G 355   (Pages : 2)   Reg. No....................................

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

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Computer Science and Engineering / Information Technology

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

(New Scheme – 2010 Admissions onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. What are Recursive algorithm? Explain with a simple example.

2. Explain the notion of Control Abstraction.

3. Describe Monte Carlo method.

4. What is Minimum Cost Spanning Tree?

5. What is your idea behind Topological sorting?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Explain Time and Space complexity.

7. Compute the cost associated with element comparison with the help of an example.

8. Compare and contrast Divide and Conquer approach with Dynamic programming.

9. Write notes on Fixed tuple and Variable tuple formulation.

10. Explain Deterministic and Non-deterministic algorithms.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Explain the Asymptotic Notations and analyses their Worst, Best and Average case complexity.

Or

12. Solve the following recurrence relation :

    (a) $T(n) = T(n/2) + n.$

    (b) $T(n) = T(n/3) + T(2n/3) + n.$

13. Using Divide and Conquer approach, explain Matrix multiplication and its complexity.

Or

14. Explain Merge Sort and analyse its complexity.

15. Explain Kruskal's Algorithm with an example and analyse its complexity.

Or

16. Explain All Pair Shortest Path problem and find the complexity. Also explain how it is solved.

17. Solve N-Queens problem and justify its complexity analysis.

Or

18. State 15-puzzle problem. Mention the best method to solve it on the basis of complexity.

19. Describe Vertex Cover Algorithm. Is it NP–complete.

Or

20. Describe any *one* string matching algorithm in detail. Analyse its complexity.

(5 × 12 = 60 marks)

G 376　　　　　　　(Pages : 2)　　　　　Reg. No..................................

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B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Information Technology

(IT 010 603) INFORMATION THEORY AND CODING (IT)

Time : Three Hours　　　　　　　　　　　　　　　　　　　Maximum : 100 Marks

Part A

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

1. What is entropy. State their properties.

2. State and explain Shannon Theorem.

3. What is Huffman Coding ?

4. Explain briefly Linear Block Coder.

5. Explain Stack Algorithm.

(5 × 3 = 15 marks)

Part B

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

6. Find the entropy in a single roll of a standard six sided die.

7. Explain the trade-off between band width and signal to noise ratio.

8. State and prove Kraft's Inequality.

9. Explain about BCH codes.

10. Briefly explain Viterby algorithm.

(5 × 5 = 25 marks)

Part C

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

11. A source emits one of four symbols S_0, S_1, S_2 and S_3 with probabilities $\frac{1}{3}, \frac{1}{6}, \frac{1}{4}$ and $\frac{1}{4}$, respectively. The successive symbols emitted by the source are statistically independent. Calculate the entropy of the source, code efficiency and redundancy.

(12 marks)

Or

Turn over

12. (a) State and prove the properties of Mutual Information.   (6 marks)

(b) Define code efficiency and redundancy in detail.   (6 marks)

13. Explain Channel Coding Theorem. What is its application to Binary Symmetric Channels.

(12 marks)

Or

14. State and prove Shannon-Hartley theorem for the channel capacity of a band limited AWGN channel.

(12 marks)

15. (a) State and prove source Coding Theorem.   (4 marks)

(b) Explain construction of instantaneous codes.   (4 marks)

(c) Can the Huffman method be applied to a two symbol alphabet ? Explain with reasons.

(4 marks)

Or

16. Use Shannon-Fano encoding to encode $S = \{S_1, S_2, S_3, S_4, S_5, S_6, S_7, S_8\}$ with

$P = \left\{ \frac{1}{4}, \frac{1}{4}, \frac{1}{8}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}, \frac{1}{16}, \frac{1}{16} \right\}$, $X = \{0, 1\}$. Find H, code efficiency and redundancy.

(12 marks)

17. The generator polynomial of a $(15, 11)$ Hamming code is defined by :   (12 marks)

$$g(X) = 1 + X + X^4.$$

Develop the encoder and syndrome calculator for this code, using a systematic form for the code.

