Code : 1G133

R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
II B.Tech. I Semester Regular Examinations, January 2014
Mathematical Foundations of Computer Science
(CSE & IT)

Time: 3 hours

Max Marks: 70

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

* * * * *

1.	a)	Define Statement and Explain various Connectives with Example.	10M
	b)	Define Tautology with Example.	4M
2.		Show that S V R is tautology implied by using Rules of inference.	
		$(P \lor Q)\,^{\wedge}\,(P \rightarrow R)\,^{\wedge}\,(Q \rightarrow S)$	14M
3.	a)	Define Relation and Explain the Representation of a relation.	7M
	b)	Let x= { 2,3,6,12,24,36} and the relation $\leq$ be such that $x \leq y$ if x divides y. Draw the Hash diagram.	7M
4.	a)	Show that the Composition of 2 Congruence relation on a set is not necessarily a Congruence Relation.	10M
	b)	Define Group and Explain with Axioms.	4M
5.	a)	In How many ways can 5 similar books be placed in 3 different racks?	6M
	b)	Explain the Principles of inclusion & exclusion principles.	8M
6.	a)	Define Recurrence relation & explain with example.	4M
	b)	Solve the following recurrence relation by substation Method. $a_n = a_{n-1} + 1\,/\,n(n+1)$, where $a_0 = 1$	10M
7.	a)	Define Graph and explain various Representation of a graph with example.	8M
	b)	Define Planer graph with Example.	6M
8.	a)	Define isomorphism with example.	7M
	b)	Define Hamiltonian Graph with example.	7M

***

Code : 1GC33

R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
II B.Tech. I Semester Regular Examinations, January 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)

* * * * *

1. a) calculate the mean , median for the following data

Height(in Cm)	No. of boys	Height(in Cm)	No. of boys
135-140	4	155-160	24
140-145	9	160-165	10
145-150	18	165-170	5
150-155	28	170-175	2

7M

b) A random sample of 5 college students is selected and their grades in Computers and Statistics are found to be as follows. Calculate the Spearman's rank correlation coefficient.

Computers	85	60	73	40	90
Statistics	93	75	65	50	80

7M

2. a) An integer is chosen at random from the first 200 positive integers. Find the probability that the integer is divisible by 6 or 8. 7M

   b) Of all the smokers in a particular district, 40% prefer brand A and 60% prefer brand B. Of those smokers who prefer brand A, 30% are females, and of those who prefer brand B, 40% are female. What is the probability that a randomly selected smoker prefers brand A, given that the person selected is a female? 7M

3. A random variable X has the following probability function :

x	0	2	4	6	8	10	12
P(x)	0	K	2k	2k	3k	k^2	$7k^2+k$

(i) Find the value of k
(ii) Evaluate $P(X<8)$, $P(X\geq10)$
(iii) Evaluate $P(0<X<8)$

14M

4. a) Hospital records show that of patients suffering from a certain disease, 75% die of it. What is the probability that of 6 randomly selected patients, 4 will recover? 7M

   b) Out of 800 families with 5 children each, how many would you expect to have, either 2or 3 boys? 7M

5. A population consists of six numbers 4,8,12,16,20,24. Consider all samples of size two which can be drawn without replacement from this population. Find
   (a) Population mean
   (b) Population S.D
   (c) Mean of the sampling distribution of means
   (d) S.D of the sampling distribution of means 14M

6. a) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence? 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. A sample of 64 students have a mean weight of 70 kgs. Can this be regarded as a sample from a population with mean weight 56 kgs and S.D 25 kgs ? 14M

8. Four methods are under development for making discs of a super conducting material. Fifty discs are made by each method and they are checked for super conductivity when cooled with liquid.

	1st Method	2nd Method	3rd Method	4th Method
Super Conductors	31	42	22	25
Failures	19	8	28	25

Test the significant difference between the proportions of conductors at 0.05 level. 14M

***

R-11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
II B.Tech. I Semester Regular Examinations, January 2014
Advanced Data Structures Through C++
(Common *to* CSE & IT)

Max. Marks: 70   Time: 03 Hours
****
Answer *any five* questions
All Questions carry equal marks (14 Marks each)

1. a) Define a class and a class member? Explain static class members with the help of an example.

   b) Write about parameter passing methods in C++

2. a) What is inheritance? Explain the different types of inheritance with the help of an example

   b) What are the differences between an abstract class and a class?

