

BTS-III-11.14-0945

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B

## B.Tech. Degree III Semester Examination November 2014

### CS 302 LOGIC DESIGN (2006 Scheme)

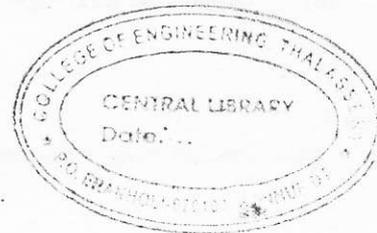
Time : 3 Hours

Maximum Marks : 100

#### PART A (Answer ALL questions)

(8 x 5 = 40)

- I. (a) Convert the following
- (i)  $(1001)_2 = ( )_{\text{excess-3}}$
  - (ii)  $(C3DF)_{16} = ( )_8$
  - (iii)  $(1000001110010100)_{BCD} = ( )_{10}$
- (b) Write a note on Gray code, with example.
- (c) Which are universal gates? Why are they called so? Implement other basic gates using one of the universal gates.
- (d) Differentiate between PLA and PAL.
- (e) Write a note on excitation table.
- (f) Draw and explain Johnson counter.
- (g) What is tristate logic?
- (h) Distinguish between CMOS and TTL families.



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#### PART B

(4 x 15 = 60)

- II. (a) Explain the conversions SOP to POS and POS to SOP, with example. (8)
- (b) Explain 1's and 2's complement arithmetic, with example. (7)

OR

- III. (a) Simplify the function  $f(w, x, y, z) = \sum m(0, 1, 2, 8, 10, 11, 14, 15)$  using Quine McClusky method. (10)
- (b) Write down the postulates and theorems of boolean algebra. (5)
- IV. (a) Explain the principle of carry look ahead adder. What is its advantage? (7)
- (b) Design a BCD to excess-3 code converter. (8)

OR

(P.T.O.)

- V. (a) Implement a full adder circuit with decoder. (5)  
(b) Compare MUX and decoders. (5)  
(c) Write a note on ROM. (5)
- VI. (a) Differentiate between combinational and sequential circuits. (5)  
(b) Design a mod-9 synchronous UP counter using J.K. flipflop. (10)

**OR**

- VII. (a) Convert a JK flipflop into T flipflop. Give the truth table and logic diagrams. (5)  
(b) Draw and explain the working of serial adder. (10)
- VIII. (a) Compare the characteristics of different IC digital logic families. (5)  
(b) Write notes on: (10)  
(i) fan-out  
(ii) propagation delay  
(iii) power dissipation  
(iv) noise margin.

**OR**

- IX. (a) Explain how a standard TTL gate can be interfaced with CMOS gate. (10)  
(b) Explain the RTL logic family. (5)

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D

**B.Tech. Degree III Semester Examination November 2014**

**IT/CS 303 DISCRETE COMPUTATIONAL STRUCTURES**  
(2006 Scheme)

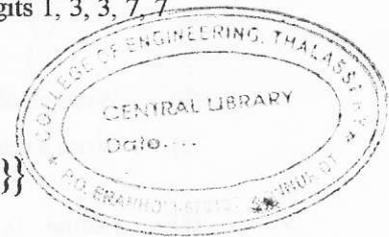
Time : 3 Hours

Maximum Marks : 100

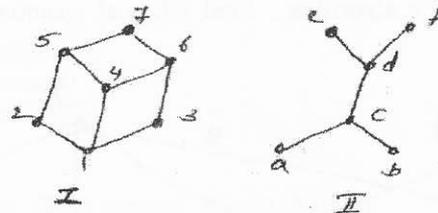
**PART A**  
(Answer ALL questions)

(8 x 5 = 40)

- I. (a) Prove that  $(p \Leftrightarrow q)$  is logically equivalence to  $(p \Rightarrow q) \wedge (q \Rightarrow p)$
- (b) Define equivalent relations? Give one example.
- (c) In how many ways can 6 men and 6 women be seated in a row if
- any person may sit next to any other?
  - men and women must occupy alternate seats
- (d) How many distinct 4 digit integers can one make from the digits 1, 3, 3, 7, 7 and 8?
- (e) Draw the graph  $G(V,E)$ , where  
 $V = \{a, b, c, d, e\}$  and  
 $E = \{\{a, b\}, \{b, c\}, \{c, d\}, \{d, e\}, \{e, a\}, \{e, b\}, \{e, c\}, \{b, d\}\}$
- Explain why it has no Euler cycle.
  - Find an Euler path.
- (f) Define monoid with example.
- (g) Let  $*$  be the binary operation defined on a set of positive rational number  $(Q^+)$  such that  $a*b=ab/3$ .
- Find identity element
  - Are the elements are invertible? If so find inverse of  $a \in Q^+$  ?
- (h) Determine whether the posets shown in the figures are lattice or not. Explain why.



