PART –A

1. a) Define preprocessor. What are the functions of pre-processor? [4M]
b) Discuss about the Syntax Error Handling. [4M]
c) Differentiate between shift-reduce and Operator Precedence Parsers. [4M]
d) What are the benefits of intermediate code generation? [3M]
e) What are the various attributes of a Symbol Table? [3M]
f) Mention the issues to be considered while applying the techniques for code optimization. [4M]

PART –B

2. a) Write a regular expression for identifiers and reserved words. Design the transition diagrams for them. [4M]
b) Explain the three general approaches for the implementation of a Lexical analyzer. [8M]
c) Compare compiler and interpreter with suitable diagrams. [4M]

3. a) Why lexical and syntax analyzer are separated out? [3M]
b) Construct the predictive parser for the following grammar
   \[ S \rightarrow (L) \mid a \\
   L \rightarrow L,S \mid S \]
   Give the classification of parsing techniques and briefly explain each. [5M]

c) Parse the input string \texttt{id, int;} using shift-reduce parser for the grammar
   \[ S \rightarrow TL; \\
   T \rightarrow \text{int} \mid \text{float} \\
   L \rightarrow L,id \mid id \]
   b) Write the steps for the efficient construction of LALR parsing table. Explain with an example. [8M]

4. a) Translate the assignment \( x := A[y,z] \) into three address statement. [8M]
b) Define Type Checker. Write down the specification of a simple Type Checker. [8M]

6. a) How symbol table can be managed? Explain. [8M]
b) Discuss storage allocation for block structured languages. [8M]

7. a) Explain in detail about inter procedural optimization with an example. [8M]
b) Discuss in detail the role of dead code elimination and strength reduction during code optimization of a compiler. [8M]
III B. Tech I Semester Regular Examinations, November - 2015
COMPILER DESIGN
(Computer Science and Engineering)

Time: 3 hours MAX. MARKS: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answering the question in Part-A is compulsory
3. Answer any THREE Questions from Part-B

PART –A

1 a) Briefly describe about the Lexical errors. [3M]
   b) What are the functions used to create the nodes of syntax trees? [4M]
   c) What are the three techniques for constructing LR parsing table? [4M]
   d) Discuss the evaluation of semantic rules. [4M]
   e) List the characteristics of peephole optimization. [4M]
   f) Give the criteria for achieving machine independent code optimization. [3M]

PART -B

2 a) Write regular expressions for the set of words having a,e,i,o,u appearing in that order, although not necessarily consecutively. [4M]
   b) Construct NFA equivalent to regular expression r= (a + b)’ab. [8M]
   c) Give general format for LEX program. [4M]

3 a) Show that the grammar S –> 0S1| SS |= is ambiguous. [3M]
   b) Explain the Non-Recursive predictive parsing with an example. [8M]
   c) What are the limitations of recursive descent parser? [5M]

4 a) Write the steps for the construction of CLR parsing table. [8M]
   b) Explain the compaction of LR parsing tables with an example. [8M]

5 a) Write the quadruple, triple, indirect triple for the expression -(a*b) + (c+d)-(a+b+c+d) [8M]
   b) Write an algorithm for constructing the dependency graph for a given parse tree. [8M]

6 a) Construct basic blocks, data flow graph and identify loop invariant statements for the following:
   for (i=1 to n)
   { 
     j=1;
     while (j<=n)
     { 
       A=B*C/D;
       j=j+1;
     } 
   } 

1 of 2
b) Explain how an activation record is related with runtime storage organization. [8M]

7 a) Explain in detail about the instruction scheduling with an example. [8M]
    b) What are the principle sources of optimization? Give the classification of code optimization. [8M]

-000-
III B. Tech I Semester Regular Examinations, November - 2015
COMPILER DESIGN
(Computer Science and Engineering)

Time: 3 hours                                                                 Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
  2. Answering the question in Part-A is compulsory
  3. Answer any THREE Questions from Part-B

PART –A

1 a) Write a LEX program to identify comments in the program. [4M]
  b) Consider the CFG S -> SS+|SS*|a . Derive the string aa+a* from the given
      CFG and construct a parse tree for this string. [5M]
  c) Differentiate between LR and LL Parsers. [3M]
  d) What are the different types of three address statements? [3M]
  e) Compare deep access and shallow access. [3M]
  f) List the properties of optimizing compilers. [4M]

