

Code : 1G132

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations June/July 2014

**Digital Logic Design**

(Computer Science &amp; Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE of the following  
All questions carry equal marks (14 Marks each)

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1. Convert the following to OCTAL and HEXADECIMAL 14M  
a)  $100101101011_2$  b)  $10110100000101_2$  c)  $791_{10}$  d)  $1600_{10}$  e)  $197_{10}$
2. a) Determine whether the following two functions are equal using their truth tables 6M  
i)  $P'Q'+PR+Q'R$  ii)  $Q'+PQR$   
b) Reduce the following expression to a minimum sum of products 8M  
i)  $XYZ'+XYZ$  ii)  $XYZ'+XY'Z+X'YZ+XYZ$
3. a) Define combinational circuit 2M  
b) Find all of the minimum sum of products expression and all of the minimum product of sums expressions for the following function. 12M  
 $F(w,x,y,z)=\sum m(2,3,5,7,10,13,14,15)$
4. Construct a 16x1 multiplexer with two 8x1 and one 2x1 multiplexes 14M
5. Define and discuss the following terms with suitable diagrams and list their applications 14M  
a) Latch b) Flip-flop c) Counter d) Register
6. Simplify the following state table using tabular method 14M

q	q*		Z	
	x=0	x=1	x=0	x=1
A	F	B	0	0
B	E	G	0	0
C	C	G	0	0
D	A	C	1	1
E	E	D	0	0
F	A	B	0	0
G	F	C	1	1

7. An asynchronous sequential circuit has two internal states and one output. the excitation and output functions describing the circuit are 14M  
 $Y_1=x_1x_2+x_1y_2+x_2y_1;$   
 $Y_2=x_2+x_1y_2+x_1y_1;$   
 $Z=x_2+y_1$   
 a) Draw the logic diagram  
 b) Derive the transition table and output map  
 c) Obtain a flow table for the circuit
8. a) Define the terms 6M  
i) HDL ii) simulation iii) synthesis  
b) Write HDL code for universal gates 8M

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**Code : 1G334**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)**II B.Tech I Semester Supplementary Examinations June/July 2014*****Electronic Devices and Circuits****(Common to CSE & IT)***Time: 3 hours****Max Marks: 70**

*Answer any FIVE of the following  
All questions carry equal marks (14 Marks each)*

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1. a) Explain the drift and diffusion currents for a semiconductor. 5M
- b) Distinguish between avalanche and zener mechanisms. 4M
- c) Explain the V-I characteristics of a photo diode. 5M
2. a) Explain the operation of bridge rectifier and derive the expression for  $V_{dc}$ ,  $I_{dc}$ , ripple factor, peak inverse voltage, transformer utilization factor, form factor and peak factor. 8M
- b) Calculate the value of capacitance to use in a capacitor filter connected to a full wave rectifier operating at a standard aircraft power frequency of 400 Hz, if the ripple factor is 10% for a load of 500 . 6M
3. a) With neat circuit and input and output characteristics explain bipolar junction transistor in CE configuration. 8M
- b) Explain the criteria for fixing the operating point. 6M
4. A germanium transistor having  $\beta = 100$  and  $V_{BE} = 0.2$  V is used in a fixed bias amplifier circuit when  $V_{CC} = 10$  V,  $R_C = 5$  k , and  $R_B = 790$  k ( $R_B$  is between  $V_{CC}$  and base). Determine its operating point. 14M
5. a) Write about broad classification of FET. 4M
- b) Draw the structure of an n-channel JFET and explain its principle of operation. Why is the name field effect used for the device? Show the circuit symbol. 10M
6. Derive the expression for the voltage gain, current gain, input impedance and output impedance of a CE amplifier using exact and approximate model. 14M
7. Draw the practical circuit for voltage series feedback and find the voltage gain, input impedance and output impedance. 14M
8. a) Derive an expression for frequency of oscillation of Hartley oscillator using transistor. 4M
- b) A Wien bridge oscillator has a frequency of 500 Hz, if the value of C is 100 PF, determine the value of R. 10M

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II B.Tech I Semester Supplementary Examinations June/July 2014

Mathematical Foundations of Computer Science

(Common to CSE & IT)

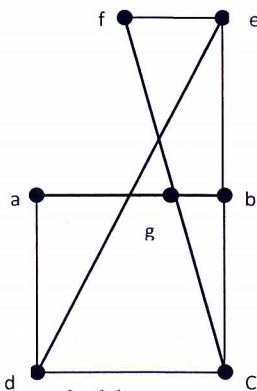
Time: 3 hours

Max Marks: 70

Answer any FIVE Questions from the following All questions carry equal marks (14 Marks each)

