

Code: 5P2B11/4P2B11

M.C.A. I Semester Regular & Supplementary Examinations January 2016

Mathematical Foundations of Computer Science

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70Marks)

UNIT-I

1. a) Show that $R \cap (P \cup Q)$ is a valid Conclusion from the premises $P \cup Q$, $Q \rightarrow R$, $P \rightarrow M$ and $\sim M$. 6M
- b) Show that the following premises are inconsistent.
 If Jack misses many classes through illness, then he fails high school.
 If Jack fails high school, then he is uneducated.
 If Jack reads a lot of books, then he is not uneducated.
 If Jack misses many classes through illness and reads a lot of books. 6M

OR

2. a) Show that $(\sim P \cap (\sim Q \cap R)) \cup (Q \cap R) \cap (P \cap R) \leftrightarrow R$. 6M
- b) Obtain the PDNF of the formula $(\sim P \rightarrow R) \cap (Q \leftrightarrow P)$. 6M

UNIT-II

3. a) Let $X = \{1, 2, 3, \dots, 7\}$ and $R = \{(x, y) / x - y \text{ is divisible by } 3\}$ Show that R is an Equivalence relation and draw its matrix and digraph. 6M
- b) Explain Warshall's algorithm. Compute the Transitive using Warshall's algorithm for the relation $R = \{(a, a), (a, b), (b, c), (c, d), (c, e), (d, e)\}$. 6M

OR

4. a) Define Lattice? Explain the properties of lattice. 6M
- b) What is Poset? Draw the Hasse diagram of the poset $(P(A), \subseteq)$, $A = \{a, b, c, d\}$. 6M

UNIT-III

5. a) How many 5 digit number can be composed of the digit in the number 1 2 3 3 4 2 3 3. 6M
- b) A multiple choice test has 15 Questions and 4 choices for each Answer. How many ways can the 15 Questions be answered so that
- i) Exactly 3 answers are correct.
- ii) At least 3 answers are correct. 6M

OR

6. a) Compute the number of 6 letter combinations of the letter of English alphabet. If no letter is to appear in the combination more than 2 times. 6M
- b) State and prove Multinomial Theorem. 6M

UNIT-IV

7. a) In $(1 + x^5 + x^9)^{10}$ find the coefficient of x^{23} and x^{32} . 6M
- b) Solve the Recurrence Relation $a_n + 6a_{n-1} + 12a_{n-2} + 8a_{n-3} = 3^n$. 6M

OR

8. a) Solve the Recurrence Relation $a_n - 8a_{n-1} + 21a_{n-2} - 18a_{n-3} = 0, n \geq 3$. 6M
- b) Solve the Recurrence Relation $a_{n+2} - 2a_{n+1} + a_{n-2} = 2^n$ where $a_0 = 1$ and $a_1 = 2$ by the method of Generating function. 6M

UNIT-V

9. a) Show that the complete graph K_5 is non planar. 6M
- b) Explain BFS Algorithm with example. 6M

OR

10. a) What is minimum spanning tree? Explain minimal spanning tree Algorithms with examples. 6M
- b) Find the Chromatic number of the $K_{3,3}$ and Wheel graph. 6M

Code: 5P2B12

M.C.A. I Semester Regular & Supplementary Examinations January 2016
Computer Programming

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 12 = 60Marks)

UNIT-I

1. a) What are the rules of identifier in C language? Give some valid and invalid identifiers. What is the need for compiler for a high level language? What are the advantages and disadvantages of writing programs in a high level language? 6M
- b) Give the precedence and associativity of operators supported by C language. How the two rules effect the evaluation of expressions. Give examples. 6M

OR

2. a) Write an algorithm/program to sort the strings. 9M
- b) What are the fundamental data types supported by C language. 3M

UNIT-II

3. a) What are the advantages and disadvantages of recursion? Write a recursive program to compute GCD of two numbers. 7M
- b) Write a program to check whether the given year is leap year or not. 5M

OR

4. a) What are the differences between structure and union? 3M
- b) Assuming you are designing data structures for a college information system. Create different structures that are required for solving the problem (Code is not required). 9M

UNIT-III

5. a) What are inline functions, and friend functions? When do you use them? Write a friend function to check whether the given number is prime or not. 8M
- b) Give the syntax of new and delete operators of the C++ language. 4M

OR

6. a) What is friend class? Give an example. 6M
- b) What are the advantages and disadvantages of C++ when compared with C. 6M

UNIT-IV

7. What is function template? Write a function template for sorting different data types of numbers. 12M

OR

8. a) What is Polymorphism? What are the different types of polymorphism? What is the need for virtual functions? 5M
- b) How the accessibility of the member variables changes with multiple and multilevel inheritance. 7M

UNIT-V

9. What is file? What are the different operations that can be performed on the files in C++? 12M

OR

10. a) What are File streams? 6M
- b) What are the rules for exception handling in C++? 6M

Code: 5P2C13/4P2C13

M.C.A. I Semester Regular & Supplementary Examinations January 2016

Probability & Statistics

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70Marks)

UNIT-I

1. a) Define Probability of an Event. If A^c is the complement of A then prove that $P(A^c) = 1 - P(A)$. 6M

- b) If the Probability density of a random variable is given by

$$f(x) = \begin{cases} kx^2 & 0 < x < 1 \\ 0 & \text{elsewhere} \end{cases}$$

Find the value of k and the Probabilities that a random variable having this Probability density will take on a value between 0.25 and 0.75. 6M