PART –B

2 a) State the reasons for separating Lexical analysis and Syntax analysis [4M]
  b) Describe the lexical errors and various error recovery strategies with suitable
      examples. [8M]
  c) Write a regular expression for relation operators. Design a transition diagram
      for them. [4M]

3 a) What is left recursion and left factoring? [3M]
  b) Verify whether the following grammar is LL(1) or not?
     E → E + T | T
     T → T* F / F
     F → (F) |a|b. [8M]
  c) Discuss about error recovery strategies in predictive parsing. [5M]

4 a) Construct the collection of LR(0) item sets and draw the goto graph for the
    grammar S -> S S | a | ε. Indicate the conflicts (if any) in the various states of
    the SLR parser. [8M]
  b) Explain the process of handling “Dangling-ELSE” ambiguity. [8M]

5 a) Construct the syntax tree and postfix notation for the expression
    (a+ (b*c)) ↑d-e / (f+g). [8M]
  b) Explain in detail how an L-attributed grammar can be converted into a
     translation scheme. [8M]

6 a) Discuss in detail about the Reference counting garbage collectors. [8M]
  b) Explain reducible and non-reducible flow graphs with an example. [8M]

7 a) Explain the role of semantic preserving transformations and dominators in code
    optimization. [8M]
  b) Explain with suitable example various sources of loop optimization. [8M]
PART –A

1 a) Write the regular expression for the language accepting the strings which are starting with 1 and ending with 0, over the set ∑ = {0,1}. [4M]
b) What are the goals of error handler in a parser? [4M]
c) List the properties of LR parser. [4M]
d) Write the need the Semantic analysis. [3M]
e) Describe the structure of entries in symbol table. [4M]
f) Compare local optimization with global optimization. [3M]

PART -B

2 a) Draw a block diagram of phases of a compiler and indicate the main functions of each phase. [8M]
b) Define lexeme, token and pattern. Identify the lexemes that make up the tokens in the following program segment. Indicate corresponding token and pattern.

```c
do swap(int i, int j) {
    int t;
    t=i;
    i=j;
    j=t;
}
```

[8M]

3 a) What is an LL(1) grammar? When the grammar is said to be LL(1) grammar? [3M]
b) Design a non-recursive predictive parser for the following grammar.

```plaintext
S -> AaAb | BbBb
A -> e
B -> e
```

[8M]
c) Discuss how Brute-Force approach operates in top down parsing. [5M]

4 a) Draw the structure of LR parser. [3M]
b) Compute closure(I) and goto(I) for the grammar

```plaintext
S -> Aal Bcl Bcl bBa
A -> d
B -> d
```

[8M]
c) Compare bottom up approaches of parsing with all top down approaches. [5M]
5  a) Construct the syntax tree and draw the DAG for the expression 
(a*b) + (c-d) * (a*b) + b. [8M]
b) Write Syntax directed definition for constructing syntax tree of an expression 
derived from the grammar 
E -> E + T | E – T | T 
T -> (E) | id | num [8M]

6  a) What is Peephole optimization? Explain its characteristics. [8M]
b) Explain with an example optimization of Basic blocks. [8M]

7  a) Discuss how copy propagation can be done using data flow equation. [8M]
b) Explain in detail the procedure that eliminates global common sub-expression. [8M]
III B. Tech I Semester Regular Examinations, November- 2015  
DATA COMMUNICATION  
(Common to CSE and IT)  

Time: 3 hours                                                                         Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)  
2. Answering the question in Part-A is compulsory  
3. Answer any THREE Questions from Part-B  

PART –A

1.  
a) Mention the standard organizations for data communications. [3M]  
b) What are the characteristics of Electromagnetic waves? [4M]  
c) Write a short note on the four predominant methods of Pulse Modulation. [4M]  
d) Define Electromagnetic Radiation. Write the mathematical representation of power density. [3M]  
e) Write a short note on Multi Frequency and Dial Pulses. [4M]  
f) What is Redundancy? Write about Character and Message Redundancy. [4M]

PART –B

2.  
a) What is meant by Network Topology? Draw and explain the structure of all Multipoint Topologies. [8M]  
b) What is Electrical noise? Write in brief the most prevalent types of Electrical noise. [8M]

