

Code : 1P2C16

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET

(AUTONOMOUS)

MCA I Semester Regular Examinations, February 2014

**TECHNICAL COMMUNICATION AND COMPUTER ETHICS**

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following  
All questions carry equal marks (12 Marks each)*

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1. Write a note on the importance and need for technical communication.
2. Explain the impact of technology on effective communication.
3. List out different type of Listening and explain with illustrations.
4. Discuss the importance of Reading and Interpreting graphic information in comprehensive of technical materials.
5. What is a Group Discussion? Write a note on the characteristics of successful Group Discussion.
6. How do you project a positive Image at a Job Interview? Discuss.
7. Write a note on ethics in Information Technology.
8. What are the key issues in Software Development? Explain.

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Code : 1P2A14

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ACCOUNTING & FINANCIAL MANAGEMENT

Time: 3 hours

Max Marks: 60

Answer any FIVE of the following  
All questions carry equal marks (12 Marks each)

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1. a) Discuss the Accounting principles & conventions?  
b) Procedure for writing a Journal.
2. What is meant by Ratio analysis? Explain its objectives and importance in financial analysis.
3. What are the advantages and disadvantages of FIFO and LIFO methods of pricing the material issues?
4. Explain the meaning of Cash Flow statement. Distinguish between Funds flow statement and Cash flow statement?
5. What is the 'Time value of Money'? Explain objectives of time value of money?
6. Examine the following three proposals and evaluate them on  
a) Payback period      b) ARR method.

Particulars	Project-A	Project-B	Project-C
Investment→	Rs. 10,00,000	Rs. 10,00,000	Rs. 10,00,000
Cash in flows	Project-A	Project-B	Project-C
* Year -1	5,00,000	6,00,000	2,00,000
Year -2	5,00,000	6,00,000	2,00,000
Year -3	2,00,000	2,00,000	6,00,000
Year -4	—	—	4,00,000

7. What is 'Variance'? Indicate its significance to the management?
8. The information about Raj and Co., are given below :
  1. Profit Volume Ratio = 20%
  2. Fixed Cost = Rs. 36,000
  3. Selling price per unit = Rs. 150

Calculate

- a) B.E.P ( in Rs. )
- b) B.E.P ( in units )
- c) Variable cost per unit.
- d) Sales.

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Code : 1P2B12

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**COMPUTER PROGRAMMING**

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following  
All questions carry equal marks (12 Marks each)*

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1. a) List and explain the different conventions used in pseudo code convention.  
b) Explain the limitations of flow charts over algorithms.
2. a) Explain any five string handling functions with its syntax and example.  
b) What is an expression? Give brief description about the different types of expressions.
3. a) Write a program in C to find the Fibonacci sequence of a given number using recursive technique.  
b) What are pointers? Mention the salient features of pointers.
4. a) Distinguish between structures and unions.  
b) Create a user defined data type from structure. The structure should contain the variables as char, int etc. by using these variables display name, sex & acno of two employees. Use array of structures.
5. a) How can we define the functions outside a class. Explain it with suitable program.  
b) Differentiate between do while and while loops.
6. a) Explain the various visibility modifiers that are used in C++.  
b) Define a constructor. Explain the copy constructor in detail.
7. Discuss in detail about the different types of inheritance.
8. a) Explain the exception handling mechanism using C++.  
b) Write short notes on file manipulators.

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MCA I Semester Regular Examinations, February 2014

***INFORMATION & COMMUNICATION TECHNOLOGY***

**Max. Marks: 60**

**Time: 03 Hours**

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**Answer any five questions**

**All Questions carry equal marks (12 Marks each)**

- |   |   |  |    |
|---|---|--|----|
| 1 | a | Explain in detail about the communication structure among various devices inside the system diagrammatically | 6  |
|   | b | Functional units of the system with block diagram  | 6  |
| 2 | a | Write about working strategy of Cache memory with replacement algorithm                                      | 6  |
|   | b | Explain PROM, EPROM, EEPROM  | 6  |
| 3 |   | Explain various secondary storage devices and explain diagrammatically                                       | 12 |
| 4 | a | Write about optical input devices  | 6  |
|   | b | Explain about Peripheral Component Interconnection and Universal Serial Bus                                  | 6  |
| 5 |   | Explain motherboard with various associated components and ports   | 12 |
| 6 | a | Explain Guided and Unguided transmission media   | 6  |
|   | b | Bridges and Routers  | 6  |
| 7 |   | Explain in details about the functionalities of all layers of OSI reference model diagrammatically.          | 12 |
| 8 | a | Importance of XML in web technologies  | 6  |
|   | b | Dynamic web pages  | 6  |

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Code : 1P2B11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
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MCA I Semester Regular Examinations, February 2014