3. What is stack? Write the ADT implementation of stacks using templates in C++.

4. a) Explain the different methods that are used to calculate hash functions?

   b) How do you resolve collision using rehashing and extendible hashing?

5. a) What is external sorting? How do you perform external sorting on tapes using polyphase merge?

   b) What are the applications of priority queues?

6. What is an AVL tree? How do you perform insertion operation in an AVL tree using single and double rotations? Explain with the help of an example?

7. a) Explain the process of insertion in Red - Black trees?

   b) Define a B-Tree of order 'm'? How do you perform searching operation in a B-Tree.

8. a) What is pattern matching? Explain in detail Boyer–Moore algorithm by taking an example?

   b) Differentiate between Standard and Compressed Tries.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
II B.Tech. I Semester Regular Examinations, January 2014
Basic Electrical Engineering
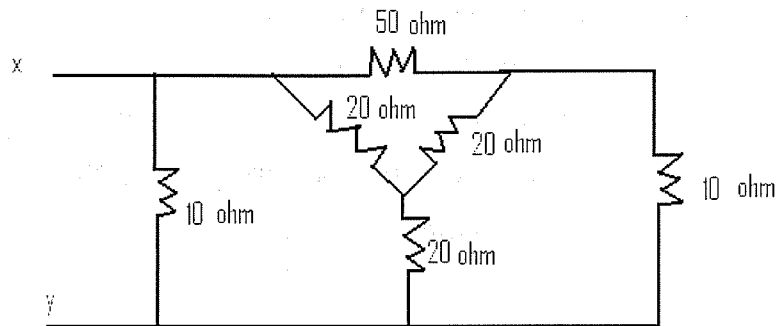*(Common to CSE & IT)*

Time: 3 hours

Max Marks: 70

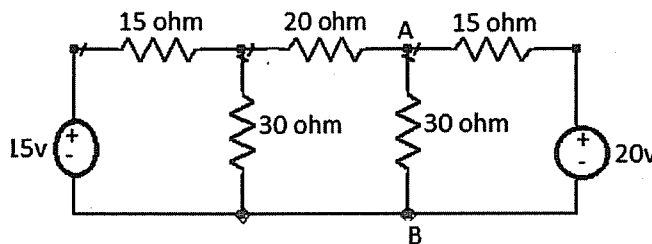*Answer any FIVE of the following*
All questions carry equal marks (14 Marks each)

* * * * *

1. a) Define the following i) Resistance (ii) Inductance (iii) Capacitance.   Also give the V-I relationship for the above elements.

   b) Find the source current in figure below

2. a) State and explain Kirchhoff's laws using neat diagrams

   b) Determine the current in branch A-B by Kirchhoff's laws.

3. a) Derive the expressions for ac through series RC circuit

   b) A series circuit consisting of a 10Ω resistor, a 100 μF capacitor and a 10 mH inductor is driven by a 50 Hz A.C voltage source of maximum value 100 volts. Calculate the equivalent Impedance, current in the circuit, the power factor and power dissipated in the circuit.

4. a) What are the advantages of a poly phase system over a single phase system

   b) Three impedances each of (5+j12) ohm are connected in star to a 220V, 3-phase, 50 Hz supply. Calculate the line currents

5. a) Derive the expression for the armature torque and shaft torque of a DC motor.

   b) The armature of a 6 pole, DC shunt motor takes 300 A at the speed of 400 revolutions per minute. The flux per pole is 75 mWb. The number of armature turns is 500. The torque lost in windage, friction and iron losses can be assumed a 2.5% calculate

         i.   Torque developed by the armature

         ii.   Shaft torque

         iii.   Shaft power in KW.

6. a) Explain the constructional details and types of single-phase transformers.

   b) A single-phase, 50 Hz transformer has 100 turns on the primary and 400 turns on the secondary winding. The net cross-sectional area of core is 250 cm². If the primary Winding is connected to a 230 V, 50 Hz supply. Determine,

         (i). The emf induced in the secondary winding

         (ii). The maximum value of flux density in the core.