3.  
a) Explain in detail about the single-mode and multi-mode step-index optical fiber. [10M]  
b) What are the advantages of optical fiber cables? [6M]

4.  
a) What is Time-Division Multiplexing? Explain with block diagram. [8M]  
b) Draw and explain Single-Channel, Simplex PCM transmission system. [8M]

5.  
a) What are Microwaves? What are the advantages and disadvantages of Microwave Radio Communications? [8M]  
b) Explain the terms:  
   (i) Satellite Elevation categories. [3M]  
   (ii) Satellite orbits and orbital patterns. [5M]

6.  
a) Explain in detail about First Generation Analog Cellular Telephone system. [10M]  
b) Draw and explain the GSM system Architecture. [6M]

7.  
a) Classify and explain Data Communication Character Codes. [8M]  
b) Explain Voice-Band Modem with block diagram. [8M]
III B. Tech I Semester Regular Examinations, November - 2015  
DATA COMMUNICATION  
(Common to CSE and IT)  
Time: 3 hours  
Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)  
2. Answering the question in Part-A is compulsory  
3. Answer any THREE Questions from Part-B

PART –A

1 a) Write a short note on layered network architecture. [3M]  
b) List out the advantages of Optical Fiber cables. [4M]  
c) Write about Linear versus Non-linear PCM codes. [4M]  
d) What is meant by Diffraction? [3M]  
e) Define FDMA and write about AMPS identification codes. [4M]  
f) What are DSU and CSU? [4M]

PART –B

2 a) Depicting the organization of layers, Explain the open system interconnection model. [10M]  
b) Explain Amplitude Modulation with a neat sketch. [6M]  

3 a) Write a brief note on the predominant losses in optical fiber cables. [10M]  
b) Explain how optical fiber is constructed with a diagram. [6M]  

4 a) What is Digital Line Encoding? Explain any four factors that should be considered when selecting Line Encoding format. [8M]  
b) What is COMPANDING? Write about ANALOG COMPANDING. [8M] 

5 a) Write a detailed note on Satellite Multiple-Accessing arrangements. [8M]  
b) Define and explain Free-Space path loss and Skip Distance. [8M]  

6 a) What is CDMA? Explain in Detail. [10M]  
b) Write a brief note on GSM Services. [6M]  

7 a) Classify and explain Bar Codes. [8M]  
b) Explain about Asynchronous Voice-Band Modems with a neat Sketch. [8M]  

-000-
III B. Tech I Semester Regular Examinations, November-2015
DATA COMMUNICATION
(Common to CSE and IT)

Time: 3 hours                                                           Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
       2. Answering the question in Part-A is compulsory
       3. Answer any THREE Questions from Part-B

PART –A

1 a) Write in brief about Serial and Parallel Data Transmission. [4M]
     b) List out the disadvantages of optical fiber. [3M]
     c) What is PCM Line speed? Represent it mathematically. [4M]
     d) What is skip distance? [3M]
     e) What are N-AMPS? [4M]
     f) Write about the classification of Voice-Band Modem. [4M]

PART –B

2 a) Explain in detail about the TCP/IP protocol suite. [8M]
     b) Explain Digital Modulation with the help of a simplified block diagram. [8M]

3 a) Explain how light propagate through optical fiber. [8M]
     b) Explain the characteristics of Electromagnetic waves. [8M]

4 a) Explain in detail about Frequency Division Multiplexing. [8M]
     b) Discuss about DIGITAL COMPANDING. [8M]

5 a) Write in detail about the optical properties of Radio Waves. [10M]
     b) Explain about Ground Wave and Space Wave Propagation. [6M]

6 a) Describe Time-Division Multiple Accessing. [8M]
     b) Explain about AMPS identification codes. [8M]

7 a) What is meant by Redundancy Checking? Explain four basic types of Redundancy Checks. [10M]
     b) Write a detailed note on Synchronous Voice Band Modem. [6M]
PART –A

1 a) What is a network topology? Classify different network topologies. [3M]
b) Write about the modes of propagation of light through optical fiber. [4M]
c) What is Multiplexing? Define Time Division Multiplexing. [4M]
d) What are the advantages of Microwave Radio Communication? [4M]
e) Write in brief about Random and Broadcast control channels. [4M]
f) List the Modem operational modes. [3M]