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- 1. a) Define Normal form and Explain various types of Normal forms. 4M
- b) Obtain any one of the normal form for the following formula. 10M  
 $P \vee (\neg P \rightarrow (Q \vee (\neg Q \rightarrow R)))$
- 2. a) Define Predicate logic & Explain with example. 4M
- b) Define and explain Automatic Theorem of proving with example. 10M
- 3. a) Explain the properties of relations with Example. 10M
- b) Define Equivalence Relation with example. 4M
- 4. a) Define and give examples for semi groups and monoids. 7M
- b) Define homomorphism and Explain the properties of Homomorphism. 7M
- 5. a) Find the number of different ways in which 4 boys and 6 girls may be arranged in a row that no 2 boys shall be together. 8M
- b) Explain pigeonhole principles with example. 6M
- 6. Solve the recurrence relations 14M  
 $a_n - 9a_{n-1} + 26 a_{n-2} = 0$  for  $n \geq 2$ , given that  $a_0 = -3$  and  $a_1 = -10$
- 7. a) Define Spanning Tree with example. 4M
- b) Find Spanning tree for the graph shown below fig with vertex ordering **abcdefg** by using BFS Method. 10M



- 8. a) Define the following terms with suitable examples. 8M
  - i. Euler Path
  - ii. Euler Circuit
  - iii. Multi Graph
  - iv. Hamiltonian cycle.
- b) Find the number of edges in a graph contains 2 vertex of degree 3 ,3 vertex of degree 4 and a vertex of degree 6. 6M

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**Code : 1GC33**

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)

**II B.Tech I Semester Supplementary Examinations June/July 2014**

**Probability & Statistics**  
(Computer Science & Engineering)

**Time: 3 hours**

**Max Marks: 70**

*Answer any FIVE of the following*  
*All questions carry equal marks (14 Marks each)*

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1. a) Find the mean, median, mode and standard deviation for the following distribution. 7M

No.of Students:	6	4	16	7	8	2
Marks:	20	9	25	50	40	80

- b) Find the coefficient of the correlation for the following data: 7M

Fertilizer Used	15	18	20	24	30	35	40	50
Productivity	85	93	95	105	120	130	150	160

2. a) State and prove Bayes' theorem 8M

- b) Problem in statistics is given to the 3 students A,B,C whose chances of solving it are  $\frac{1}{2}, \frac{3}{4}, \frac{1}{4}$  respectively. What is the probability that the problem is solved? 6M

3. a) A random variable X has the following probability function : 8M

x	0	1	2	3	4	5	6	7
P(x)	0	k	2k	2k	3k	k <sup>2</sup>	2k <sup>2</sup>	7k <sup>2</sup> +k

Determine k and  $P(X \leq k) > \frac{1}{2}$ , find minimum value of k .

- b) If X is a continuous random variable and  $Y=aX+b$ , prove that  $E(Y)=aE(X)+b$  and  $Var (Y)= a^2 Var(X)$ , where a and b are constants. 6M

4. a) A discrete random variable X has the mean 6 and variance 2.If it assumed that the distribution is binomial find the probability that  $5 \leq x \leq 7$  7M

- b) If X is a Poisson variate such that  $p(x=0)=p(x=1)$ , find  $p(x=0)$  and using recurrence formula find the probabilities at  $x=1,2,3$ . 7M

5. A population consists of six numbers 1,2,3,4,5,6. Consider all samples of size two which can be drawn without replacement from this population. Find 14M
- (a) Population mean
  - (b) Population S.D
  - (c) Mean of the sampling distribution of means
  - (d) S.D of the sampling distribution of means.
6. a) A random sample of 400 items is found to have mean 82 and standard deviation of 18. Find maximum error of estimation at 95% confidence interval? 7M
- b) A sample of 11 rats from a central population had an average blood viscosity of 3.92 with a standard deviation of 0.61. Estimate the 95% confidence limits for the mean blood viscosity of the population. 7M
7. Ambulance services claims that it takes on the average less than 10 minutes to reach its destination in emergency calls. A sample of 0.36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the significance at 0.05 level. 14M
8. Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same, at 5% level. 14M

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Code : 1G131

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)**

II B.Tech. I Semester Supplementary Examinations June/July 2014

***Advanced Data Structures Through C++***

**(Common to CSE & IT)**

Max. Marks: 70

Time: 03 Hours

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**Answer any five questions**

