G 1428

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Information Technology

IT 010 603—INFORMATION THEORY AND CODING (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. State and explain Shannon's source coding theorem.
2. Explain briefly Linear Block Codes.
3. What is Huffman Coding ?
4. Define hamming weight and hamming distance. How many errors can be detected and corrected for a (7, 4) hamming code.
5. Explain Stack algorithm.

(5 × 3 = 15 marks)

Part B

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

6. Describe the steps involved in algorithm to generate an (n, k) cyclic code.
7. Explain the Viterbi algorithm.
8. Explain BCH codes.
9. Find the entropy in a single roll of a standard six sided die.
10. Explain the principle of ZIP coding.

(5 × 5 = 25 marks)

Part C

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

11. (a) State and prove source coding theorem. (4 marks)

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

    (c) Can Huffman method be applied to a two symbol alphabet ? (4 marks)

Or

Turn over

12. Explain channel coding theorem. What is its application to Binary Symmetric Channels ?

(12 marks)

13. (a) A discrete memory less source emits independent sequence of symbols from an alphabet consisting of five symbols once in every two milliseconds. The symbols are :

A	B	C	D	E
$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{5}{16}$

Find the entropy of source and information rate.

(6 marks)

(b) Given the alphabet A = {a, b, c} and P_A = {0.7, 0.1, 0.2}, code the string 'a b c', using arithmetic coding scheme.

(6 marks)

Or

14. (a) State and prove properties of entropy. (6 marks)

(b) Prove I (X ; Y) = H(X) – H(X/Y). (6 marks)

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

(12 marks)

Or

16. 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)

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

Or

18. Explain channel coding theorem. What is its application to Binary Symmetric Channels ?

(12 marks)

19. 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, cod efficiency and redundancy.

(12 marks)

Or

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

[5 × 12 = 60 marks]

G 1443 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Information Technology

IT 010 604—SOFTWARE ENGINEERING (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. Define Software process.
2. Brief Eliciting requirements.
3. What do you understand by design ?
4. What do you mean by Debugging ?
5. Explain "The Stakeholders" in the context of The Management Spectrum.

(5 × 3 = 15 marks)

Part B

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

6. Explain Generic Process Model.
7. Write a note on Developing Use cases.
8. Explain Modularity.
9. Explain White box testing.
10. Explain Project Scheduling.

(5 × 5 = 25 marks)

Part C

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

11. Explain :
    (i) Prescriptive process models ;
    (ii) Personal and Team process models.

Or

Turn over

12. What is an Agile Process ? Discuss any three Agile Process models.

13. Draw block diagrams and explain Class based modelling.

Or

14. Explain :

    (i) scenario based modelling ;

    (ii) Patterns for requirements modelling.

15. Draw a diagram of the "Dimensions of the design model" and explain.

Or

16. Explain :

    (i) User Interface Analysis and Design.

    (ii) Component based development.

17. Explain Test Strategies for object-oriented software.

Or

18. Explain :

    (i) Test strategies for web applications.

    (ii) Control structure testing.

19. Write notes on :

    (i) Measuring Quality ;

    (ii) Process metrics.

Or

20. Explain Empirical estimation models.

(5 × 12 = 60 marks)

G 1457 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

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. What is a Router ?
2. What are the functions of datalink layer ?
3. List some of the routing algorithms.
4. What are internet transfer protocols ?
5. What is DNS ?

(5 × 3 = 15 marks)

Part B

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

6. Describe the TCP/IP Reference Model.
7. What are the static and dynamic allocation of LAN and WAN ?
8. Explain Leaky bucket algorithm.
9. What are the principal characteristics of ATM ?
10. Illustrate Mobile Telephone systems.

(5 × 5 = 25 marks)

Part C

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

11. Explain the ISO-OSI reference model in detail.

Or

12. Describe the various network hardware used in the network.

Turn over

13. Explain in detail error detection and correction codes.

Or

14. Explain the various sliding window protocols.

15. Explain any two routing algorithms in detail.

Or

16. Explain any two congestion control algorithms.

17. Describe the various transport protocols elements.

Or

18. Explain Remote procedure call in detail.

19. Describe the architecture of Email.

Or

20. What is Bluetooth ? What are the L2CAP layers of Bluetooth ?

(5 × 12 = 60 marks)

G 1494 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

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. Give the block diagram of a generic layering scheme for query processing in distributed database.
2. What is Persistance ?
3. Explain the goals of data mining.
4. What is database tuning ?
5. Explain inferences and convoy effect in parallel database systems.

(5 × 3 = 15 marks)

Part B

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

6. Explain vertical fragmentation.
7. What are the new data types supported in object data base systems ?
8. Explain how query processing and optimization is done in mobile database.
9. Explain a spatial databases.
10. Explain some of the multimedia database Applications.

(5 × 5 = 25 marks)

Part C

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

11. Explain the characterization of query processors.

Or

12. Explain the time-stamp-based concurrency control method.

Turn over

13. Explain the approaches of object oriented Data bases.

Or

14. Explain in detail :

    (a) Multiversion locks.

    (b) Recovery in object oriented databases.

15. Explain OLAP data model and OLAP servers in detail.

Or

16. Discuss the coaching, directory management and transection management of Mobile Database.

17. Discuss the different types of Normalization with examples.

Or

18. Explain the procedure of the design of temporal databases.

19. Explain the parallel data bases techniques and problems.

Or

20. Explain the design and implementation issues of deductive data bases.

(5 × 12 = 60 marks)

20. (a) Evaluate and compare the 8-point for the following sequence. Using DIT-FFT algorithm :

$$x(n) = \begin{cases} 1 & \text{for } -3 \le n \le 3 \\ 0 & \text{otherwise} \end{cases}.$$

(b) Why impulse invariant method is not preferred in the design of IIR filter other than low-pass filter ?