PART –B

2 a) Discuss in detail about Peer-to-Peer and Dedicated Client/Server networks. [10M]
b) Define Information Capacity and explain about M-ary Encoding. [6M]

3 a) Draw and explain the optical fiber communication system. [8M]
b) List out the advantages and disadvantages of optical fiber transmission. [8M]

4 a) Write a detailed note on Wavelength Division Multiplexing. [8M]
b) For a 20-channel PCM/TDM system with an 8-KHz sample rate, 10 bits per sample and one framing bit per frame, determine the Line speed. [4M]
c) Write a short note on SONET. [4M]

5 a) Draw the block diagram of Simplex Microwave Radio Link and explain it. [8M]
b) Discuss about Geosynchronous satellites [8M]

6 a) Explain about Basic Telephone Call Procedures. [8M]
b) Write about the functions of the Telephone Set in detail [8M]

7 a) Write a detailed note on Retransmission and Forward Error Correction. [8M]
b) What is the significance of Modem Equalizer in Modem Synchronization? [8M]
III B. Tech I Semester Regular Examinations, November- 2015
DATABASE MANAGEMENT SYSTEMS
(Common to CSE and IT)

Time: 3 hours                                                                         Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answering the question in Part-A is compulsory
3. Answer any THREE Questions from Part-B

PART –A

1 a) What is DBA? Mention the functionalities of DBA. [3M]
b) What is a view? Explain it. [4M]
c) Describe the properties of a relation. [4M]
d) What is Functional Dependency? Explain it briefly. [4M]
e) Illustrate lost update problem with suitable example. [4M]
f) What is the purpose of file header? [3M]

PART –B

2 a) Draw and explain the detailed system architecture of DBMS. [8M]
b) What are the advantages of DBMS? [4M]
c) Describe the concept of client/server model. [4M]

3 a) Explain in detail about various key constraints used in database system. [10M]
b) Explain the importance of Null values in Relational Model. [6M]

4 a) Discuss the mechanism of attribute relationship inheritance. How is it useful? [8M]
b) By considering an example describe various data update operations in SQL. [8M]

5 a) Explain insertion, deletion and modification anomalies with suitable examples. [8M]
b) State BCNF. How does it differ from 3NF? [8M]

6 a) Draw transaction state diagram and describe each state that a transaction goes through during its execution. [8M]
b) Explain in detail about timestamp based concurrency control techniques. [8M]

7 a) Explain in detail about internal hashing Techniques. [8M]
b) Discuss in detail about cluster and Multilevel indexes. [8M]
III B. Tech I Semester Regular Examinations, November - 2015
DATABASE MANAGEMENT SYSTEMS
(Common to CSE and IT)

Time: 3 hours                                                                 Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answering the question in Part-A is compulsory
3. Answer any THREE Questions from Part-B

PART –A

1 a) List different types of database users. [4M]
b) Mention various DML operations with examples. [4M]
c) Explain the difference among Entity, Entity Type & Entity Set [4M]
d) Briefly describe BCNF. [3M]
e) Briefly discuss about different types of schedules. [4M]
f) List out the operations that can be performed on files. [3M]

PART –B

2 a) Discuss the main characteristics of the database approach and specify how it differs from traditional file system. [8M]
b) Explain in detail about the three tier schema architecture of DBMS. [8M]

3 a) Describe the concept of Referential Integrity. [8M]
b) List and explain the common data types available in SQL. [8M]

4 a) Differentiate specialization and generalization. [8M]
b) What is a view? How views are implemented? [8M]

5 a) What is meant by the closure of functional dependencies? Illustrate with an example. [7M]
b) State 1NF, 2NF & 3NF and explain with examples. [9M]

6 a) Discuss about different types of failures. [8M]
b) What is 2-phase locking protocol? How does it guarantee serializability? [8M]

7 a) Explain in detail about external hashing techniques. [8M]
b) By considering an example, show how to reduce access time with primary index. [8M]
PART –A

1. a) List out the characteristics of database system. [3M]
    b) Distinguish between primary and super keys. [4M]
    c) Specify and explain various structural constraints of relationship type. [4M]
    d) Mention the desirable properties of relation decomposition. [4M]
    e) Describe Wait/Die & Wound/Wait protocols. [4M]
    f) Differentiate between internal and external hashing. [3M]

