B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Computer Science and Engineering

CS 010 605 – SOFTWARE ENGINEERING [CS]

(New Scheme – 2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. For what types of project waterfall model can be used?

2. What is a work breakdown structure? Give example.

3. Outline the need for modeling an use case diagram.

4. Define data abstraction. Give example.

5. What is a test case? Give example.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. What is a prototype? Classify prototypes and discuss the same.

7. Outline the features of CASE tools.

8. Develop a complete use case for the following activity: Searching for books (on a specific topic) using an on-line book store.

9. Explain top-down design with an example.

10. What is boundary value analysis? Explain with an example.

(5 × 5 = 25 marks)

Part C

Answer all the questions.

Each question carries 12 marks.

11. Compare the waterfall life cycle model and incremental life cycle model.

Or

12. Discuss rapid application development model. What are the rapid application development model strengths? What are the rapid application development model deficiencies? When to use the rapid application development model?

13. Explain with an example COCOMO II empirical estimation model.

Or

14. What is software configuration management? List and explain the activities involved in software configuration management.

15. What is an analysis model? Outline the elements of the analysis model.

Or

16. What is a software requirements specification? Prepare a software requirement specification for a "Library Management System".

17. What is coupling? Explain the different types of coupling with an example.

Or

18. Compare function oriented and object oriented design. Give example.

19. What is cyclomatic complexity? Explain with an example how to construct a flow graph for a program and compute cyclomatic complexity.

Or

20. (a) Explain alpha testing and beta testing.

    (b) What is regression testing? Why regression testing? Give example.

[5 × 12 = 60 marks]

G 5422   (Pages : 2)   Reg. No................................

                                                      Name..................................

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Computer Science and Engineering

CS 010 606 L01—DISTRIBUTED SYSTEMS (Elective I) (CS)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1 Define ubiquitous computing.

2 Is multicost used in group communication ? Defend your answer.

3 What do you mean by mobility transparency and performance transparency ?

4 Show the importance of linearizability as a correctness criteria.

5 Explain phantom deadlock. Give example.

                                                      (5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6 Explain the limitations of middleware.

7 Illustrate with examples, the reliability and ordering of multicast.

8 Identify the file system modules and brief on them.

9 Briefly discuss the features of scheduling algorithms.

10 Write short notes on Network Partitioning.

                                                      (5 × 5 = 25 marks)

Part C

Answer all questions.

Each full question carries 12 marks.

11 (a) What are architectural styles ? Specify two architectural styles and elaborate them with
         necessary diagrams.

                                    Or

                                                      Turn over

(b) Define VMTP. Highlight the peculiar features of VMTP and discuss them in detail.

12 (a) State and explain cristian's method for synchronizing clocks.

Or

(b) Explain group communication in detail. Specify its key areas of application.

13 (a) With a neat sketch, describe the architecture of Google file system.

Or

(b) Provide a basic architectural model for the management of replicated data and explain replication.

14 (a) Define threads. State the design issues and explain them in detail.

Or

(b) Write short notes on :

    (i) Process migration mechanisms.

    (ii) Byzantine failures.

15 (a) With a neat illustration, explain distributed DBMS architecture in detail.

Or

(b) Explain in detail, distributed database recovery using 2PC with necessary diagrams.

$(5 \times 12 = 60$ marks)

G 5426

Reg. No..............................

Name..............................

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Computer Science Engineering/Information Technology

CS 010 606 L04/IT 010 606 L03—UNIX SHELL PROGRAMMING (Elective I) [CS, IT]

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. What are the features of Unix operating system ?

2. How do you access command line arguments from a shell script ?

3. Display the first 3 lines of text from a file using sed editor command.

4. Write a shell script to arrange the given numbers in ascending order.

5. List the differences between background processes and foreground processes.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Brief the attributes of a file contained in Unix inode.

7. Using filters and pipes, write a script to remove the duplicate lines present in a file. Brief the filters used for this purpose.

