G 1532

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

EN 010 401—ENGINEERING MATHEMATICS–III

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

{Common for all branches}

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Find the fourier series of $f(x) = x(2l - x)$ in $(0, 2l)$.
2. Find the Fourier Cosine Transform of e^{-ax}. $(a > 0)$.
3. Form the partial differential equation by eliminating the arbitrary function 'f' from $f(z - xy, x^2 + y^2) = 0$.
4. Find the binomial distribution which has mean 2 and variance 4/3.
5. Define type I and type II error.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Find the Fourier series expansion of $f(x) = x^2 + x$ in $(-2, 2)$.
7. Find the Fourier transform of unit step function.
8. Solve $x^4 p^2 - yzq - z^2 = 0$.
9. A random variable X has a Poisson distribution of $\sqrt{2}\,P(X \leq 1) = P(X \leq 2)$ find $P(X = 0)$.
10. A random sample is taken from a normal population with mean 30 and standard deviation 4. How large a sample should be taken of the sample is to be between 25 and 35 with probability 0.98 ?

(5 × 5 = 25 marks)

Turn over

Part C

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

11. Find the Fourier series $f(x) = |\cos x|$ in $-\pi \le x \le \pi$.

Or

12. Find the Fourier series expansion of :

$$f(x) = \begin{cases} 1, & 0 < x < 1 \\ 2, & 1 < x < 3. \end{cases}$$

13. Find the Fourier Transform of $f(x)$ if :

$$f(x) = \begin{cases} 1 - |x| & |x| < 1 \\ 0, & |x| > 1, \end{cases}$$

Hence prove that $\int_0^\infty \frac{\sin^4 x}{x^4}\, dx = \frac{\pi}{3}$.

Or

14. Find $f(x)$ of its Fourier sine transform is $\frac{s}{s^2+1}$.

15. Solve $z^2 (p^2 + q^2 + 1) = c^2$.

Or

16. Solve $(pq - p - q)(z - px - qy) = pq$.

17. In a normal distribution 7% of the items are under 35 and 10% of the items are above 55. Calculate the mean and variance.

Or

18. Fit a Binomial distribution to the following frequency distribution :

x	:	0	1	2	3	4	5	6
f	:	13	25	52	58	32	16	4

19. Two independent samples of size 7 and 8 item here the following values :

Sample I	:	10	12	10	14	10	9	8
Sample II	:	9	11	11	13	15	9	12	14

Do the estimates of means of population differ significantly at 5% level of significance.

Or

20. The mean life time of a sample of 9 items is 49.11 and standard deviation 2.47. Does this mean value differ significantly from the assured mean value 47.5.

(5 × 12 = 60 marks)

G 1537 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Computer Science and Engineering

CS 010 402—OBJECT ORIENTED PROGRAMMING (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 the term 'object oriented programming'. Give example of an object oriented Language.
2. What do you mean by friend function ?
3. Explain the term polymorphism in software programming languages.
4. What are the blocks used in exception handling ?
5. What are the object oriented features in Java ?

(5 × 3 = 15 marks)

Part B

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

6. Explain constructors and destructors with proper examples.
7. Differentiate private and protected inheritance in OOPs.
8. Explain overloading of functions with proper examples.
9. Describe with example on how object are allocated dynamically during runtime.
10. Compare the various features of C++ and Java programming.

(5 × 5 = 25 marks)

Part C

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

11. Differentiate classes and objects in OOPs. Give examples to show how they are used for developing programs.

Or

12. (a) Explain the evolution of object oriented language. (6 marks)

    (b) Explain nested classes with examples. (6 marks)

13. Explain the various classification of inheritance with examples.

Or

14. Explain hybrid inheritance with suitable OOP program.

15. What is meant by Abstractclass ? Give its syntax. Explain its application.

Or

16. Explain operator overloading ? Explain how a friend member function be used for operator overloading.

17. Describe the exception throwing and catching mechanism with examples.

Or

18. Write a program to show the implementation of arguments in Function template.

19. Explain how data is added or read from files. Write a program to demonstrate it.

Or

20. How can we open a binary file and write to it ? Give example.

(5 × 12 = 60 marks)

G 1544

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Computer Science and Engineering/Information Technology

CS 010 403/IT 010 405—DATA STRUCTURES AND 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. Define time complexity and space complexity of algorithm.
2. What is a sparse matrix and how is it represented ?
3. Write a note on garbage collection and compaction.
4. Give a recursive algorithm for preorder traversal of a binary tree.
5. Differentiate internal sorting and external sorting.

(5 × 3 = 15 marks)

Part B

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

6. Discuss the concept of open Hashing and closed Hashing techniques with suitable examples.
7. Write an algorithm to delete an element from a circular queue.
8. Write algorithms to perform push and pop operations on a linked stack.
9. Give an algorithm for the dept first traversal of a connected graph. Explain with an example.
10. Compute the average, best and worst case time complexity of quick sort.

(5 × 5 = 25 marks)

Part C

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

11. (a) Discuss Big-Oh, Big-Omega and Big-Theta notations in detail. (5 marks)

    (b) What is a recursive function ? Explain the method to calculate the time complexity of recursive functions with an example.