PART –B

2. a) Discuss the activities of different database users. [8M]
    b) Briefly describe various architectures of database systems. [8M]

3. a) Write a short notes on i) Foreign Key ii) Relation state iii) Database schema. [12M]
    b) Write and explain the structure of SQL SELECT statement with suitable example. [4M]

4. a) Discuss in detail about the concepts of E-R model with suitable examples. [8M]
    b) What is a group function? List and explain how to use group functions in SQL with appropriate examples. [8M]

5. a) State the Armstrong inference rules. Provide suitable examples to describe each. [8M]
    b) Show how to preserve Functional Dependencies during decomposition. [8M]

6. a) Why the concurrency control is needed? Explain it. [8M]
    b) Write and explain optimistic concurrency control algorithm. [8M]

7. a) When does a collision occur in hashing? Illustrate various collision resolution techniques. [8M]
    b) Describe different methods of defining indexes on multiple keys. [8M]

-000-
III B. Tech I Semester Regular Examinations, November - 2015  
DATABASE MANAGEMENT SYSTEMS  
(Common to CSE and IT)  

Time: 3 hours                                                                 Max. Marks: 70  

Note: 1. Question Paper consists of two parts (Part-A and Part-B)  
2. Answering the question in Part-A is compulsory  
3. Answer any THREE Questions from Part-B  

PART –A  

1 a) What is Data Independence? Why is it essential? [4M]  
b) Define Database Schema Explain it with example. [4M]  
c) Write Syntax of SQL Order By and Group By clauses. [4M]  
d) Define Surrogate Key. Explain it. [3M]  
e) Explain WAL protocol. [4M]  
f) Brief extendible hashing scheme. [3M]  

PART –B  

2 a) Compare the database system with conventional file system. [8M]  
b) Describe in detail about two-tier and three-tier client-server architectures. [8M]  

3 a) Explain the importance of avoiding NULL values in a database. [4M]  
b) Write short notes on  
   i) DDL  ii) DML  iii) Database Schema. [12M]  

4 a) Explain about various constraints used in ER-model. [8M]  
b) Differentiate between independent and correlated nested queries. [8M]  

5 a) What is normalization? Explain its need. [4M]  
b) Discuss in detail about various normal forms. [12M]  

6 a) Write short notes on:  
   i) Phantom Record  ii) Repeatable Read  iii) Incorrect Summary  
   iv) Dirty Read. [8M]  
b) Describe Wait/Die and Wound/Wait deadlock protocols. [8M]  

7 a) Discuss in detail about primary file organization. [8M]  
b) By considering relevant example, show insertion and deletion operations on a B-Tree. [8M]  

-000-
PART –A

1. a) Define Operating System. List the objectives of an operating system. [3M]
   b) With a neat diagram, explain various states of a process. [4M]
   c) Give the Peterson’s solution to the Critical section problem. [4M]
   d) Distinguish between Logical and Physical address space. [3M]
   e) What are the necessary conditions for the occurrence of deadlock? [4M]
   f) What are the various attributes that are associated with an opened file? [4M]

PART –B

2. a) With a neat diagram, explain the layered structure of UNIX operating system. [8M]
   b) What are the advantages and disadvantages of using the same system call interface for manipulating both files and devices? [8M]

3. a) What is a process? Explain about various fields of Process Control Block. [8M]
   b) What are the advantages of inter-process communication? How communication takes place in a shared-memory environment? Explain. [8M]

4. a) What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy. [8M]
   b) What is Dining Philosophers problem? Discuss the solution to Dining philosopher’s problem using monitors. [8M]

5. a) What is a Virtual Memory? Discuss the benefits of virtual memory technique. [8M]
   b) What is Thrashing? What is the cause of Thrashing? How does the system detect Thrashing? What can the system do to eliminate this problem? [8M]

6. a) What is a deadlock? How deadlocks are detected? [8M]
   b) Explain the Resource-Allocation-Graph algorithm for deadlock avoidance. [8M]

