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R-11 / R-13

Code: 1G131

II B.Tech. I Semester Supplementary Examinations May 2018

Advanced Data Structures Through C++

(Common to CSE & IT)

Max. Marks: 70

Time: 3 Hours

Answer any **Five** questions
All Questions carry equal marks (**14 Marks** each)

- 1. a) Define Class? Explain about inline function with Example. 6M
b) Explain about dynamic memory allocation and de-allocation 8M

- 2. a) Explain the concept of function overloading with an example. 7M
b) Explain Base Class and Derived Class with Example. 7M

- 3. a) Define Abstract Data Type? Explain the implementation of Queue ADT in details. 7M
b) How we can measure the performance of an algorithm? Discuss in detail. 7M

- 4. Define Hash Table? Discuss in detail about collision resolution technique? 14M

- 5. a) Define and explain in detail about Priority Queue ADT. 4M
b) Explain about external sorting and Multi way merge. 10M

- 6. a) Define AVL Trees? Explain various steps for AVL search tree insertion with illustrations. 5M
b) Define Binary Search Tree? Explain Binary Search Tree Traversal with below example.
Preorder: A B D G C E H I F, In-order: D B G A H E I C F. Construct post order. 9M

- 7. a) Describe insertion operation of a B-tree with an example. 7M
b) Explain about splay trees. 7M

- 8. a) What are the properties of Compressed and Suffix tries. 7M
b) Write and explain Brute force algorithm. 7M

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R-11 / R-13

Code: 1G132

II B.Tech. I Semester Supplementary Examinations May 2018

Digital Logic Design

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. Convert the following:
 - a) $(4567)_8$ to decimal 2M
 - b) $(11001101.0101)_2$ to octal 3M
 - c) $(53.1575)_{10}$ to binary 3M
 - d) $(11010001.1110)_2$ to hexa decimal 3M
 - e) $(425.125)_{10}$ to base 5 3M
2. a) For the given Boolean function $F = xy'z + x'y'z + w'xy + wx'y + wxy$.
 - i. Draw the logic diagram
 - ii. Simplify the function to minimal literals using Boolean algebra. 6M
- b) Obtain the Dual of the following Boolean expressions.
 - i. $AB'C + A'B'D + A'B'$
 - ii. $ABCD + AB'C'D + A'B'CD$ 4M
- c) Obtain the complement of the following Boolean expressions.
 - i. $A'B + A'BC' + A'BCD + A'BC'D'E$
 - ii. $ABEF + ABE'F' + A'B'EF$. 4M
3. a) Define k-map? Reduce the function $F(A,B,C,D,E) = (0,2,4,6,9,13,21,23,25,29,31)$ using a suitable k-map. 10M
- b) Mention the disadvantages of k-map? 4M
4. a) Define Multiplexer? Design a 4 X 1 multiplexer? 5M
- b) Define Full Adder? Explain the design procedure of Full Adder in detail? 4M
- c) Design a 4-bit Binary adder? 5M
5. a) Draw the logic diagram of a JK flip-flop and using excitation table, explain its operation. 6M
- b) Design a 4-bit Binary ripple down-counter using a negative edge triggered D flip-flops. 8M
6. a) Explain about the analysis of the clocked sequential circuits in detail with an example. 7M
- b) Explain about state reduction and assignment with an example. 7M
7. a) What is an asynchronous sequential circuit? Explain the design procedure? 6M
- b) An asynchronous sequential circuit has two internal states and one output. The excitation and output functions describing the circuit are:

$$Y_1 = x_1x_2 + x_1y_2' + x_2'y_1, Y_2 = x_2 + x_1y_1'y_2 + x_1'y_1, Z = x_2 + y_1$$
 - i. Draw the logic diagram of the circuit.
 - ii. Derive the transition table and output map.
 - iii. Obtain a flow table for the circuit. 8M
8. a) Draw the block diagram and explain in detail about the PAL? 3M
- b) Implement the following Boolean functions using a PAL that has two sections with three product terms each:

$$F_1(A,B,C,D) = (2,12,13) \text{ and } F_2(A,B,C,D) = (7,8,9,10,11,12,13,14,15).$$
 8M
- c) Draw the Logic diagram and HDL representation of XOR gate. 3M

