

Code : 1G131

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

II B.Tech. I-Semester Regular Examinations, November 2012

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. | Explain various parameter passing mechanisms in C++. | 7 |
| b. | Describe the purpose of friend functions with suitable examples. | 7 |
| 2. a. | Explain in detail about the templates in C++ with example. | 8 |
| b. | List the merits and demerits of Inheritance. | 6 |
| 3. a. | Define the following notations:
i) Big Oh ii) Omega iii) Theta | 6 |
| b. | Write ADT operations for array implementation of polynomial addition. | 8 |
| 4. a. | Write short notes on open addressing technique. | 10 |
| b. | Distinguish between separate chaining and open addressing. | 4 |
| 5. a. | Discuss the model for external sorting. | 7 |
| b. | Explain multiway merge sort with example. | 7 |
| 6. a. | Construct the binary search tree for the input set 40, 60, 55, 33, 11, 46 and write a C++ function to implement the same. | 6 |
| b. | Discuss how elements are inserted into the AVL trees with example. | 8 |
| 7. a. | Write short notes on splay trees. | 7 |
| b. | Define B-Trees. Explain the construction of B-tress of order 5 with example. | 7 |
| 8. | Write a C++ program to print all occurrences of pattern in text using brute force substring search algorithm. | 14 |

Code : 1G235

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

II B.Tech. I-Semester Regular Examinations, November 2012

**Basic Electrical Engineering
(Common to CSE & IT)**

Max. Marks: 70

Time: 03 Hours

Answer any five questions

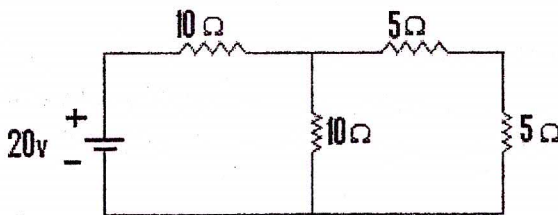
All Questions carry equal marks (14 Marks each)

1. a) Explain the following terms:

- | | | |
|---------------------|-----------------------|-------------------------|
| a) Charge | b) Electric potential | c) Potential difference |
| d) Electric current | e) Resistance | f) Conductance |
| g) Power | | |

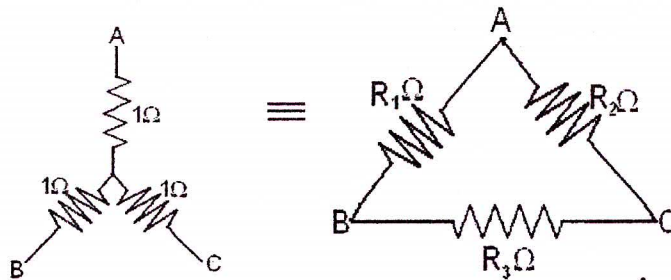
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b) Find the current, I in the following ckt



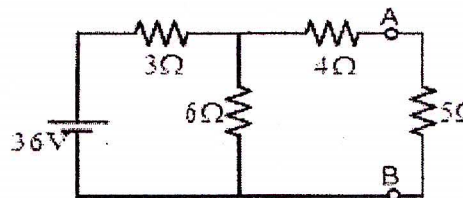
7

2. a) Calculate the equivalent delta connected Resistances values for the following star connected Resistances.



7

b) By using Thevenins theorem find the current through 5Ω resistor.



7

3. a) Derive expression for r.m.s. and average value of a sinusoidal alternating quantity

7

b) A two element series circuit is connected across an A.C. source given by $v = 200\sqrt{2} \sin(314t + 20)$. The current in the circuit is found to be $i = 10\sqrt{2} \cos(314t - 25)$. Determine the parameters of the circuit. Also determine the power factor, real power and reactive power taken by the circuit. Show that peak factor of a sinusoidal current wave form is 1.414?