7. a) Briefly explain about single-level, two-level and Tree-Structured directories. [8M]
   b) Explain and compare the SCAN and C-SCAN disk scheduling algorithms. [8M]
III B. Tech I Semester Regular Examinations, November-2015
OPERATING SYSTEMS
(Common to CSE and IT)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answering the question in Part-A is compulsory
3. Answer any THREE Questions from Part-B

PART – A

1 a) Explain how multiprogramming increases the utilization of CPU. [3M]
b) What are the advantages of inter-process communication? Also explain various implementations of inter-process communication. [4M]
c) What is a Semaphore? Also give the operations for accessing semaphores. [4M]
d) What is the purpose of Paging and Page tables? [3M]
e) What are the various methods for handling deadlocks? [4M]
f) Briefly explain the indexed allocation method. [4M]

PART – B

2 a) Explain the Dual-Mode operation of an operating system. [8M]
b) Mention the objectives and functions of Real-Time Embedded systems. [8M]

3 a) With a neat sketch, explain the process state diagram. [8M]
b) What are the criteria for evaluating the CPU scheduling algorithms? Why do we need it? [8M]

4 a) What is a semaphore? List the types of semaphores and Show that, if the wait() and signal() semaphore operations are not executed atomically, then mutual exclusion may be violated. [10M]
b) Discuss the Bounded-Buffer problem. [6M]

5 a) What is a page fault? Explain the steps involved in handling a page fault with a neat sketch. [8M]
b) Consider the following page reference string:
   1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
   How many page faults would occur for the optimal page replacement algorithm, assuming three frames and all frames are initially empty. [8M]

6 a) Write about deadlock conditions and bankers algorithm in detail. [10M]
b) Discuss various techniques to recover from the deadlock. [6M]

7 a) Write in detail about file attributes, operations and types and structures. [8M]
b) Explain in detail about various ways of accessing disk storage. [8M]
III B. Tech I Semester Regular Examinations, November-2015  
OPERATING SYSTEMS  
(Common to CSE and IT) 

Time: 3 hours Max. Marks: 70  

Note: 1. Question Paper consists of two parts (Part-A and Part-B)  
2. Answering the question in Part-A is compulsory  
3. Answer any THREE Questions from Part-B  

PART –A  
1 a) What are the various security issues that arise in multiprogramming and time shared systems? [3M]  
b) Describe the differences among short-term, medium-term, and long-term scheduling. [4M]  
c) Briefly explain the Readers-Writers problem. [4M]  
d) What are the disadvantages of single contiguous memory allocation? [3M]  
e) Explain the various ways of aborting a process in order to eliminate deadlocks. [4M]  
f) What is the drawback of Network-attached storage systems? [4M]  

PART -B  
2 a) With a neat sketch, describe the services that an operating system provides to users, processes and other systems. [8M]  
b) Distinguish between client-server and peer-to-peer models of distributed systems. [8M]  

3 a) Define a Thread? Give the benefits of multithreading. What resources are used when a thread is created? How do they differ from those used when a process is created? [8M]  
b) Explain the Round Robin scheduling algorithm with a suitable example. [8M]  

4 a) State the Critical Section problem. Illustrate the software based solution to the Critical Section problem. [8M]  
b) How does the signal() operation associated with monitors differ from the corresponding operation defined for semaphores. [8M]  

5 a) What are the disadvantages of single contiguous memory allocation? Explain. [6M]  
b) Discuss the hardware support required to support demand paging. [10M]  

6 a) How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail. [10M]  
b) Is it possible to have a deadlock involving only a single process? Explain. [6M]  

7 a) Explain the various methods for free-space management. [10M]  
b) Discuss various issues involved in selecting appropriate disk scheduling algorithm. [6M]  

-000-
III B. Tech I Semester Regular Examinations, November-2015
OPERATING SYSTEMS
(Common to CSE and IT)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answering the question in Part-A is compulsory
3. Answer any THREE Questions from Part-B

PART –A
1 a) Explain the importance of Real-Time Embedded systems. [3M]
   b) Define Thread. Write the differences between user-level and kernel-level threads. [4M]
   c) Define Monitor. Explain how it overcomes the drawback of semaphores. [4M]
   d) Explain how demand paging affects the performance of a computer system. [4M]
   e) Write about Resource-Allocation graph. [4M]
   f) Explain the bit vector representation of free space management. [3M]