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Time: 3 hours

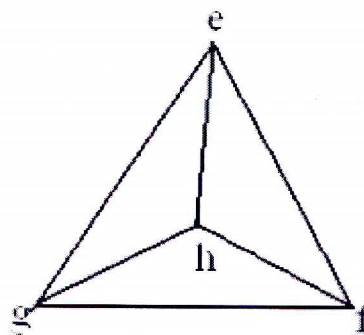
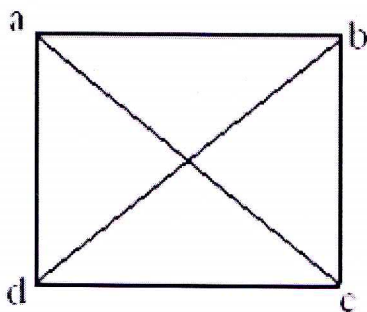
Max Marks: 60

*Answer any FIVE of the following**All questions carry equal marks (12 Marks each)*

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1. a) Prove that  $[(p \vee q) \wedge (p \rightarrow r) (q \rightarrow r)] \rightarrow r$  is a tautology. 6M
- b) Obtain CNF of  $\sim (p \rightarrow (q \wedge r))$  6M
2. a) Explain the two types of quantifiers and determine the truth value of each of the following statements:
- (i)  $(\forall x), |x| = -x$
- (ii)  $(\forall x), x + 2 > x$
- (iii)  $\exists x, x^4 = x$
- (iv)  $\exists x, x-2 = x$  6M
- b) Show that the following set of premises is inconsistent.. “If the contract is valid, then John is liable for penalty. If John is liable for penalty, he will go bankrupt. If the bank will loan him money, he will not go bankrupt. As a matter of fact, the contract is valid and the bank will loan him money”. 6M
3. a) Let  $U = \{1, \dots, 9\}$ ,  $A = \{1, 2, 4, 6, 8\}$ ,  $B = \{2, 4, 5, 9\}$ ,  $C = \{x / x \text{ is a '+' ve integer and } x^2 \leq 10\}$  Compute the following.
- (i)  $A - B$
- (ii)  $B - A$
- (iii)  $(A \cap B) - C$
- (iv)  $A \cup (B - C)$
- (v)  $(A \cup B) - (A \cup C)$
- (vi)  $(A \cup B) - (B \cap C)$  6M
- b) Given  $A = \{2, 3, 4\}$ ,  $B = \{4, 5\}$ ,  $C = \{1, 2, 4, 8\}$ . Prove the associative and distributive properties on sets. 6M
4. a) i) Let  $A = \{1, 2, 3\}$  and  $B = \{a, b, c\}$ . Let  $R$  be a relation defined from  $A$  to  $B$  as  $R = \{(1, a), (1, b), (2, b), (2, c)\}$ . Find  $R^{-1}$
- ii) Prove that the relation “congruence modulo  $m$ ” over the set of positive integers is an equivalence relation. 6M
- b) i) If  $f(x) = 2x$  and  $g(x) = x^3 + 2x - 3$ , find  $f \circ g(x)$
- ii) Is the function defined by  $f: \mathbb{R} \rightarrow \mathbb{R}$ ,  $f(x) = |x| + x$  for all  $x \in \mathbb{R}$  one-one and onto? Justify. 6M

5. a) Define homomorphism and isomorphism between two algebraic systems. 4M  
 b) Show that the set  $N$  of natural numbers is a semi group under the operation  $x * y = \max \{x, y\}$ . Is it a monoid? 8M
6. a) A student is to answer 10 out of 13 questions  
 i) How many choices has he?  
 ii) How many if he must answer the first two questions  
 iii) How many if he must answer the first or second but not both.  
 iv) How many if he must answer three out of the first five questions?  
 v) How many if he must answer at least three of the first five questions. 8M
- b) Determine the sum of all the coefficients in the expansions of  
 i)  $(x+y)^3$   
 ii)  $(x+y)^{10}$   
 iii)  $(x+y+z)^{10}$   
 iv)  $(w+x+y+z)^5$  4M
7. a) Solve the recurrence relation  $a_n - 3a_{n-1} - 4a_{n-2} = 0$  for  $n \geq 2$  and  $a_0 = a_1 = 1$  using the characteristic roots. 8M  
 b) Find the coefficient of  $x^{32}$  in  $(1 + x^5 + x^9)^{10}$  4M
8. a) What is a graph? Discuss about chromatic numbers 4M  
 b) (i) 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  $G$ .  
 (ii) Find whether the following graphs are isomorphic



8M

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Code : 1P2C13

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Probability & Statistics

Time: 3 hours

Max Marks: 60

Answer any FIVE of the following  
All questions carry equal marks (12 Marks each)

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- 1. a) If  $A$  and  $B$  are two events, then prove that  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ . 4M
- b) Determine the probability of the following event :  
The sum 8 appears in a single toss of pair of fair dice. 4M
- c) Police plan to enforce speed limits by using radar traps at 4 different locations within the city limits. The radar traps at each of these locations  $L_1, L_2, L_3, L_4$  are operated for 40%, 30%, 20% and 30% of the time. If a person who is speeding on his way to work has probabilities of 0.2, 0.1, 0.5 and 0.2 respectively of passing through these locations, what is the probability that he will be fined (for over speed)? 4M