7. a) Explain the principle and operation of a three-phase induction motor

   b) Explain the differences between squirrel cage induction motor and slip ring induction motor.

8. a) Explain

         (a) Deflecting torque

         (b) Controlling torque

         (c) Damping torque

   b) Explain with neat sketch the principle of operator of moving iron Instruments

***

Code : 1G132

Time: 3 hours   Max Marks: 70

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

* * * * *

1.   Show how the following decimal numbers are stored in a 6-bit two's complement
     format   a) +25   b)+32   c) -15   d) -1   e) 0   f) -45   g) +15   14M

2. a) Show the truth table for the following
        a) F=XY'+YZ+X'Y'Z'
        b) G= X'Y'+(X+Z')(Y+Z)   6M

   b) Reduce the following expression to a minimum sum of products form
        a) X(Y+W'Z)+WXZ
        b) X'Y'Z'+X'Y'Z+X'YZ+XY'Z+XYZ   8M

3. a) Discuss multiple output problems   4M

   b) Discuss integrated consensus for multiple output problems with suitable example   10M

4.   Design a combinational circuit whose output is equal to 1 if the input variables
     have more 1's than 0's. The output is 0 otherwise.   14M

5. a) Define sequential circuit   2M

   b) Design 4-bit synchronous binary counter using JK flip-flops   12M

6.   Discuss the following terms in detail with suitable diagrams
        a) Melay circuit
        b) Moore circuit
        c) Transition table
        d) Flow table
        e) State machine notations   14M

7.   An asynchronous sequential circuit is described by the excitation and output
     functions
                $Y=x_1x'_2+(x_1+x'_2)y$;
                $Z= y$
        a) Draw the logic diagram
        b) Derive the transition table and output map
        c) Obtain a two state flow table   14M

8.   Implement the following in PAL and PLA
     $F_1(a,b,c)=\sum(0,1,2,4)$ 14M

***

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)
II B.Tech. I Semester Regular Examinations, January 2014
Electronic Devices and Circuits
(CSE & IT)

Time: 3 hours

Max Marks: 70

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

* * * * *

1. a) Draw the energy band diagram of a PN junction under open circuit conditions and explain. 10M

   b) Explain the temperature dependence of V – I characteristics of a PN diode. 4M

2. a) Explain full wave centre tapped rectifier with capacitor filter with neat waveforms. 7M

   b) A full wave diode rectifier has v_i = 100sinωt, R_L = 900 Ω and R_f = 100 Ω. Calculate (a) the peak load current I_m, (b) the dc load current I_{dc} (c) ac load current I_{rms} (d) dc load voltage V_{dc} (e) the peak inverse voltage on the diode (f) ac input power (g) the dc output power (h) rectification efficiency. 7M

3. a) Draw the circuit of BJT in CC configuration and explain with input and output characteristics. 7M

   b) Distinguish between ac and dc load lines with suitable diagrams. 7M

4. a) List out the different types of biasing methods. 7M

   b) Derive the expression for stability factor for self-bias bipolar junction transistor. 7M

5. a) Why FET is called voltage controlled device? 4M

   b) With a neat sketch explain the drain source characteristics and transfer characteristics of enhancement type MOSFET. 10M

6. a) Compare A_V, A_I, R_i and R_o of CE, CB and CC configurations. 4M

   b) The h-parameters of a transistor used in CE circuit are h_{ie} = 1.0 kΩ, h_{re} = 10x 10^{-4}, h_{fe} = 50, h_{oe} = 100k. The load resistance for the transistor is I kΩ in the collector circuit. Determine R_i, R_o, A_V, and A_I in the amplifier stage (Assume R_s=100Ω). 10M

7. Explain the current shunt feedback, also find the gain, input impedance and output impedance. 14M

8. a) Explain the Barkhausen conditions required for sinusoidal oscillations to be sustained. 4M

   b) A Colpitts oscillator is designed with C_1= 100 PF and C_2 7500 PF. The inductance is variable. Find the range of inductance value, if the frequency of oscillation is to vary between 950 KHz and 2050KHz. 10M

***