of CRM. (04 Marks)
c. What is ERP? Explain benefits and challenges of ERP and the costs of ERP. (10 Marks)

PART – B

- 5 a. Explain essential E-Commerce process and process architecture. (12 Marks)
b. State and explain some of the key factors for success in E-Commerce. (08 Marks)
- 6 a. What is DSS? With a neat block diagram, explain the components of web enabled marketing DSS. (10 Marks)
b. Explain on line analytical processing using DSS. (05 Marks)
c. Explain web-based knowledge management system. (05 Marks)
- 7 a. What is Hacking? Explain the common hacking tactics to assault the companies. (10 Marks)
b. Explain: i) Encryption with figure; ii) Firewalls with figure. (10 Marks)
- 8 a. Explain the major components of business/IT planning process and IT architecture. (10 Marks)
b. Describe the top issues in managing international data communication. (10 Marks)

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10IS74

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Data Warehousing and Data Mining

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

- 1
 - a. Give the definition of Data warehousing. With a schematic diagram, explain the working of general Data warehousing architecture. (08 Marks)
 - b. List the major steps involved in ETL process. (08 Marks)
 - c. What is Meta data? Discuss different types of meta data used in Data warehouse. (04 Marks)
- 2
 - a. Explain Codd's OLAP characteristics. (10 Marks)
 - b. Describe data cube operations, with an example. (10 Marks)
- 3
 - a. Discuss the challenges that motivate the development of Data mining. (06 Marks)
 - b. Consider the following vectors. Find i) Simple matching co-efficient ii) Jaccard coefficient iii) Hamming distance. (04 Marks)
 $X = 0101010001$ $Y = 0100011000$.
 - c. Describe any five data preprocessing approaches. (10 Marks)
- 4
 - a. What is Association Analysis? Define Support and confidence, with an example. (04 Marks)
 - b. Develop the Apriori algorithm for frequent itemset generation, with an example. (08 Marks)
 - c. Explain the various measures of evaluating association patterns. (08 Marks)

PART – B

- 5
 - a. Explain the various measures for selecting the best split with an example. (06 Marks)
 - b. Give the difference between rule based ordering and class based ordering scheme. (04 Marks)
 - c. Consider a training set that contain 100 +ve examples and 400 –ve examples for each of the following candidate rule. Determine which is the best and worst candidate according to i) Rule accuracy ii) Foil Information gain. (10 Marks)
 $R1 : A \rightarrow +$ (covers 4 +ve and 1 –ve examples)
 $R2 : B \rightarrow +$ (covers 30 +ve and 10 –ve examples)
 $R3 : C \rightarrow +$ (covers 100 +ve and 90 –ve examples).
- 6
 - a. Explain Bayesian classification. (10 Marks)
 - b. Explain how the predictive accuracy of classification methods be estimated. (10 Marks)
- 7
 - a. Explain desired features of cluster analysis. (10 Marks)
 - b. Explain how distance between a pair of points can be computed. (05 Marks)
 - c. Write short note on density based methods. (05 Marks)
- 8
 - a. Explain web content mining and how it is used for discovering useful information from the web. (10 Marks)
 - b. Write short notes on : i) Spatial data mining ii) Text mining. (10 Marks)

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10CS/IS753

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
JAVA and J2EE

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1
 - a. List and explain JAVA buzzwords. (05 Marks)
 - b. Explain how arrays are defined and used in JAVA with an example. (05 Marks)
 - c. List and explain access specifiers in java and their scope. (06 Marks)
 - d. Explain : i) >>> ii) foreach. (04 Marks)
- 2
 - a. What are command line arguments? While a Java program to read a number as command line argument and check whether it is prime or not. (04 Marks)
 - b. What is an exception? Explain the usage of throw keyword with an example. (06 Marks)
 - c. What is an applet? Write an applet program to display the message “A SIMPLE APPLET”. (06 Marks)
 - d. Distinguish between method overloading and method overriding. (04 Marks)
- 3
 - a. What is thread? Explain two ways of creating a thread in JAVA with example. (10 Marks)
 - b. What is the need of synchronization? Explain with an example how synchronization is implemented in JAVA. (06 Marks)
 - c. What is delegation event model? (04 Marks)
- 4
 - a. Describe the different types of swing buttons. (10 Marks)
 - b. Write the steps to create J-table. Write a program to create a table with column heading “Name, USN and age”. Insert at least 5 records into the table and display. (10 Marks)