- 2. a) A discrete random variable  $X$  has the following probability distribution given below:

Value of X	0	1	2	3	4	5	6	7
$P(X = x)$	0	$k$	$2k$	$2k$	$3k$	$k^2$	$2k^2$	$7k^2 + k$

- (i) Find the value of ' $k$ '. (ii) Find  $P(X < 6), P(0 < X < 4)$  and  $P(X \geq 6)$ . 6M

- b) If the Probability density of a random variable is given by  $f(x) = \begin{cases} x & \text{for } 0 < x < 1 \\ 2 - x & \text{for } 1 \leq x < 2 \\ 0 & \text{elsewhere} \end{cases}$

Find the Probabilities that a random variable having this Probability density will take on a value (i) between 0.2 and 0.8; (ii) between 0.6 and 1.2. 6M

- 3. a) Find the mean and variance of Binomial distribution. 6M
- b) Students of a class were given a mechanical aptitude test. Their grades were found to be normally distributed with mean 60 and standard deviation 5. What percent of students scored  
(i) More than 60 grades? (ii) Less than 56 grades? (iii) Between 45 and 65 grades? 6M

4. a) Let  $U_1$  be a variable that stands for any of the elements of the population 2, 7, 9 and  $U_2$  be a variable that stands for any of the elements of the population 3, 8. Compute: (a)  $\mu_{U_1}$  (b)  $\mu_{U_2}$  (c)  $\mu_{U_1+U_2}$  (d)  $\mu_{U_1-U_2}$  (e)  $\sigma_{U_1}$  (f)  $\sigma_{U_2}$  (g)  $\sigma_{U_1+U_2}$  (h)  $\sigma_{U_1-U_2}$ .

Verify that

$$(i) \mu_{U_1 \pm U_2} = \mu_{U_1} \pm \mu_{U_2} \quad (j) \sigma_{U_1 \pm U_2} = \sqrt{\sigma_{U_1}^2 + \sigma_{U_2}^2} . \quad 8M$$

- b) A random sample of 8 envelopes is taken from the letter box of a post office and their weights in grams are found to be: 12.1, 11.9, 12.4, 12.3, 11.5, 11.6, 12.1, and 12.4. Find 95% confidence limits for the mean weight of the envelopes received at that post office. 4M

5. a) A filling machine is expected to fill 5 kg of powder into bags. A sample of 10 bags gave the following weights: 4.7, 4.9, 5.0, 5.1, 5.4, 5.2, 4.6, 5.1, 4.6 and 4.7. Test whether the machine is working properly. Use a 0.05 level of significance. 6M

- b) A study is conducted to compare the length of time between men and women to assemble a certain product. Past experience indicates that the distribution of times for both men and women is approximately normal but the variance of the times for women is less than that for men. A random sample of times for 11 men and 14 women produced the following data:

Men	Women
$n_1 = 11$	$n_2 = 14$
$s_1 = 6.1$	$s_2 = 5.3$

Test the hypothesis that  $\sigma_1^2 = \sigma_2^2$  against the alternative that  $\sigma_1^2 > \sigma_2^2$ . Use 0.05 level of significance. 6M

6. a) Explain briefly the following

- (i) Level of significance                      (ii) Critical region  
(iii) Left One tailed test                      (iv) Right one tailed test 6M

- b) A manufacturer claims that the average tensile strength of thread A exceed the average tensile strength of thread B by at least 12 kilograms. To test his claim, 50 pieces of each type of thread are tested under similar conditions. Type A thread had an average tensile strength of 86.7 kilograms with known standard deviation of  $\sigma_A = 6.28$  kilograms, while type B thread had an average tensile strength of 77.8 kilograms with known standard deviation of  $\sigma_B = 5.61$  kilograms. Test the manufacturers claim at 0.05 level of significance. 6M



7. a) Fit a Straight line  $y = a + bx$  to the following data by the method of least squares:

$x$	0	1	3	6	8
$y$	1	3	2	5	4

5M

- b) Find the Correlation Coefficient between the heights and weights of 300 adult males in the United States as given in the Table-1.

		Heights $x$ (inches)				
		59-62	63-66	67-70	71-74	75-78
Weights $y$ (pounds)	90-109	2	1			
	110-129	7	8	4	2	
	130-149	5	15	22	7	1
	150-169	2	12	63	19	5
	170-189		7	28	32	12
	190-209		2	10	20	7
	210-229			1	4	2

Table-1

7M

8. a) Explain (M/ M/ 1): ( $\infty$  / FCFS) Queuing model. 5M
- b) Assume that both arrival rate and service rate following Poisson distribution. The arrival rate and service rate are 25 and 35 customers/hour respectively, at a single window in RTC reservation counter. Find  $\rho$ ,  $L_s$ ,  $L_q$ ,  $W_s$  and  $W_q$ . 7M

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