8. Explain the shell commands grep, egrep and fgrep with examples.

9. Write a note on the different environmental variables present in Unix.

10. With a neat diagram, explain the software architecture of X window system.

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each full question carries 12 marks.

11. Explain the architecture of Unix with a neat diagram.

Or

Turn over

12. Discuss the following process utilities with their unix commands :

    (a) Running system programs.   (4 marks)

    (b) Process states and attributes.   (4 marks)

    (c) Creation and termination of processes.   (4 marks)

13. (a) State the purpose of tee command in Unix with an example.   (3 marks)

    (b) Write about the system call pipe. Give an example which uses pipe.   (3 marks)

    (c) Illustrate the cycle of command execution by Unix.   (6 marks)

Or

14. Explain the following filters with examples :

    (a) More.   (3 marks)

    (b) CMP.   (3 marks)

    (c) Tr.   (3 marks)

    (d) Uniq.   (3 marks)

15. Discuss about the features of sed and explain the usage of regular expressions with sed commands.

Or

16. Describe the string and mathematical functions present in AWK with examples.

17. (a) Explain the different conditional expressions available in korn shell.   (6 marks)

    (b) Demonstrate the usage of 'eval command' with an example.   (6 marks)

Or

18. Explain debugging entire or part(s) of the Bash script with suitable examples.

19. Discuss the implementation of processes in Unix.

Or

20. Explain the client-server architecture model in Unix with a neat diagram.

                                                              [5 × 12 = 60 marks]

G 5357   (Pages : 2)   Reg. No..............................

Name..................................

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Computer Science and Engineering

CS 010 602—INTERNET COMPUTING (CS)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. Define Encapsulation. Give an example.

2. What is a thread ? Give the two ways for creating a thread.

3. Write a brief note on AWT event hierarchy.

4. State the reasons for multicasting.

5. List the uses of image filters.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Demonstrate any *five* bitwise operators in Java with sufficient examples.

7. What are parametrized constructors ? Demonstrate with an example.

8. Write a brief note on the classes and methods used to read and write files in Java.

9. Brief the importance of Java's URL class with an example.

10. Create an image object and demonstrate loading and displaying operations using the same.

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each question carries 12 marks.

11. (a) Illustrate the scope and life time of variables with examples.   (8 marks)

    (b) Write a Java program to perform addition and subtraction of two matrices. Elements are stored in a 2D array.   (4 marks)

Or

Turn over

12. (a) Write a Java program using if-else-if ladder to determine which season a particular month is in.

(6 marks)

    (b) List the jump statements supported by Java and demonstrate their use with examples.

(6 marks)

13. (a) Explain the types of inheritance with necessary examples.   (8 marks)

    (b) How can an interface inherit another interface ? Brief with an example.   (4 marks)

Or

14. Discuss exception handling in Java and write a program to read 10 marks and compute its average. Throw an exception when a mark less than 0 or a mark greater than 100 is entered and handle the same.

15. (a) Write the syntax of 'Applet' tag and explain its components.   (6 marks)

    (b) How can a collection be accessed using an iterator ? Give example.   (6 marks)

Or

16. How can the different mouse events be handled ? Demonstrate with an example.

17. Write a Java program to implement socket programming using Datagram class.

Or

18. What is meant by remote method invocation ? Explain the steps to build a simple client/server application using RMI.

19. (a) Explain the life cycle of a servlet.   (4 marks)

    (b) Write a program to display employee id, name and address from a database using JDBC.

(8 marks)

Or

20. Discuss about the classes and method used to process images in Java with examples.

[5 × 12 = 60 marks]

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Computer Science and Engineering

CS 010 603—SYSTEM SOFTWARE (CS)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. State the need for application software and list any *four* application software.