Or

18. Explain in detail :

(a) BCH codes.   (4 marks)

(b) RS codes.   (4 marks)

(c) Burst Error Correction.   (4 marks)

19. Briefly explain ML decoding of convolutional codes.   (12 marks)

Or

20. Explain Block and Convolutional Interleaving.   (12 marks)

[5 × 12 = 60 marks]

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Information Technology

IT 010 604 – SOFTWARE ENGINEERING

(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 is Software Engineering?

2. What are use cases?

3. What is Transform mapping?

4. Define Debugging.

5. Identify the risks and risk types.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Define Software process. State the important features of a process.

7. What are the objectives of Requirements modeling?

8. Write short notes on user interface design process.

9. What do you mean by Software Reliability?

10. Describe any *three* product and process attributes.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.
Each question carries 12 marks.

11. Write short notes on the Unified Process.

Or

12. Explain briefly about Waterfall model. What are its advantages and disadvantages?

13. Write short notes on Behavioral modelling.

Or

14. Explain briefly about scenario based modelling.

15. Explain briefly the commonly used architectural styles in software design.

Or

16. Explain in detail the characteristics and criteria for a good design.

17. Write short notes on Software Quality Assurance.

Or

18. What are the benefits of Model Based Testing?

19. Explain briefly the organization of a Software Project Plan document.

Or

20. What are the responsibilities of a Software Project Manager?

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

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Information Technology

IT 010 601 – COMPUTER NETWORKS (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. List the benefits of a layered network Architecture.

2. Differentiate between Persistent and Non-persistent CSMA.

3. Distinguish between Datagrams and Virtual circuits.

4. Draw the structure of the UDP header and explain the purpose of the individual fields.

5. What is the role of DNS in the Internet? Describe the format of the DNS resource records.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Distinguish between LANs, MANs and WANs.

7. Write notes on pure ALOHA. How does it differ from slotted ALOHA?

8. Differentiate between adaptive and non adaptive routing algorithms. Write notes on the concept of using flooding as a routing mechanism.

9. Describe the Jacobson's algorithm used by TCP for retransmission timer management. How does Karn's algorithm improve the same?

10. Distinguish between piconets and scatternets in Bluetooth Networks.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each question carries 12 marks.

11. Explain the ISO OSI reference model for networks in detail.

Or

12. Write detailed notes on the various network transmission media.

13. Describe the salient features of 802.3 Ethernet.

Or

14. Describe the various functions of the data link layer in detail.

15. Explain the link state routing algorithm in detail.

Or

16. What are the various approaches used for preventing and controlling congestion in networks ? Explain.

17. What is meant by the ATM Adaptation Layer ? Describe the various AAL protocols.

Or

18. Describe the format of the TCP header and explain the purpose of the individual fields. Write brief notes on TCP connection management.

19. Describe the various protocols used for the transmission and delivery of E-mails. What is the role of MIME with regard to E-mail ?

Or

20. Explain the role of the Link Manager Protocol, Service Discovery Protocol and L2CAP in Bluetooth networks.

(5 × 12 = 60 marks)

G 416

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

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

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Computer Science and 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? Explain.

2. What is a pipe?

3. List some of the applications of awk.

4. Explain the features of KORN Shell.

5. Explain the use of Telnets.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Explain the process utilities.

7. Explain briefly with example job control.

8. Bring out the user defined functions. Explain the uses of these functions.

9. What are environmental variables? Explain with examples.

10. Give a brief description of Client Server Mechanisms.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*

Each question carries 12 marks.

11. Explain the Process utilities and Disk utilities with examples.

Or

12. Give a brief description of UNIX File System.

13. With examples, explain Command execution and Command substitution.

Or

14. What is a filter? Explain the filter utilities of UNIX.

15. Using grep, explain with example how the file searching is done?

Or

16. With examples, discuss the applications of awk, grep and sed.

17. Discuss the features of different types of shells.

Or

18. Explain the command history and command execution process.

19. Give a brief description of process creation and methods of sending signals to processes.

Or

20. Explain with proper examples the network management.

(5 × 12 = 60 marks)

G 430

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

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

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Information Technology

IT 010 606 L04—ADVANCED DATABASE SYSTEMS (Elective I) (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 a note on federated database management systems.