PART – B

- 5
 - a. Describe the various steps of JDBC with code snippets. (08 Marks)
 - b. What are transactions? Write a Java program to execute database transaction. (08 Marks)
 - c. Explain: i) Prepared statement ii) Callable statement. (04 Marks)
- 6
 - a. Explain the servlet life cycle with example (06 Marks)
 - b. Define a cookie. Write a servlet program to add a cookie. (07 Marks)
 - c. Write a program to describe parameter reading using servlets. (07 Marks)
- 7
 - a. Define JSP. Explain different types of JSP tags. (10 Marks)
 - b. What is RMI? Explain the server side and client side methods. (10 Marks)
- 8

Write short notes on :

 - a. EJB transaction attributes (05 Marks)
 - b. Session java bean (05 Marks)
 - c. Stateless and stateful session bean (05 Marks)
 - d. Message driven bean. (05 Marks)

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Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
C# Programming and •NET

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1
 - a. Define •NET. Explain the limitation and complexities found within the technologies prior to •NET. Briefly explain how •NET attempts to simplify that. (08 Marks)
 - b. With the help of neat diagram describe the workflow that takes place between your source code, a given •NET compiler and the •NET execution engine. (06 Marks)
 - c. CLS rules apply only to those parts of a type that are expressed outside the defining assembly. Justify with illustration. (06 Marks)
- 2
 - a. Define metadata and manifest. Give the procedure to explore the metadata, manifest and intermediate language using “ildasm.exe”. (06 Marks)
 - b. Describe the meaning of the following C# compiler options :
 i) @ ii) /? iii) /addmodule iv) /baseaddress
 v) /bugreport vi) /checked vii) /codepage viii) /doc. (08 Marks)
 - c. Explain the following aspects of VS•NET (IDE) :
 i) Solution explorer ii) Documenting code Via XML. (06 Marks)
- 3
 - a. Write a C# program that accepts five integers as a command line arguments and prints them in ascending order. The main method definition should have no arguments. (04 Marks)
 - b. Explain the following C# programming aspects with an example :
 i) foreach/in ii) ref iii) params iv) enum. (08 Marks)
 - c. List out the different members of System.Object and explain how would you override the following virtual methods for a user defined class.
 i) ToString ii) Equals iii) GetHashCode(). (08 Marks)
- 4
 - a. With illustration explain the following C# static types :
 i) static methods ii) static data iii) static class
 iv) static constructor v) static properties. (10 Marks)
 - b. What is containment/delegation? Illustrate with appropriate programming snippets. (06 Marks)
 - c. Differentiate between classical and adhoc polymorphism with example. (04 Marks)

PART – B

- 5
 - a. Discuss with illustration how the encapsulation can be enforced using traditional accessors, mutators and class properties. (08 Marks)
 - b. Define errors, bugs and exceptions. Discuss what is the role of •NET exception handling. (06 Marks)
 - c. Write a C# application to illustrate, how to handle multiple exceptions. (06 Marks)
- 6
 - a. What is meant by object lifetime? Describe the role of •NET garbage collection, finalization process and adhoc destruction method with examples. (10 Marks)
 - b. List out atleast five members of System.GC type and give their meaning. (05 Marks)
 - c. Write a C# program to demonstrate a “Generation” objects. (05 Marks)

- 7 a. Differentiate between the following :
- i) Abstract classes and interfaces (08 Marks)
 - ii) Synchronous and asynchronous delegates. (06 Marks)
- b. With an illustration discuss how the interface can be used to implement multiple inheritance. (06 Marks)
- c. Write a program in C# to simulate simple calculator using delegates. (06 Marks)
- 8 a. Mention the major elements of .NET binaries and explain each component. (10 Marks)
- b. Explain the steps involved in building and consuming a multiple assembly. (10 Marks)

SKIT LIBRARY

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Artificial Intelligence

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1
 - a. Explain the properties of task environments with example. (10 Marks)
 - b. Explain the structure of a model based reflex agent with a diagram. (04 Marks)
 - c. Briefly explain the depth limited search and iterative deepening depth first search. (06 Marks)
- 2
 - a. State and prove the conditions that heuristic function $h(n)$ should satisfy so that A^* search is both complete and optimal. (10 Marks)
 - b. Explain how backtracking search is used in solving constraint satisfaction problem with an example. (08 Marks)
 - c. Define a game as a kind of search problem. (02 Marks)
- 3
 - a. Give the PEAS description of Wumpus world. (05 Marks)
 - b. Illustrate the procedure of converting the following sentence into conjunctive normal form.
 $B_{1,1} \Leftrightarrow (P_{1,2} \vee P_{2,1})$ (06 Marks)
 - c. Write BNF grammar of sentences in propositional logic. (06 Marks)
 - d. Define equivalence, validity and satisfiability in logic. (03 Marks)
- 4
 - a. Explain the knowledge engineering process for the domain of electronic circuits. [Refer Fig.Q4(a)] (10 Marks)