7

4. a) Derive the relation between phase and line values of a 3-phase balanced delta connected system. 7
- b) Three similar inductive coils, each having a resistance of 20Ω and reactance of 12.57Ω are connected in star are fed from a 3- ϕ , 50 Hz, 200V supply. Calculate the line current and the power absorbed. 7
5. a) Explain different methods of excitation of D.C generators with suitable diagrams 7
- b) A 4 Pole D.C Series Motor has 944 wave connected Armature conductors. at a Certain load the Flex per pole is 209 Nm , Calculate load current and the Speed at which it will run with an applied voltage of 500v. The total motor resistance is 3Ω . 7
6. a) Define voltage regulation and efficiency of a transformer. Deduce the expression for the voltage regulation. 8
- b) The number of turns on the primary and secondary windings of a single phase transformer are 350 and 35 respectively. If the primary is connected to a 2.2 KV 50 HZ supply determine the secondary voltage 6
7. a) Derive the expression for the torque in three phase induction motor 8
- b) A 6 pole induction motor is fed by three phase 50HZ supply and running with a full load slip of 3%. Find the full load speed of induction motor and also the frequency of rotor emf. 7
8. a) Define the terms "indicating instruments", "recording instruments" and "integrating Instruments". Give examples of each case. 6
- b) Explain the construction and working of PMMC type instruments. 8

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

II B.Tech. I-Semester Regular Examinations, November 2012

**Digital Logic Design
(CSE)**

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

- 1.a) Convert the following hexa decimal numbers into an equivalent binary numbers. 7
 - i) 58 ii) 234 iii) ABC iv) FB18
- b) Subtract the following decimal numbers using the 9's complement. 7
 - i) 347-265 ii) 49-84 iii) 349-436 iv) 9-4
- 2.a) Express the following function in sum of min terms and product of max terms. 7
 $F(A, B, C, D) = B^1D + A^1D + BD$
- b) Simplify the following expression using k-map. 7
 $F(A, B, C, D) = \Sigma(1, 2, 9, 10, 11, 14, 15)$
- 3.a) Explain about canonical forms. 6
- b) Implement the following Boolean function F using the two level form. 8
 - i) NAND-AND ii) AND-OR $F(A, B, C, D) = \Sigma 0, 1, 2, 3, 4, 8, 9, 12$
4. Write short notes on the following. 14
 - a) Combinational Circuit
 - b) Binary Adder-Subtractor
 - c) Encoders
5. Define Latch? Explain about different types of Latches in detail? 14
6. Explain about the procedure for designing Sequential Circuits in detail? 14
7. Explain about the following 14
 - a) Asynchronous Sequential Circuits
 - b) Merging of the Flow Table
8. Explain in detail about Programmable Array Logic (PAL). 14

Code : 1G334

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

II B.Tech. I-Semester Regular Examinations, November 2012

Electronic Devices and Circuits
(Common to CSE & IT)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Explain the operation of zener diode and define zener breakdown. Draw its VI characteristics? 7
- b) Define the terms given below
 - i) Diffusion current ii) Drift current iii) Reverse saturation current
 - iv) cut in voltage v) Barrier potential. 7
2. a) Explain Full wave rectifier operation and derive all the necessary parameters of HWR? 7
- b) Ideal diodes are used in a bridge rectifier with a source of 230 V, 50Hz. If the load resistance is 150Ω and turns ratio is 4:1. Find
 - (i)DC output voltage (ii) rms voltage (iii) ripple factor (iv) Efficiency. 7
3. a) Explain the input output characteristics of common base configuration with neat sketches? 7
- b) If a transistor with $\alpha=0.96$ and emitter to base resistance 80Ω is placed in common emitter configuration, find A_I , A_V and A_P . 7
4. a) Draw the self bias circuit and obtain the expression for the stability factor S. what are the advantages of this circuit. 7
- b) Compare all the three biasing circuits. 7
5. a) Explain the principle of operation of N-channel JFET 7
- b) For a p-channel silicon FET, with $a=2 \times 10^{-4}$ and channel resistivity $\rho=10\text{-cm}$. find the pinch off voltage. 7
6. Given a single stage transistor amplifier with h-parameter as $h_{ie} = 1.1K\Omega$, $h_{rc}=1$, $h_{fe}=-51$, $h_{oc}=25\mu A/v$, calculate A_I , A_V , R_I and R_O for the common collector configuration, with $R_S=R_L=10K$. 14
7. a) Briefly discuss the effect of negative feedback on band width and stability of an amplifier? 7
- b) The gain of an amplifier is decreased to 1000 with the feedback from its gain of 5000. Calculate the feedback factor and amount of negative feedback in dB. 7
8. a) With suitable diagram explain the operation of Colpitts oscillator? 7
- b) Discuss in detail about the operation of Wien bridge oscillator? 7