2. What is meant by type constructor ?

3. What is data warehouse ?

4. Define integrity and consistency.

5. What is meant by decision support query ?

(5 × 3 = 15 marks)

Part B

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

6. Write a note on homogeneous and heterogeneous DDBMS.

7. What is versioning ? What is the difference between Versions and Configurations ?

8. Compare OLTP with OLAP.

9. Define Normalization. What are the desirable properties of normalization ?

10. Write a note on intraquery parallelism.

(5 × 5 = 25 marks)

Part C

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

11. Explain the advantages and disadvantages of using distributed DBMS.

Or

Turn over

12. (a) Explain distributed query processing techniques.

    (b) Explain vertical fragmentation with example.

13. With examples, explain Object Definition Languages (ODL) and Object Query Languages (OQL).

Or

14. (a) Explain the schemes for implementing persistence within object oriented DBMS.

    (b) Write a note on multiversion locks.

15. (a) Explain multidimensional data model. How is it used in data warehousing ?

    (b) Write a note on mobile databases.

Or

16. (a) Explain classification techniques.

    (b) Briefly explain data warehouse architecture.

17. (a) Construct an ER diagram for a car-insurance company that has a set of customers, each of whom owns one or more cars. Each car has associated with it zero to any number of recorded accidents.

    (b) Write a note on temporal databases.

Or

18. (a) Write a note on database tuning.

    (b) Explain query optimization techniques.

19. (a) Briefly explain multimedia databases.

    (b) Describe the benefits and drawbacks of using pipelined parallelism.

Or

20. (a) Write a note on image databases.

    (b) Briefly explain deductive databases.

(5 × 12 = 60 marks)

G 446 (Pages : 2)

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Information Technology

PROJECT MANAGEMENT (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. Write a note on classification of Project Costs.

2. Briefly discuss the application of Probability theory to Project development.

3. What is the favourable effect of benefit analysis on a project ?

4. Write a note on softwares used for analysis of a market.

5. What are the advantages of project control ?

6. What is the effect of organisational behaviour on a project ?

7. Define productive maintenance.

8. Discuss the importance of ISI.

9. How will you reduce errors in sampling ?

10. Classify sampling schemes.

(10 × 4 = 40 marks)

Part B

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

11. Discuss the various challenges in Project Management and the solution strategies for each.

(12 marks)

Or

12. Differentiate between a project development and product development. Explain how they are inter-related.

(12 marks)

Turn over

13. Discuss the effect of analytical tools on forecasting in Project Management.   (12 marks)

Or

14. Explain the methodologies for project analysis. Explain this with few schematic diagrams.

(12 marks)

15. Discuss the role of control systems in minimizing duration of a project.   (12 marks)

Or

16. Discuss the process of project review and evaluation in various types of long-term projects.

(12 marks)

17. What are the various ISO system series for quality management ? Discuss.   (12 marks)

Or

18. Discuss how the methodologies of total quality management varies from product to product ?

(12 marks)

19. Discuss the importance of choosing a proper size of samples for different types of populations.

(12 marks)

Or

20. Explain different schemes for estimating statistical response variables of population. (12 marks)

[5 × 12 = 60 marks]

G 454

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

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

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Computer Science and Engineering/Information Technology

SOFTWARE ENGINEERING (R, T)

(Old Scheme—Supplementary/Mercy Chance)

[Prior to 2010 Admissions]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 marks.

1. Explain the Automated Cross Referencing method for SRS validation.

2. Differentiate between Monitoring and Control Phase and Termination Analysis Phase.

3. Explain the characteristics of the "egoless team" and the "democratic team" structuring philosophies.

4. What all important information must a Software Configuration Management Plan generally have ?

5. How does modularity help a software system ? When do we call a software system modular ?

6. What do you mean by Stability Metrics for a design ?

7. Comment on the importance of Internal Documentation.

8. What do you mean by Unit Testing ? Explain how it is carried out during code verification.

9. What are Test Oracles ? Explain their necessity.

10. What are the major issues in testing classes in an Object Oriented Software ?

(10 × 4 = 40 marks)

Part B

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

11. (a) What do you mean by Requirement Review ? How is it carried out ? Comment on its effectiveness.