2. What are the different assembler directives ?

3. Bring out the differences between linking loaders and linkage editors.

4. Present the capabilities of a debugger.

5. Define the functions of a device driver.

(5 × 3 = 15 marks)

Part B

Answer all questions
Each question carries 5 marks.

6. What are nested macros ? Give examples.

7. What is meant by forward references ? Brief with an example.

8. Highlight the two techniques used for relocation with suitable examples.

9. Mention the three categories of editors and brief their functions.

10. Write an interrupt service routine to deactivate a device and explain.

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each question carries 12 marks.

11. Describe the basic functions and machine independent features of macro preprocessors.

Or

12. Design a two-pass macroprocessor and explain the data structures used.

Turn over

13. Design a two pass assembler and explain the data structures used. Also state the necessity of two passes.

Or

14. Discuss the machine independent features of assemblers.

15. Explain the algorithm to design an absolute loader. Also state the advantages and disadvantages of absolute loader.

Or

16. What is meant by automatic library search ? Explain its implementation in a loader.

17. (a) Present an overview of the editing process with an example.   (6 marks)

    (b) Discuss about user interface, the conceptual model of the editing system.   (6 marks)

Or

18. Explain the techniques for debugging a system software.

19. (a) Present the anatomy of a device driver using a block diagram. Explain the role of the components involved.

                                                                                                        (6 marks)

    (b) Write the major functions on the driver initialization code.   (6 marks)

Or

20. Explain the different block and character device drivers and highlight their advantages and disadvantages.

                                                                                                [5 × 12 = 60 marks]

G 5182

Reg. No.................................

Name.................................

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Computer Science and Engineering/Information Technology

SOFTWARE ENGINEERING (RT)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 4 marks.

1. Why iterative model is widely used ? Discuss.

2. What are software metrics ? Why software metrics ?

3. Why use cost estimation ? Discuss.

4. What does software configuration management process deal with ? Discuss.

5. Define abstraction and explain the same with an example.

6. Explain functional cohesion with an example.

7. What is static analysis good for ? Discuss.

8. Present a simple example for symbolic execution and discuss the same.

9. What is software testing ? Why software testing.

10. Distinguish between black box testing and white box testing.

(10 × 4 = 40 marks)

Part B

Answer all questions.
Each question carries 12 marks.

11. Diagrammatically illustrate and discuss the spiral life cycle model.

Or

12. What is a software requirements specification document (SRS) ? What is the purpose of SRS ? How the customer's requirements are defined in the SRS ? Discuss.

Turn over

13. What is cost estimation model ? Explain the basic COCOMO model.

Or

14. List and discuss the contents of a quality assurance plan.

15. Explain top down and bottom up design strategies with example.

Or

16. What is coupling ? Explain content coupling, common coupling and control coupling with example.

17. Explain the structured approach to program development with an example.

Or

18. What are code inspections ? Why code inspections ? Discuss the deliverables of code inspections.

19. (a) Explain unit testing with an example.

(6 marks)

(b) Define reliability ? What is reliability assessment ? Discuss.

(6 marks)

Or

20. (a) Why is it necessary to develop test cases for both valid and invalid input condition ? Explain with example.

(6 marks)

(b) What is state based testing ? Explain with an example.

(6 marks)

[5 × 12 = 60 marks]

G 5211   (Pages : 2)   Reg. No..................................

Name.................................

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Computer Science and Engineering/Information Technology

NETWORK COMPUTING [R, T]

(Old Scheme – Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. Name the common lists used in designing a web page. Explain each in two statements.

2. Explain the different methods to include style contents in a web document.

3. Differentiate static and dynamic HTML with an example.

4. Write a program using Java Script to check if a string is palindrome or not.

5. Discuss parameterized constructors with an example.

6. Write an exception handler to catch divide by zero error.

7. Give the necessity of applets in communication.

8. Compare and contrast iterative and concurrent servers.

9. Demonstrate HTTP GET and HTTP PUT methods with an example.

10. Brief the significance of POP protocol as an application layer protocol.

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each question carries 12 marks.