(7 marks)

Or

Turn over

12. Explain in detail the various collision resolution techniques.

13. Write an algorithm to convert an infix expression to postfix and evaluation of a postfix expression using stack with an example.

Or

14. How do we represent a polynomial using array ? What are its disadvantages ? Write an algorithm to add two polynomials using array representation.

15. Write algorithms to insert and delete a node a node from a doubly linked list prior to a node pointed to by *p*.

Or

16. Write algorithms to insert and delete a node from a circular double lined list.

17. Define a β-tree of order M. Build a β-tree by inserting records with following key sequence, into an empty β-tree of order 4 :—

a, g, f, b k, d, h, m, j, e, s, i, r, x, c, l, n, t, n, p.

Or

18. Write a non-recursive algorithm to traverse a binary tree in preorder.

19. Sort the following set of elements using Heap sort. 25, 37, 48, 11, 12, 92, 58, 89. Also write algorithm for the same.

Or

20. Write algorithms to sort an array of elements using insertion and selection sort. Trace the steps using an example.

[5 × 12 = 60 marks]

G 1580 **(Pages : 3)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Computer Science and Engineering/Information Technology

CS 010 406/IT 010 404—THEORY OF COMPUTATION (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 is diagonalization principle.
2. Write the formal definition of regular expressions.
3. What are null productions ? How they can be removed ?
4. Write the formal definition of Turing Machine.
5. Differentiate tractable and intractable problems.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Prove that $f(x) = 2 * x$ and $f(x) = 2x$ are primitive recursive functions.
7. Write regular expressions for :
   (a) Set of all strings that end in double letter over {a, b}.
   (b) Set of all three lettered words starting with 'b' over {a, b}.
8. Define CFG. Give CFG for :
   (a) Strings with equal no of a's and b's.
   (b) Regular expression (011 + 1)* (01)*.

Turn over

9. What are multi-head and multi-tape Turing machines.

10. Explain the technique of polynomial time reduction.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*

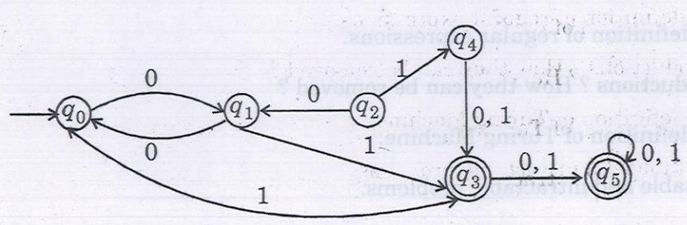
Each full question carries 12 *marks.*

11. Explain the proof by induction and prove that for a finite set A, $| 2^A | = 2^{|A|}$.

Or

12. Explain Chomsky classification of languages.

13. Minimize the given DFA. Explain the algorithm



Or

14. Explain different applications of finite automata.

15. Design a PDA for the language $L = \{ w \mid w \in (a,b)^* ;\ n_a(w) > n_b(w) \}$.

Or

16. Explain simplification of CFG by simplifying the given CFG :

$G = (\{s, x, z, c\}, \{0, 1\}, p, s)$

$P : s \to 0x \mid 0\,11, x \to 00x \mid \in$

$z \to \mid z \mid 11c, c \to z.$

17. (a) Construct a turing machine for $L = \{a^n, b^n, c^n, n \geq 0\}$ and show the trace for one acceptable and one non-acceptable strings.

(8 marks)

(b) Design a turing machine for $f(n) = n \bmod 2$.

(4 marks)

Or

18. Explain universal turing machine in detail.

19. Explain various complexity classes with proper examples.

Or

20. Prove that 'clique' problem is NP-complete.

(5 × 12 = 60 marks)

G 1556 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Computer Science and Engineering

CS 010 404 – SIGNALS AND COMMUNICATION SYSTEMS (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 sampling theorem.
2. Define signal to noise ratio.
3. What are the main advantage of FM over AM?
4. Distinguish between two basic multiplex in techniques.
5. Explain convolution coding.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. What is quantization?
7. Define Shannon Hartley theorem.
8. Explain differential phase shift keying.
9. What are the differences between half duplex and full duplex communication?
10. Explain Baudot and bar coding.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*

Each full question carries 12 *marks.*

11. Explain the linearity and time scaling properties of Fourier transform.

Or

12. Explain the difference between continuous time signal and discrete time signal.

Turn over

13. What are the basic problems in signal transmission?

Or

14. Contrast the advantages and disadvantages of fiber-optic cables and metallic cables.

15. Mathematically show that the double-side band full carrier AM signal consists of one carrier and two side bands of equal amplitudes.

Or

16. Derive an expression for quantization noise and SNR of PCM system.

17. Explain how packet switching works.

Or

18. What are the differences between half duplex and full duplex communication?

19. Explain the following in detail :

    (a) ASCII.

    (b) Baudot coding.

    (c) Parity coding.

Or

20. What is the purpose of Hamming code? Construct the Hamming code for bit sequence 100011001.

(5 × 12 = 60 marks)