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**PART B**

- II. (a) Let  $X = \{1, 2, 3, 4\}$ . On  $X$  define a relation  $R$  by  $(x, y) \in R$  if  $x \leq y$  (5) (4 x 15 = 60)
- Is  $R$  an equivalence relation or a partial order relation? Why?
  - Draw the digraph representing  $R$ .

(P.T.O.)

- (b) Prove that  $(P \wedge (P \Rightarrow Q)) \Rightarrow Q$  is a tautology. (3)
- (c) Define  $f: R \rightarrow R$  by  $f(x) = 2x + 3$  (7)
- (i) Show that  $f$  is bijective
  - (ii) Find  $f^{-1}$
  - (iii) Sketch the graphs of  $f$  and  $f^{-1}$

OR

- III. (a) A survey was conducted among 1000. Of these 595 like Metro channel, 595 like Star movies and 550 Zee TV. 395 of them like Metro channel and star movies, 350 of them like Metro channel and Zee TV and 400 of them like Star Movies and Zee TV, 250 of them like Metro channel, Star Movies and Zee TV. (8)
- (i) How many of them who do not like Metro channel, do not like Star Movies and do not like Zee TV?
- (b) Using the principle of induction prove that (7)
- $$1^2 + 3^2 + 5^2 + \dots + (2n-1)^2 = \frac{n(2n-1)(2n+1)}{3}$$

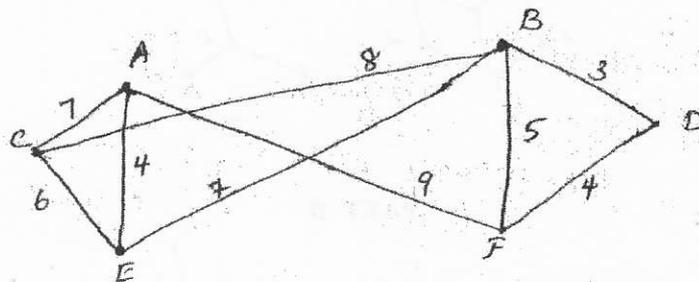
- IV. (a) In a shipment, there are 40 floppy disks of which 5 are defective. Determine in how many ways we can select (5)
- (i) 5 floppy disks containing exactly 3 defective disks.
  - (ii) 5 floppy disks containing at least one defective disks.
- (b) Write an algorithm to check whether a give number is prime or not. (5)
- (c) Write a recursive algorithm to find gcd of 2 number. (5)

OR

- V. (a) Define  $O$ ,  $\Omega$  and  $\theta$  notations. Explain the applications of each notations. (5)
- (b) Analyse linear search algorithm for the following three cases (10)
- (i) best case
  - (ii) average case
  - (iii) worst case.
- VI. (a) Define Euler graph. Prove that a connected graph has an Euler trail if it has at most two vertices of odd degree. (8)
- (b) Define Hamiltonian path? Give one path that is Hamiltonian but not an Euler path. (7)

OR

- VII. Explain Kruskal's algorithm. Find minimal spanning tree using this algorithm. (15)



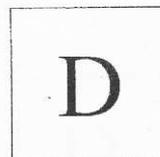
- VIII. Show that set of all non zero real numbers with binary operation  $*$  defined by  $a*b = ab/2$  is an abelian group. (15)

OR

- IX. Let  $A = \{2, 7, 14, 28, 56, 84\}$  and  $a \leq b$  if and only if  $a$  divides  $b$ . (15)
- Draw Hassc diagram from the POSET  $(A, \leq)$ .

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## ***B. Tech. Degree III Semester Examination November 2014***

### **IT/CS 304 OBJECT ORIENTED PROGRAMMING USING C++ (2006 Scheme)**

Time: 3 Hours

Maximum Marks: 100

#### **PART A** (Answer *ALL* questions)

(8 x 5 = 40)

- I. (a) Differentiate class and object in object oriented programming.
- (b) Describe the use of scope access operator (::) and reference operator (&).
- (c) How are the public and private keywords different from each other?
- (d) Define anonymous objects. Give examples.
- (e) What is the use of virtual base class in inheritance?
- (f) What do you mean by dynamic objects? How are they created?
- (g) List the different types of file opening modes in C++ with their meaning.
- (h) Explain the need of templates.



#### **PART B**

(4 x 15 = 60)

- II. (a) Discuss the key concepts of object oriented programming. (10)
- (b) Give the advantages of new operator over malloc (). (5)
- OR**
- III. What is a function? Explain the three argument passing methods used in C++ functions with examples. (15)
- IV. (a) Write notes on friend functions and friend classes. (7)
- (b) Write a C++ programme to exchange values between two classes using friend function. (8)
- OR**
- V. (a) Discuss the characteristics of constructors and destructors. (7)
- (b) Write a programme to find the factorial of a number by calling the function recursively. (8)
- VI. (a) What is wild pointer? Explain the situations where a pointer become wild pointer. (7)
- (b) What is 'this' pointer? Write a programme to find the largest of two numbers using 'this' pointer. (8)
- OR**
- VII. What are the different types of inheritance? Explain each type with examples. Give their merits and demerits. (15)
- VIII. (a) List any five string functions and their use with examples. (7)
- (b) Write a programme to invoke the same function declared in both base and derived classes using virtual function. (8)
- OR**
- IX. (a) What do you mean by exception handling? Describe the role of try, catch and throw in exception handling. (7)
- (b) Write a C++ programme that illustrate the application of multiple catch statements in exception handling. (8)