(8 marks)

(b) What are the advantages of Phased Development Process of software ? (4 marks)

Or

12. Explain the methods of Structured Analysis of requirements by using DFDs and Data Dictionaries.

Turn over

13. What do you mean by Risk Assessment ? How is it carried out ? Give any *six* major risk items that can be anticipated in a software project, and associated techniques to manage them.

Or

14. Explain the purpose of Software Assurance Plan. What are the tasks involved in SQAP ?

15. Explain in detail, any one approach for Design Verification.

Or

16. Explain the general design principles that are applicable to most of the software design approaches.

17. How does Proof of correctness method differ from error detection method for code verification ? Explain.

Or

18. (a) Explain the Law of Demeter for object oriented programs.   (6 marks)

    (b) Explain in detail, the Code Inspection and Review process.   (6 marks)

19. Illustrate Data Flow Based Testing with an example.

Or

20. (a) Explain the basic levels of Testing.   (6 marks)

    (b) What is a Test Plan ? What all information does it contain ?   (6 marks)

[5 × 12 = 60 marks]

G 495

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

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

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Information Technology

PERSONAL COMPUTER HARDWARE (T)

(Old Scheme—Supplementary/Mercy Chance)

[Prior to 2010 Admissions]

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer **all** questions briefly.*
Each question carries 4 marks.

1. List the different types of connectors found on modern motherboards.

2. How the functions of keyboard and mouse controllers are provided by the parts of a motherboard ?

3. What is the size and address range of UMA ?

4. List a few interface standards used for interfacing hard disk drives.

5. What are the interfaces available in a PC for attaching CD-ROM drives to the PC ?

6. Distinguish data encoding techniques in hard disks and CD-ROM discs.

7. Explain extended memory and expanded memory. What are the differences ?

8. Explain the role of Cache memory in a PC.

9. Compare the performance of ISA and EISA buses.

10. Explain the functioning of AGP slots in a PC.

(10 × 4 = 40 marks)

Part B

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

11. (a) Explain the basic functions of North Bridge and South Bridge of a motherboard chip set.

(8 marks)

(b) Where does a PC keep the hardware configuration details ? Explain. (4 marks)

Or

12. Explain the various power supply voltage values required in a PC. With neat diagrams, show how each one of these are derived ?

Turn over

13. (a) Clearly explain how binary levels are stored and retrieved from a magnetic media.

(6 marks)

(b) Describe the arrangements in hard disks for parking the read/write heads when power fails suddenly.

(6 marks)

Or

14. (a) How do you install a floppy disk drive, hard disk drive, and CD-ROM drive in a modem PC ?

(6 marks)

(b) Explain the function and working of a floppy disk controller in a PC.   (6 marks)

15. Explain the working principle of magneto-optical drives in detail.

Or

16. What are WORM devices ? Explain their principle of working and applications.

17. With neat diagrams, explain the flat memory model and video memory clearly.

Or

18. Explain with the help of circuit diagrams, the static and dynamic semiconductor memory cells. How the read and write operations are performed ?

19. Interface an 8 bit output port to the ISA bus in memory mapped I/O scheme. Draw the circuit diagram and explain.

Or

20. (a) Explain the basic functions of USB host and USB devices.   (6 marks)

(b) Describe the design of memory expansion board for the ISA bus.   (6 marks)

[5 × 12 = 60 marks]

19. Design an ideal lowpass filter with frequency response :

$$H\left(e^{jw}\right) = 1 \quad \text{for} \quad -\tfrac{\pi}{2} \le w \le \tfrac{\pi}{2}$$

$$= 0 \quad \text{for} \quad \tfrac{\pi}{2} \le |w| \le \pi$$

find the value of $h(n)$ for N = 11.

(12 marks)

Or

20. Determine eight point DFT of the real signal $x[n] = [2, 0, -2, 1, -1]$ using radix-2 DITFFT algorithm.

(12 marks)

(5 × 12 = 60 marks)

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Information Technology

IT 010 602—DIGITAL SIGNAL PROCESSING (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. Draw the block diagram of digital signal processing system and explain the use of each block.