(5 × 12 = 60 marks)

G 1415 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

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. Find whether the following are static or dynamic :
   (i) $y(n) = x(n)\, x(n-1)$
   (ii) $y(n) = x^2(n) + x(n)$.
2. Find the fourier transform of $u(n)$ and $u(n-k)$.
3. State sampling theorem and what is aliasing effect ? A band limited continuous time signal with higher frequency f_m s.
4. Draw the direct-form I realization structure of a 3rd order system.
5. What do you understand by a fixed-point number ?

(5 × 3 = 15 marks)

Part B

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

6. What are the classifications of discreate-time systems ? Find whether the systems are causal or non-causal.
   (i) $y(n) = x(n) + 1/x(n-1)$.
   (ii) $y(n) = x(n^2)$.
7. Derive the interconnection of LTI systems for cascade connection of two systems.

8. Find the Z-transform and ROC of the causal sequence $x(n) = \{1, 0, 3, -1, 2\}$. Explain the convolution property of Z-Transform.

9. Determine the direct form II realization for the following system :

$y(n) = -0.1\, y(n-1) + 0.72 y(n-2) + 0.7\, x(n) - 0.252\, x(n-2)$.

10. Compute the eight-point DFT of the sequence $x(n) = \{0.5, 0.5, 0.5, 0.5, 0, 0, 0, 0\}$ using the radix-2 DIT algorithm.

(5 × 5 = 25 marks)

Part C

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

11. (a) Determine if the following systems are time-invariant or time variant :

(i) $y(n) = x(n) + x(n-1)$.

(ii) $y(n) = x(-n)$.

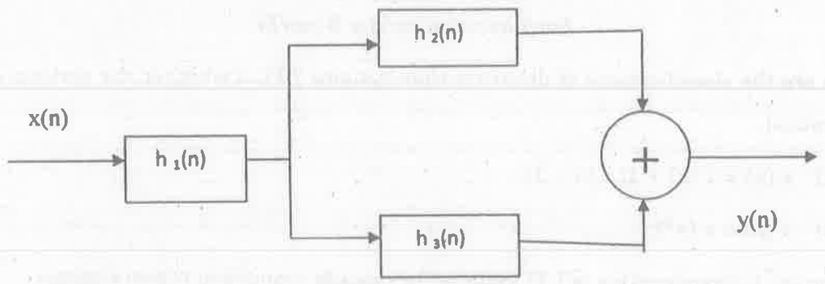
(b) Find $y(n)$ if $x(n) = n + 2$ for $0 \le n \le 3$

$h(n) = a^n\, u(n)$ for all n.

Or

12. Explain the operations on signals. Derive the equation for Symmetric and Antisymmetric.

13. An interconnection of LTI systems is shown below. The impulse responses are $h_1(n) = (1/2)^n [u(n) - u(n-3)]$; $h_2(n) = \delta(n)$ and $h_3(n) = u(n-1)$. Let the impulse response of overall system from $x(n)$ to $y(n)$ be denoted as $h(n)$. Express $h(n)$ in terms of $h_1(n)$, $h_2(n)$, $h_3(n)$. Evaluate $h(n)$.



Or

14. Evaluate the convolution $y(n) = x(n) * h(n)$ of the sequences :

$$h(n) = \begin{cases} a^n & 0 \le n \le N \\ 0 & \text{elsewhere} \end{cases}$$

$$x(n) = \begin{cases} b^{n-m} & m \le n \\ 0 & n < m \end{cases}$$

15. Find the Inverse Z-Transform of $X(z) = z^2 + z/(z-1)(z-3)$, ROC : $|z| > 3$. Using :

(i) Partial Fraction Expansion method ; and (ii) Convolution method.

Or

16. Mention any two properties of Z-Transform. Find the Z-Transform of the following :

(i) $X(n) = \cos n\theta\, u(n)$.

(ii) $x(n) = (-1/5)^n\, u(n) + 5(1/2)^{-n}\, u(n-1)$.

17. (a) Obtain the cascade realization for the following system :

$H(z) = (1 + 3/2\, z^{-1} + 1/2\, z^{-2})(1 - 3/2\, z^{-1} + z^{-2}) / (1 + z^{-1} + 1/4\, z^{-2})(1 + 1/4\, z^{-1} + 1/2\, z^{-2})$.

(b) Realize the system given by difference equation :

$y(n) = -0.1\, y(n-1) + 0.72\, y(n-2) + 0.7\, x(n) - 0.252 x(n-1)$. Using Parallel form.

Or

18. (a) Determine the direct form I realization for the following system :

$y(n) = 0.5y(n-1) - 0.25\, y(n-2) + x(n) + 0.4\, x(n-1)$.

(b) Realize the system given by difference equation :

$y(n) = 3/4\, y(n-1) - 1/8\, y(n-2) + x(n) + 1/3\, x(n-1)$.

19. Design an FIR low-pass filter satisfying the following specifications :

$\alpha_p \le 0.1$ dB $\quad \alpha_s \ge 44.0$ dB

$\omega_p = 20$ rad/sec ; $\omega_s = 30$ rad/sec ; $\omega_{sf} = 100$ rad/sec.

Or