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**B.Tech. Degree III Semester Examination November 2014**

**CS 305 PRINCIPLES OF PROGRAMMING LANGUAGES**  
(2006 Scheme)

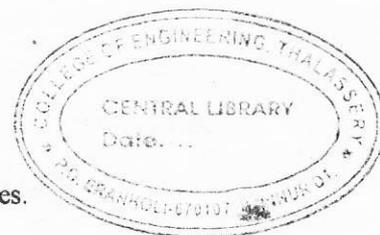
Time : 3 Hours

Maximum Marks : 100

**PART A**  
(Answer ALL questions)

(8 x 5 = 40)

- I. (a) Write notes on denotational semantics
- (b) Which are the different areas in which programming languages are used?
- (c) Explain referencing environment.
- (d) Write notes on variables.
- (e) Explain polymorphism.
- (f) Explain exception handling in JAVA.
- (g) Describe applications of functional programming languages.
- (h) What is meant by resolution principle?



**PART B**

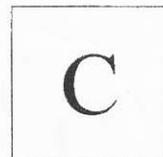
(4 x 15 = 60)  
(15)

- II. Explain:
  - (i) Functional programming.
  - (ii) Imperative programming
  - (iii) Logic programming.
- III. Explain :
  - (i) BNF. With suitable example show how it can be used to describe syntax of a programming language. (10)  
(5)
  - (ii) Operational semantics. (15)
- IV. Explain the different parameter passing methods. (15)
- V. Write notes on:
  - (i) Co-routines
  - (ii) Named constants
  - (iii) Scope of variable(15)
- VI. Explain : (15)
  - (i) Data abstraction
  - (ii) Encapsulation
  - (iii) Inheritance
- VII. Explain how encapsulation and inheritance is implemented in JAVA. (15)  
Give suitable examples.
- VIII. (a) With suitable example, explain the tracing model in Prolog. (10)  
(b) Explain any two applications of logic programming. (5)
- IX. (a) Explain the features of functional programming languages. (7)  
(b) Write notes on LISP. (8)

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## B. Tech. Degree III Semester Examination November 2014

### CS/EB/EE 306 ELECTRONIC DEVICES AND CIRCUITS (2006 Scheme)

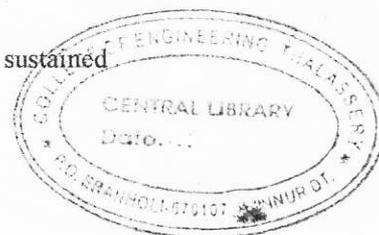
Time: 3 Hours

Maximum Marks: 100

#### PART A (Answer ALL questions)

(8 x 5 = 40)

- I. (a) Explain the VI characteristics of UJT.  
(b) Explain  $\pi$  filter. What is the use of bleeder resistor in LC circuit?  
(c) What are the needs of biasing?  
(d) Define stability factor. Draw a fixed bias circuit. Derive the expression for the stability factor.  
(e) What are the classifications of power amplifiers?  
(f) Which are the two Barkhausen criteria required in order to sustained oscillation?  
(g) Explain a simple sweep circuit using transistor.  
(h) Explain integrator and differentiator.



#### PART B

(4 x 15 = 60)

- II. (a) Explain a full-wave bridge rectifier and derive the expression for ripple factor, efficiency and TUF. (10)  
(b) Design a capacitor filter with ripple factor of 2%. (5)
- OR**
- III. (a) What are the advantages of bridge rectifier over full-wave centre tapped rectifier? (5)  
(b) Explain the working of a transistor series regulator, with neat diagram. (10)
- IV. (a) Sketch typical transistor CB configuration and its characteristics and derive the current amplification factor. (10)  
(b) Compare the 3-transistor configuration. (5)
- OR**
- V. (a) List out the different biasing techniques of BJT and compare. (5)  
(b) Explain the voltage divider bias in detail. (10)
- VI. (a) Sketch the circuit of a transformer coupled class-A amplifier and derive its efficiency. (10)  
(b) Explain +ve and -ve feedback. (5)
- OR**
- VII. Explain a Wein-bridge oscillator and derive the expression for frequency of oscillation and conditions for sustained oscillations, with neat diagram. (15)
- VIII. With neat diagram explain (15)  
(i) astable multivibrator (ii) mono-stable multivibrator
- OR**
- IX. (a) Explain how a transistor can be used as a switch. (5)  
(b) Explain the working of a boot-strap sweep circuit, with neat diagram. (10)