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R-11 / R-13

Code: 1G334

II B.Tech. I Semester Supplementary Examinations May 2018

Electronic Devices and Circuits

(Common to CSE & IT)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. a) Draw and explain the V-I characteristics of a Zener diode. What are the two breakdown mechanisms in a Zener diode? 7M
b) A diode operating at 300^ok at a forward voltage of 0.4V carries a current of 10mA. When voltage is changed to 0.42V, the current becomes twice. Calculate the value of reverse saturation current and I_s for the diode. 7M
2. a) With a neat circuit diagram and necessary wave forms explain the operation of bridge rectifier. 8M
b) A voltage $V=300 \cos t$ is applied to a half wave rectifier, with $R_L=5K$. the rectifier may be represented by ideal diode in series with a resistance of $1K$. Calculate I_m , I_{RMS} , I_{DC} , P_{DC} , P_{AC} and efficiency. 6M
3. a) Draw and explain the input and output characteristics of a transistor in CE configuration. Indicate cut-off, saturation and active region in the characteristics. 8M
b) What is meant by early effect in the case of transistor and explain the consequences. 6M
4. a) What is the need for biasing? Explain the Voltage divider biasing with neat circuit diagram and analysis. 6M
b) What are the compensation techniques used for V_{BE} and I_{CO} ? Explain with the help of suitable circuits. 8M
5. a) Draw the symbol and structure of an n-channel JFET and explain the operation. Why is the name field effect transistor used for the device? 6M
b) With the neat sketch explain the drain source and transfer characteristics of enhancement type MOSFET. 8M
6. a) Draw the h parameter model for CE Amplifier and derive the expression for A_i , R_i , A_v and Y_o . 10M
b) List out the advantages of complementary symmetry configuration over push pull configuration. 4M
7. a) Explain the concept of feedback. Draw the circuit diagram of voltage- series feedback amplifier and explain the effect of negative feedback on voltage gain, input impedance and output impedance of an amplifier. 10M
b) What are the advantages and disadvantages of the positive feedback amplifiers? 4M
8. a) Draw the circuit diagram of Wein-bridge oscillator and derive the expression for the frequency of oscillation. 8M
b) In Colpitts oscillator of frequency 318.5kHz, $L=1mH$ and $C_1=500pF$. Calculate the value of C_2 . 6M

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R-11 / R-13

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II B.Tech. I Semester Supplementary Examinations May 2018

Mathematical Foundations of Computer Science

(Common to CSE & IT)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. a) Define a Statement and its Notations with the help of examples. 4M
b) Show that $S \vee R$ is tautology implied by $(P \vee Q) \wedge (P \wedge r) \wedge (Q \wedge S)$. 10M
2. a) Define Quantifiers and write all the properties of Quantifiers with Examples. 8M
b) Write a short note on Automatic theorem of proving. 6M
3. a) Define a Relation and explain the different types of representing the Relations. 6M
b) Let $x = \{2, 3, 6, 12, 24, 36\}$ and the relation be such that $x \ R \ y$ if x divides y . Draw the Hash diagram. 8M
4. a) Show that a set of all non zero real numbers is a group with respect to multiplication 6M
b) Let R be a group of all real numbers under addition and R^+ be a group of all positive real numbers under multiplication. Show that the mapping $f : R \rightarrow R^+$ defined by $f(x) = 2^x$ for all $x \in R$ is an isomorphism. 8M
5. a) Write a short note on Pigeon Hole Principles and its applications. 8M
b) In how many ways can 7 women and 3 men be arranged in a row if the 3 men must always stand next to each other? 6M
6. a) Solve the following recurrence relation by substitution Method.
 $a_n = a_{n-1} + 1/n(n+1)$, Where $a_0=1$. 8M
b) Define Recurrence Relation and its Properties. 6M
7. a) Define a Graph and Explain the different types of representing a Graph. 8M
b) Define a Spanning Tree and write the step by step Procedure for finding the Spanning Tree by using Krushkal's Algorithm 6M
8. a) Write a Short note on Hamiltonian Graph with Example. 6M
b) What is meant by Chromatic Number and write the step by step procedure for finding the Chromatic Number of a Graph. 8M