11. Write a HTML script to display an image with a border of size '2' width of 200 and a height of 200. The image when clicked should link to a search engine and should be opened in a new window. Explain the tags used.

Or

12. Explain absolute and relative positioning of elements in a form with suitable illustrations.

13. Write a Javascript program to remove duplicate items from an array of '*n*' elements.

Or

14. Explain document object model with examples.

15. Elaborate on the implementation and application of interfaces with an example.

Or

16. Create a simple GUI using AWT controls.

17. Explain the methods defined by applets for networking.

Or

18. Discuss the structure and working of a simple RMI program.

19. Explain the different HTTP methods used in server side scripting.

Or

20. Explain the working of a CGI supported web server with a block diagram.

(5 × 12 = 60 marks)

G 5383

(Pages : 3)

Reg. No..

Name..

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Computer Science and Engineering

CS 010 604—COMPUTER NETWORKS (CS)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Define unicast, broadcast and multicast.

2. What is bit stuffing ? Give example.

3. Outline the functions performed by a LAN switch.

4. Illustrate diagrammatically congestion in a packet-switched network.

5. What is a peer to peer network ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Illustrate diagrammatically a switched network and discuss the same.

7. Encode the following bits 0 0 1 0 1 1 1 1 0 1 0 0 0 0 1 0 using NRZ and Manchester encoding.

8. Illustrate virtual circuit switching with an example and diagrammatic illustration.

9. Explain connection establishment and termination in TCP with diagrammatic illustration.

10. Outline the activities involved in network management.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.
Each question carries 12 marks.

11. (a) Explain frequency division multiplexing and synchronous time-division multiplexing with an example.

(8 marks)

(b) Compare LANs, MANs and WANs.

(4 marks)

Or

12. Explain with diagrammatic illustration the layers in the open systems interconnection architecture.

(12 marks)

13. Suppose we want to transmit the message 1 0 1 1 0 0 1 0 0 1 0 0 1 0 1 1 and protect it from errors using the CRC-8 polynomial $x^8 + x^2 + x^1 + 1$.

(a) Use polynomial long division to determine the message that should be transmitted.

(6 marks)

(b) Suppose the leftmost bit of the message is inverted due to noise on the transmission link, what is the result of the receiver's CRC calculation ? How does the receiver know that an error has occurred ?

(6 marks)

Or

14. (a) Suppose you are designing a sliding window protocol for a 1-Mbps point-to-point link to the moon, which has a one-way latency of 1.25 seconds. Assuming that each frame carries 1 KB of data, what is the minimum number of bits you need for the sequence number ?

(4 marks)

(b) Explain with diagrammatic illustration an Ethernet repeater and an Ethernet hub.

(8 marks)

15. (a) Illustrate diagrammatically an extended LAN with loops and show the spanning tree that corresponds to the extended LAN.

(8 marks)

(b) How bridges forward unicast frames from one LAN to another ? Illustrate with an example.

(4 marks)

Or

16. What is routing ? Explain distance-vector routing algorithm with an example.

17. Explain with diagrammatic illustration the working of remote procedure call.

Or

18. Explain with an example and diagrammatic illustrations additive increase/multiplicative decrease mechanism implemented by TCP for congestion control.

19. (a) Explain with an example and diagrammatic illustration how DNS implements a hierarchical name space for Internet objects.

(6 marks)

(b) Given a hierarchy of name servers, how a client engages these servers to resolve a domain name ? Explain with an example.

(6 marks)

Or

20. Explain with an example how Hyper Text Transport protocol can be used to communicate between Web browsers and Web servers.

[5 × 12 = 60 marks]

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Computer Science Engineering/Information Technology

CS 010 601/IT 010 605—DESIGN AND ANALYSIS OF ALGORITHMS (CS, IT)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

*Answer **all** questions.*
Each question carries 3 marks.