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

- |    |    |   |    |
|----|----|---|----|
| 1. | a) | Explain about constructor and destructor? Write a C++ program that demonstrates the use of these.   | 7  |
|    | b) | Write about parameter passing methods in C++  | 7  |
| 2. | a) | Explain in detail about operator and function overloading by taking an example.   | 7  |
|    | b) | Write about I/O streams in C++.   | 7  |
| 3. |    | What is Queue? Write the ADT implementation of Queues using templates in C++.   | 14 |
| 4. | a) | What is a dictionary? Explain in detail the different ways of representations of dictionaries?  | 7  |
|    | b) | Define collision? Explain any two techniques that are used to resolve collision with suitable examples?                                       | 7  |
| 5. | a) | What is a priority queue? How do you implement priority queues using Heaps?   | 7  |
|    | b) | What are the different ways of performing external sorting on tapes?  | 7  |
| 6. | a) | What is an AVL search tree? How do we define the height of it? Explain about the <i>balance factor</i> associated with a node of an AVL tree. | 7  |
|    | b) | Explain how an AVL tree can be used to sort a sequence of n elements in $O(n \log n)$ time.   | 7  |
| 7. | a) | What is Splay tree? Explain the process of splaying by taking an example  | 7  |
|    | b) | Write a routine to perform insertion into a B-tree  | 7  |
| 8. | a) | What is Pattern matching? Explain in detail Brute force algorithm by taking an example?   | 7  |
|    | b) | Differentiate between Standard and Compressed Tries.  | 7  |

Code : 1G235

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations June/July 2014  
*Basic Electrical Engineering*

(Common to CSE & IT)

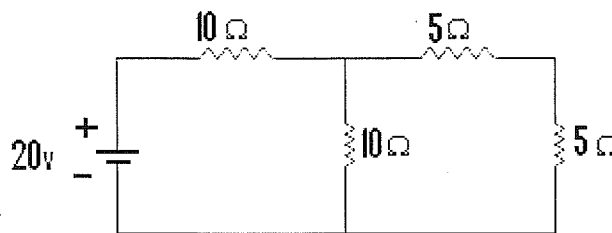
Time: 3 hours

Max Marks: 70

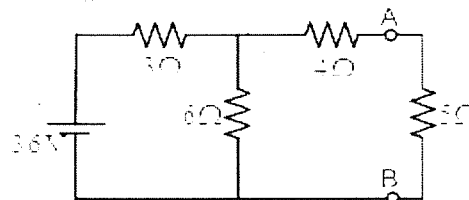
Answer any FIVE of the following  
All questions carry equal marks (14 Marks each)

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- 1. a) Derive the equation for equivalent resistance when connected in i) series ii) parallel.
- b) Find the current, I in the following ckt



- 2. a) Give the statement of Thevenins Theorem and explain by taking a network
- b) By using Thevenins theorem find the current through 5Ω resistor.



- 3. a) Derive expression for r.m.s. and average value of a sinusoidal alternating quantity
- b) A two element series circuit is connected across an A.C. source given by  $V = 200\sqrt{2} \sin(314 t + 20)$ . The current in the circuit is found to be  $i = 10\sqrt{2} \cos(314 t - 25)$ . Determine the parameters of the circuit. Also determine the power factor, real power and reactive power taken by the circuit.
- 4. a) Derive the relation between phase and line values in a 3-phase balanced star connected system.
- b) Three impedances each of  $(3-j4)$  ohms is connected its delta to a 230V, 3-phase, and 50Hz balanced supply. Calculate the line and phase currents in delta connected load and the power delivered to the load.

5. a) Explain different methods of excitation of D.C generators with suitable diagrams.
- b) The Armature of a 6 pole D.C generator has a wave winding containing 664 conductors. Calculate Generated E.M.F When Flux per Pole Is 0.06 Weber and speed Is 250 R.P.M. at what Speed must the Armature be Driven to generate an emf of 250 If the flux per pole is reduced to 0.58 Weber ?
6. a) Explain the tests to be conducted to determine copper and iron losses with neat circuit diagram.
- b) The iron and full load copper loss in a 40KVA 1 phase transformer are 450 W and 850 W respectively. Find
- (a) Efficiency at full load when the power factor of the load is 0.8 lagging
  - (b) The maximum efficiency and
  - (c) The load at which the maximum efficiency occurs.
7. a) Explain the types of rotors in three phase induction motor with suitable diagram
- b) A three-phase, 50Hz, 4-pole induction motor has a slip of 4%. Calculate:
- (i). Speed of the motor.
  - (ii). Frequency of the rotor emf.
8. a) What are the basic requirements of indicating instrument? Briefly discuss them.
- b) Explain with neat sketch the principle of operation of permanent magnet type moving coil Instruments

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