PART -B
2 a) What is a System call? Explain the various types of system calls provided by an operating system. [8M]
   b) What is the purpose of interrupts? What are the differences between a trap and an interrupt? Can traps be generated by a user program? Explain the purpose with an example. [8M]

3 a) Distinguish between preemptive and non-preemptive scheduling. Explain each type with an example. [8M]
   b) Describe the actions taken by a thread library to context-switch between user-level threads. [8M]

4 a) What is synchronization? Explain how semaphores can be used to deal with n-process critical section problem. [8M]
   b) Discuss Mutual-exclusion implementation with test and set() instruction. [8M]

5 a) Explain the difference between External fragmentation and Internal fragmentation. How to solve the fragmentation problem using paging. [8M]
   b) Discuss various issues related to the allocation of frames to processes. [8M]

6 a) Discuss the necessary conditions that cause deadlock situation to occur. [8M]
   b) Discuss various methods for the prevention of deadlocks. [8M]

7 a) Explain the Indexed allocation of disk space. [8M]
   b) Explain and compare the FCFS and SSTF disk scheduling algorithms. [8M]
III B. Tech I Semester Regular Examinations, November - 2015

PRINCIPLES OF PROGRAMMING LANGUAGES
(Computer Science and Engineering)

Time: 3 hours                                                               Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answering the question in Part-A is compulsory
3. Answer any THREE Questions from Part-B

PART –A

1 a) What constitutes a programming environment?  [3M]
b) What mixed-mode assignments are allowed in C and Java?  [4M]
c) What is an alias? What are the problems associated with it?  [4M]
d) What is attribute grammar? Explain how attribute grammar is use for evaluation of the expressions.  [4M]
e) What is type inferencing used in ML?  [3M]
f) What is the difference between checked and unchecked exception in java?  [4M]

PART -B

2 a) What is the difference between a sentence and a sentential form in a CFG?  [4M]
b) Explain with an example how the weakest precondition for a logical pretest loop is derived.  [8M]
c) A concise and understandable description of a programming language is essential to the language’s success. Comment on this.  [4M]

3 a) What are the merits of sub range types?  [3M]
b) Explain in detail various design issues of character string types.  [8M]
c) What is a variable and what are the attributes of a variable? Elaborate on address of a variable.  [5M]

4 a) Discuss the following term:
   i) Dangling pointers, ii) Tail recursion elimination.  [10M]
b) Explain associative arrays, their structure and operations.  [6M]

5 a) What is the difference between the way original C and C89 deal with an actual parameter whose type is not identical to that of the corresponding formal parameter?  [8M]
b) Discuss in detail overloaded operators.  [8M]

6 Discuss how producer-consumer problem and Dining philosopher’s problem are solved using concurrency in ADA.  [16M]

7 a) For what sort of application logic programming is useful? Briefly explain.  [8M]
b) What are existential queries? Briefly explain.  [8M]
PART –A

1  
   a) What do you mean by a general purpose language? Is C a general purpose language?  
      [3M]  
   b) Give an example of left recursive rule in CFG. What is the significance of left  
      recursive rule?  
      [4M]  
   c) What do you mean by binding? Give examples of some of the bindings and their  
      binding times.  
      [4M]  
   d) Consider the following C program:  
      int fun(int _ i) {  
        *i+=5;  
        return 4;  
      }  
      void main {  
        int x=3;  
        x=x+fun (&x)  
      }  
      What is the value of x after assignment statement in main method assuming i.  
      operands are evaluated left to right?  
      [4M]  
   e) What are advantages and disadvantages of dynamic local variables?  
      [3M]  
   f) What is type inferencing used in ML?  
      [4M]  

PART –B

2  
   a) Explain the process of compilation in each phase of a compiler.  
      [8M]  
   b) Give some reasons why computer scientists and professional software developers  
      should study general concepts of language design and evaluation.  
      [8M]  

3  
   a) Discuss about Context-free grammar and regular expression? Give the parse tree of a  
      following statement: A = (B+C) * (D / E).  
      [8M]  
   b) Consider the following pseudo code.  
      Procedure P (A, B: real)  
      X: real  
      Procedure Q (B, C: real)  
      Y: real  
      . . .  
      Procedure R (A, C: real)  
      Z: real  
      . . . (*)&  
      . . .  
      Assuming static scope, what is the referencing environment at location marked by (*)?