2. What are the conditions for the existance of Fourier transform of a sequence $x[n]$?

3. Define the Region of convergence of z-transform and state its properties.

4. Explain any *two* structures of realization of FIR filters.

5. What is the relation between DFT and DTFT ?

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Given $x[n] = [2, -3, 4, 5, 7, 10]$ sketch $x(n-5)$ and $x[5-n]$.

7. Find the step response of the system whose impulse response is given by $2^n \cup [n]$.

8. The signal $x(t) = 1 + \cos 8\pi t + \sin 4\pi t$ is sampled twice the Nyquist rate. Find the sample values over one fundamental period of $x(t)$.

9. What is meant by finite word length effects in digital filters and list any *two* ?

10. Show that discrete time Fourier Transform is periodic in frequency with period 2π.
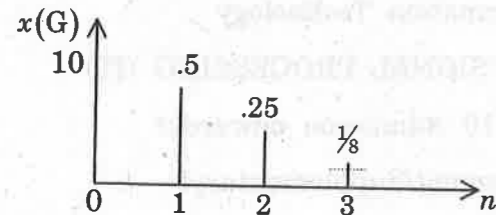
(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each full question carries 12 marks.

11. (a) A discrete time signal $x[n]$ is shown in figure :

sketch and label

 (i) $x(n) \cup (1-n)$; (ii) $x(n) \cup (n+2)$; (iii) $x(n).\delta(n-1)$. (6 marks)

 (b) Check the linearity, memory, causality and time invariance of a discrete time system described

 by the difference equation $y(n) = \frac{1}{3}\big[x(n) + x(n-1) + x(n-2)\big]$.

    (6 marks)

Or

12. (a) Determine whether or not each of the following :—

 Signals is periodic. If a signal is periodic determine its fundamental period.

$$x[n] = e^{j(\pi/4)n}, \quad x[n] = \cos^2(\pi/8)n$$

$$x[n] = \cos n + \sin \sqrt{2}\, n.$$

    (6 marks)

 (b) If $x_1(n)$ and $x_2(n)$ are two periodic sequences with fundamental period N_1 and N_2, under what conditions is the sum $x[n] = x_1[n] + x_2[n]$ periodic and what is the fundamental period of $x[n]$ if it is periodic.

    (6 marks)

13. (a) Find the convolution of the following sequences :

$$x_1[n] = 2\delta(n+1) - \delta(n) + \delta(n-1) - 3\,\delta(n-2),$$

$$x_2(n) = 3\delta(n+1) + 4\,\delta(n-1) + \delta(n-3).$$

    (6 marks)

 (b) Show that convolution is associative.   (6 marks)

Or

14. (a) Two discrete time LTI systems H_1 and H_2 having impulse response $h_1(n) = (\frac{1}{3})^n \cup (n)$ and $h_2(n) = (\frac{1}{4})^n \cup (n)$ respectively are connected in cascade. Compute the impulse response of the combination.

    (6 marks)

 (b) Find the inverse discrete time Fourier transform of $X(\Omega) = 2 + 2\cos\Omega + 4\sin 2\Omega$.

    (6 marks)

15. (a) Determine the z-transform and their ROC of the following discrete time signal

$$x(n) = (.5)^n \cup (n) + (.8)^n \cup (-n-1).$$

    (6 marks)

 (b) State and prove time-shifting property of z-transform. (6 marks)

Or

16. (a) Determine the transfer function and impulse response for the LTI system described by the difference equation

$$y(n) - \frac{1}{4}y(n-1) - \frac{3}{8}y(n-2) = x(n) + 2x(n-1).$$

    (6 marks)

 (b) The transfer function of discrete time LTI system is given by $H(z) = \dfrac{1}{\left(1 - \frac{1}{2}z^{-1}\right)\left(1 - 2z^{-1}\right)}$.

 Find the impulse response of the stable system corresponding to this transfer function.

    (6 marks)

17. Obtain the Direct Form I, Direct Form II, Cascade and Parallel form realisation for the system

$$y(n) = -0.1y(n-1) + 0.2y(n-2) + 3x(n) + 3.6x(n-1) + 0.6x(n-2).$$

    (12 marks)

Or

18. (a) Explain coefficient quantization effects in direct form realisation of IIR filter. (6 marks)

 (b) Explain about fixed point and floating point data representation. (6 marks)

Turn over