1. Write an algorithm to compute n^{th} Fibonacci number and find its complexity using table method.

2. Give the control abstraction for divide and conquer method.

3. Find all the feasible solution and an optimal solution to the Knapsack instance :

$$n = 3, m = 20, (p_1, p_2, p_3) = (25, 24, 15) \text{ and } (w_1, w_2, w_3) = 18, 15, 10 .$$

4. Mention the advantages of state space trees.

5. What is an approximation algorithm ? Give example.

(5 × 3 = 15 marks)

Part B

*Answer **all** questions.*
Each question carries 5 marks.

6. Show that the following equalities are correct :

(i) $2n^2 2^n + n \log n = \theta\left(n^2 \cdot 2^n\right).$ (ii) $n! = 0\left(n^n\right).$

7. Compute the running time of quicksort algorithm if an array A contains district elements and is sorted in descending order.

8. Explain the general procedure of dynamic programming and present its merits and demerits.

9. Solve to puzzle problem using branch and bound strategy.

10. Write an approximate algorithm to solve vertex cover problem with a suitable example.

(5 × 5 = 25 marks)

Turn over

Part C

*Answer **all** questions.*
Each full question carries 12 marks.

11. Write an algorithm to sort 'n' elements using selection sort and trace its steps with an example.

Or

12. Develop an algorithm for any recursive problem of your choice and derive its time complexity. Prove its correctness by induction.

13. Use divide and conquer approach to find the maximum and minimum elements in an array containing 'n' elements. Derive its time complexity and compare its performance with two individual function MAX and MIN performing the same operations.

Or

14. Write an algorithm to sort 'n' numbers using merge sort. Show the intermediate steps in sorting the numbers 45, 82, 60, 9, 122, 11 and 80. Also derive its time complexity.

15. Write the Prim's algorithm to construct a minimum cost spanning tree. Apply the algorithm to the given graph and compute a MST :
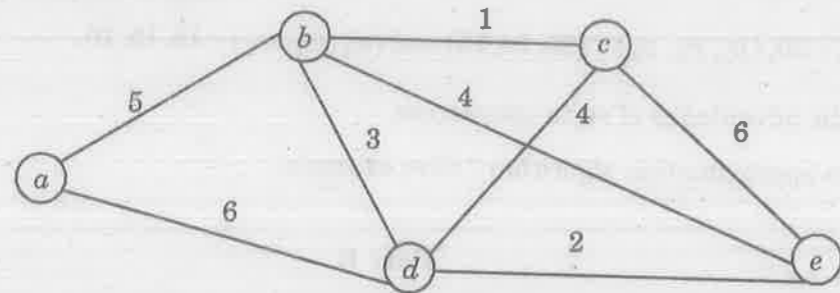
Or

16. Devise an algorithm using dynamic programming to solve travelling salesman problem and apply the same to the given directed graph and its edge lengths :

Graph 'G'
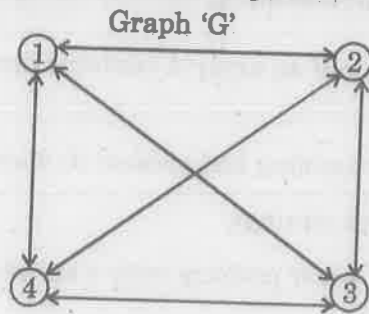
edge length

$$\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 9 & 0 \end{bmatrix}$$

17. Write an algorithm to find all the solutions to the N Queens problem and explain how it works for W = 4.

Or

18. Explain FIFO, LIFO and Least Cost (LC) search methods used in branch and bound algorithmic strategy with suitable examples.

19. Discuss Rabin Karp string matching algorithm with an example and analyze its time complexity.

Or

20. What are comparison trees ? Explain how these trees are used to derive the lower bounds for searching and sorting algorithms.

$(5 \times 12 = 60 \text{ marks})$