1 of 2
4 a) Explain in detail arrays, indices, subscript bindings, and array categories.  
    b) What are the problems posed by managing a heap of single-size cell and variable-size cell? Explain in detail various methods for reclaiming garbage.

5 a) Discuss precedence and associativity rules of different programming languages.  
    b) Explain in detail multiple selection constructs.

6 a) What are the characteristics of co-routine feature? List the languages which allow co-routines.  
    b) How to implement generic functions in C++?

7 a) Define monitor? Explain how cooperation synchronization and competition synchronization are implemented using monitors.  
    b) Write a prolog description of your family tree (based only on facts), going back to your grandparents and including all descendants. Be sure to include all relationships.

-000-
III B. Tech I Semester Regular Examinations, November - 2015
PRINCIPLES OF PROGRAMMING LANGUAGES
(Computer Science and Engineering)

Time: 3 hours                                                                         Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answering the question in Part-A is compulsory
3. Answer any THREE Questions from Part-B

PART –A
1 a) Differentiate between Hybrid Interpretation and Pure Interpretation. [3M]
b) Write short notes on Short Cut evaluation. [4M]
c) What are the design issues for exception handling in JAVA? [3M]
d) Differentiate In mode and Out Mode parameter passing mechanisms. [4M]
e) With respect to the object oriented programming, briefly explain virtual functions. [3M]
f) What are the three features of Haskell that makes very different from schema? [4M]

PART –B
2 a) What are the main features of the programming paradigm with examples? [8M]
b) Define CFG? What does it mean for CFG to be ambiguous? [8M]
3 a) (i) Explain Dijkstra’s selection construction and loop structure. [8M]
(ii) Explain with examples user-located loop control mechanisms provided by various languages.
b) What is meant by type checking? Differentiate between static type checking and dynamic type checking and give their relative advantages. [8M]
4 a) Discuss the significance of holes in the records. Why they do and what problem do they cause? [8M]
b) Explain the difference between virtual and non-virtual methods. [8M]
5 a) Describe three alternative means of allocating co-routine stacks. What are their relative strengths and weaknesses? [8M]
b) What is dangling-else problem? Discuss How it can be handled by the programming language. [8M]
6 a) Explain the following terms : [6M]
b) Message passing [5M]
c) Concurrency in Ada [5M]
c) Monitors. [5M]
7 a) For what sort of application logic programming is useful? Briefly explain. [8M]
b) Write a LISP function fib(n) that computes nth Fibonacci number. [8M]
III B. Tech I Semester Regular Examinations, November - 2015  
PRINCIPLES OF PROGRAMMING LANGUAGES  
(Computer Science and Engineering)  

Time: 3 hours  
Max. Marks: 70  

Note: 1. Question Paper consists of two parts (Part-A and Part-B)  
2. Answering the question in Part-A is compulsory  
3. Answer any THREE Questions from Part-B  

*****  

PART –A  

1 a) Briefly write about Virtual Machines. [3M]  
b) What are the advantages of user-defined data types? [4M]  
c) How does C support relational and Boolean expressions? [3M]  
d) Explain with example how operand-evaluation order interacts with functional side effects. [4M]  
e) Write a short note on ‘this’ pointer in C++. [3M]  
f) Explain about LISP interpreter. [4M]  

PART -B  

2 Explain language evaluation criteria and the characteristics that affect them. [16M]  

3 a) Define syntax and semantics. [5M]  
b) The levels of acceptance of any language depend on the language description. Comment on this. [5M]  
c) Define grammars, derivation and a parse tree. [6M]  

4 a) What are dangling pointers and lost heap-dynamic variables? How are they created? [8M]  
b) What are the problems posed by managing a heap of single-size cell and variable-size cell? Explain in detail various methods for reclaiming garbage. [8M]  

5 Discuss about the various attributes of a good language and explain the process of evaluating attributes with example. [16M]  

6 a) Write an analysis of the similarities and differences between java packages and C++ namespaces. [8M]  
b) Explain how information hiding in provided in an ADA package. [8M]  

7 a) Discuss about basic elements of prolog. Give examples. [8M]  
b) Explain how data abstraction is implemented in ADA. [8M]  

-000-