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

II B.Tech. I-Semester Regular Examinations, November 2012

Mathematical Foundations of Computer Science

(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 tautology. Show that $[(p \vee q) \wedge (p \rightarrow r) \wedge (q \rightarrow r)] \rightarrow r$ is a tautology by constructing truth table 7M
- b) If P,Q and R are three atomic variables, obtain the principle disjunctive normal form for $(P \rightarrow (Q \wedge R)) \wedge (\neg P \rightarrow (Q \vee R))$ 7M
- 2 a) What are the bound variables and free variables? Identify the same in each of the following expressions
- i) $\forall y \exists z [\cos(x + y) = \sin(z - x)]$
- ii) $\exists x \exists y [x^2 - y^2 = z]$ 6M
- b) Establish the validity of the following argument using the rules of inference
- $$\begin{array}{l} p \Rightarrow q \\ r \Rightarrow \neg q \\ \hline \therefore p \Rightarrow \neg r \end{array}$$
- 8M
- 3 a) What is a Hasse diagram? Draw the Hasse diagrams of the following sets under the partial ordering relation "divides" and indicate those which are totally ordered.
(i) {2,6,24} (ii) {1,2,3,6,12} 8M
- b) Define function composition and let $A=\{1,2,3,4\}$, $B=\{a,b,c\}$ and $C=\{w,x,y,z\}$ with $f: A \rightarrow B$ and $g: B \rightarrow C$, given by $f=\{(1,a), (2,a), (3,b), (4,c)\}$ and $g=\{(a,x), (b,y), (c,z)\}$. For each of the element of A find gof . 6M
- 4 a) Let $S=\{a,b,c\}$ and let $*$ denote a binary operation on S given by Table 1. Also let $P=\{1,2,3\}$ and \oplus be a binary operation on P given by Table 1. Show that $\langle S, * \rangle$ and $\langle P, \oplus \rangle$ are isomorphic.
- | | | | | | | | |
|-----|---|---|---|----------|---|---|---|
| $*$ | a | b | c | \oplus | 1 | 2 | 3 |
| a | a | b | c | 1 | 1 | 2 | 1 |
| b | b | b | c | 2 | 1 | 2 | 2 |
| c | c | b | c | 3 | 1 | 2 | 3 |
- Table 1: 6M
- b) Define an Abelian group with examples. For any group G prove that G is abelian if and only if $(ab)^2 = a^2b$ for all $a, b \in G$ 8M

- 5 a) One type of automobile license plate number in Massachusetts consists of one letter and five digits. Compute the number of such license plate numbers possible. 7M
- b) There are five different roads from city A to city B, three different roads from city B to C, and three different roads that go directly from A to C.
- How many different ways are there from A to C altogether?
 - How many different trips are there there from A to c and back to A that visit B at least once? 7M
- 6 a) a. Find the generating function of $(n-1)^2$ 4M
- b) b. Find the coefficient of x^{20} in $(x^3 + x^4 + x^5 + \dots)^5$ 4M
- c) c. Explain the recurrence relation. What is its application in computer science and give suitable examples. 6M
- 7 a) Give the adjacency matrix of the digraph $G = (\{a, b, c, d\}, R)$, where $R = \{ (a, b), (b, c), (d, c), (d, a) \}$ 6M
- b) Prove that if G is a plane graph, then the sum of the degrees of the regions determined by G is $2|E|$, where $|E|$ is the number of edges of G . 8M
- 8 a) Find whether the following graphs (**figure a**) are isomorphic or not.