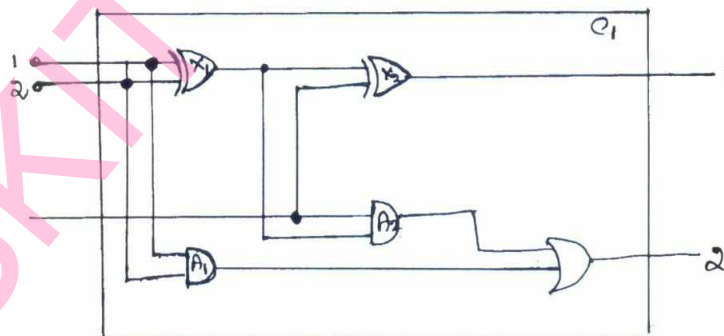


Fig.Q4(a)

- b. Explain the syntax of first order logic with equality, specified in BNF. Give example for each word. (10 Marks)

PART – B

- 5
 - a. The law says that it is a crime for an American to sell weapons to hostile nations. The country Nano, an enemy of America, has some missiles and all of its missiles were sold to it by west, who is American. Prove that west is a criminal using resolution. (12 Marks)

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- b. Determine the color of Fritz from the following knowledge base using (i) forward chaining (ii) backward chaining.
 If x croaks and eats flies, then x is a frog. If x chirps and sings, then x is a canary. If x is a frog, then it is colored green if x is canary, then x is colored yellow. Fritz croaks and eats flies. (08 Marks)
- 6 a. Explain how categories and objects are represented and defined with suitable examples. (06 Marks)
 b. What is situation calculus? Explain the ontology of situation calculus. (06 Marks)
 c. Write short notes on : (i) Semantic networks (ii) Truth maintenance systems. (08 Marks)
- 7 a. The full joint distribution for three variables Toothache, cavity and catch are given below.
- | | Toothache | | \neg Toothache | |
|---------------|-----------|--------------|------------------|--------------|
| | Catch | \neg Catch | Catch | \neg Catch |
| Cavity | 0.108 | 0.012 | 0.072 | 0.008 |
| \neg Cavity | 0.016 | 0.064 | 0.144 | 0.576 |
- Find (i) $P(\text{cavity} | \text{toothache})$
 (ii) $P(\text{toothache} \wedge \text{catch} | \text{cavity})$
 (iii) $P(\text{cavity})$ (06 Marks)
- b. What is a Bayesian network? Explain the semantics of Bayesian network with an example. (10 Marks)
 c. Write ADL description of simple spare fire problem. (04 Marks)
- 8 a. Write the decision tree learning algorithm with an example. (10 Marks)
 b. Explain the issues affecting design of a learning element. (10 Marks)

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10CS/IS765

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Storage Area Networks

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Discuss the key characteristics of a Data Centre, with a neat diagram. (06 Marks)
b. What is information life cycle management? Describe ILM implementation in detail, with its benefits. (10 Marks)
c. Consider a disk I/O system in which an I/O request arrives at the rate of 80 IOPS. The disk service time is 6 ms. Compute (i) Utilization of I/O controller (ii) Total response time. (04 Marks)
- 2 a. Describe RAID levels with reference to nested RAID, RAID 3, RAID 5 with neat diagram. (10 Marks)
b. With the neat diagram, explain the structure of read and write operations in cache. (10 Marks)
- 3 a. Explain connectivity options of FC architecture with relevant diagram. (10 Marks)
b. Explain the components of ISS with reference to LUN and LUN masking with diagram. (06 Marks)
c. Explain FC frame. (04 Marks)
- 4 a. Describe NAS implementation and benefits with neat diagram. (10 Marks)
b. What is iSCSI? Explain protocol stack with neat diagram. (10 Marks)

PART – B

- 5 a. Explain object storage and retrieval in CAS with suitable diagrams. (10 Marks)
b. Discuss storage virtualization types in detail and also discuss its challenges. (10 Marks)
- 6 a. What is information availability? Explain how information availability is defined and measured. (08 Marks)
b. Describe the failure analysis in BC. Mention some important BC technology solutions. (12 Marks)
- 7 a. Explain Pointer based virtual replication with respect to write to source and write to target with neat diagram. (12 Marks)
b. What is remote replication? Explain different modes of remote replication with neat diagram. (08 Marks)
- 8 a. Write a note on risk traid. Explain in detail. (10 Marks)
b. Explain storage management activities in detail, with example. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.