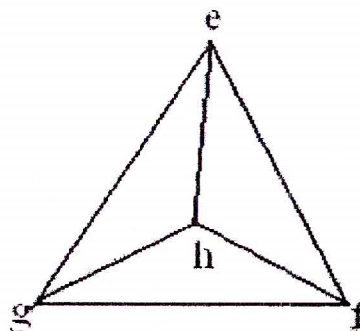
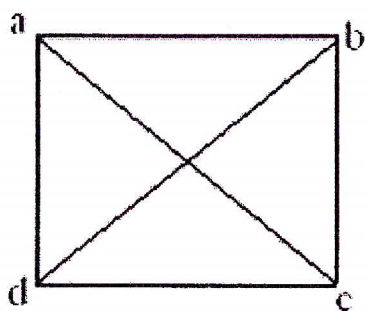


figure a

8M

- b) Verify Euler's formula for the following graph. **Figure b**

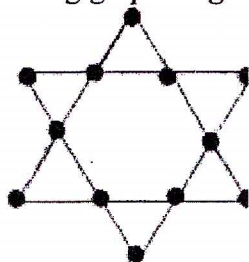


Figure b

6M

Code: IGC33

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

II B.Tech. I-Semester Regular Examinations, November 2012

Probability & Statistics

(Computer Science & Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

1. a. Calculate mean, median and mode of the following data relating to weight of 120 articles:

Weight (in gms): 0-10 10-20 20-30 30-40 40-50 50-60

No. of articles: 14 17 22 26 23 18

7

- b. Find the correlation co-efficient between x and y for the given values.

 x : 1 2 3 4 5 6 7 8 9 10 y : 10 12 16 28 25 36 41 49 40 50

7

2. a. 1. If $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{3}$ and $P(A \cup B) = \frac{1}{2}$ then evaluate

 $P(A/B)$, $P(B/A)$, $P(A \cap B')$ and $P(A/B')$.

7

- b. The students in a class are selected at random, one after the other, for an examination. Find the probability that the boys and girls in the class alternate if the class consists of 4 boys and 3 girls.

7

3. a. Find the distribution function of the total number of heads occurring in three tosses of an unbiased coin.

7

- b. If $f(x) = \begin{cases} \frac{1}{2}(x+1), & -1 < x < 1 \\ 0, & \text{elsewhere} \end{cases}$

represents the density of a random variables, find $E(X)$ and $V(X)$.

7

4. a. In 256 sets of 12 tosses of a coin, in how many cases one can expect 8 heads and 4 tails.

7

- b. In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution.

7

5. a. A random sample of size 81 is taken from an infinite population having the mean 65 and standard deviation 10. What is the probability that mean will lie between 66 and 68.

7

- b. A random sample of size 25 from a normal population has the mean 47.5 and the standard deviation 8.4. Does this information tend to support or refuse the claim that the mean of the population is 42%.

7

6. a. Among 900 people in a state 90 are found to be rice eaters. Construct 99% confidence interval in the true proportion.

7

- b. If x_1, x_2, \dots, x_n be a random sample of size n taken from a finite population then show that the sample variance $s^2 = \frac{1}{n-1} \sum (x_i - \bar{x})^2$ is an unbiased estimator of the parameter σ^2 .

7

7. a. A machine runs on an average of 125 hours/year. A random sample of 49 machines has an annual average use of 126.9 hours with standard deviation 8.4 hours. Does this suggest to believe that machines are used on the average more than 125 hours annually at 0.05 level of significance. 7
- b. To test the claim that men are taller than women, a survey was conducted resulting in the following data:

Gender	Sample size	Mean height (cm)	s.d. (cm)
Men	1600	172	6.3
Women	6400	170	6.4

Is the claim tenable at 0.01 level of significance. 7

8. a. Test whether there is significant difference at 0.05 level in the quality of teaching among four engineering colleges A, B, C, D of a technological university if the number of failures are 26, 23, 15, 32 respectively. Assume that each college has a strength of 200 students. 7
- b. Test for goodness of fit of a Poisson distribution at 0.01 level of significance to the following observed data of e-mails received:

No. of e-mails	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Observed frequency	3	15	47	76	68	74	46	39	15	9	5	2	0	1