OR

2. a) Suppose colored balls are distributed in three indistinguishable boxes as follows:

| | Box I | Box II | Box III |
|-------|-------|--------|---------|
| Red | 2 | 4 | 3 |
| White | 3 | 1 | 4 |
| Blue | 5 | 3 | 3 |
| Total | 10 | 8 | 10 |

A box is selected at random from which a ball is selected at random. What is the probability that the ball is colored (i) red (ii) white (iii) black? 8M

- b) Find the value of k and the distribution function $F(x)$ given the probability density function of a random variable X as:

$$f(x) = \frac{k}{x^2 + 1}, \quad -\infty < x < \infty.$$

4M

UNIT-II

3. a) Define the normal distribution and find its mean and variance. 6M

- b) Out of 800 families with 4 children each, how many families would be expected to have (i) 2 boys and 2 girls (ii) at least one boy (iii) no girl (iv) at most two girls? Assume equal probabilities for boys and girls. 6M

OR

4. a) If the probability of a bad reaction from a certain injection is 0.001. Determine the chance that out of 2000 individuals more than two will get a bad reaction. 6M

- b) Define the uniform distribution and find its mean and variance. 6M

UNIT-III

5. a) Define population and sample. Find the value of the finite population correction factor for $n = 10$ and $N = 1000$. 6M

- b) Determine a 95% confidence interval for the mean of a normal distribution with variance $\sigma^2 = 0.25$, using a sample of $n = 100$ values with mean $\bar{x} = 212.3$. 6M

OR

6. a) How many different samples of size $n = 2$ can be chosen from a finite population of size (i) $N = 7$, (ii) $N = 24$, (iii) What is the probability of each sample in part (i) and the probability of each sample in part (ii). 6M

- b) The average zinc concentration recovered from a sample of zinc measurements in 36 different locations is found to be 2.6 grams per milliliter. Find a 95% confidence intervals for the mean zinc concentration in the river. Assume that the population standard deviation is 0.3. 6M

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| UNIT-IV |
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7. a) Explain the test procedure for large sample test concerning difference between two proportions. 6M
- b) In two independent samples of sizes 8 and 10 the sum of squares of deviations of the sample values from the respective sample means were 84.4 and 102.6. Test whether the difference of variances of the populations is significant or not. Use a 0.05 level of significance. 6M

OR

8. a) 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 $\dagger_A = 6.28$ kilograms, while type B thread had an average tensile strength of 77.8 kilograms with known standard deviation of $\dagger_B = 5.61$ kilograms. Test the manufacturers claim at 0.01 level of significance. 6M
- b) Explain the test procedure for large sample test concerning one proportion. 6M

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| UNIT-V |
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- Q.9 a) Explain the test procedure of χ^2 test for goodness of fit. 5M
- b) An experiment was designed to study the performance of 4 detergents for cleaning fuel injectors. The following "cleanness" readings were obtained with specially designed equipment for 12 tanks of gas distributed over 3 different models of engines:

| | Engine 1 | Engine 2 | Engine 3 | Total |
|--------------------|------------|------------|------------|------------|
| Detergent A | 45 | 43 | 51 | 139 |
| Detergent B | 47 | 46 | 52 | 145 |
| Detergent C | 48 | 50 | 55 | 153 |
| Detergent D | 42 | 37 | 49 | 128 |
| Total | 182 | 176 | 207 | 565 |

Looking at the detergents as treatments and the engines as blocks, obtain the appropriate analysis of variance table and test at the 0.01 level of significance whether there are differences in the detergents or in the engines. 7M

OR

10. a) The following is the distribution of the hourly number of trucks arriving at a company's warehouse:

| | | | | | | | | | |
|--------------------------|----|-----|-----|-----|----|----|---|---|---|
| Trucks arriving per hour | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Frequency | 52 | 151 | 130 | 102 | 45 | 12 | 5 | 1 | 2 |

Find the mean of this distribution and using it as the parameter λ , fit a Poisson distribution. Test for goodness of fit at the 0.05 level of significance. 7M

- b) Explain procedure for one-way classification of analysis of variance. 6M

Hall Ticket Number :

R-15

Code: 5P2A14

M.C.A. I Semester Regular Examinations January 2016

Accounting and Financial Management

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 12 = 60Marks)

UNIT-I

1. What is meant by double entry system of accounting? Explain its advantages and limitations.

OR

2. From the following transaction prepare a journal, ledger accounts and a trial balance in the books of Mr.Raju.

| | | |
|---------------|-----------------------------------|------------|
| 1March 2015 | Mr. Raju Started business Cash | Rs.100,000 |
| 2 March 2015 | Cash deposited in to bank | Rs.30,000 |
| 5 March 2015 | Goods purchase for cash | Rs.15,000 |
| 10 March 2015 | Machinery bought for cash | Rs.20,000 |
| 14 March 2015 | Goods sold for cash | Rs.12,000 |
| 15 March 2015 | Good bought from Sri Krishna & Co | Rs.25,000 |
| 18 March 2015 | Cash with drawn from bank | Rs.10,000 |
| 21March 2015 | Goods sold to Mr. Kumar | Rs.15,000 |
| 31 March 2015 | Salaries paid to employees | Rs.15,000 |

UNIT-II

3. Explain the significance, assumption and limitation of breakeven analysis.

OR

4. Calculate: **a)** P/ V Ratio **b)** BEP Sales in rupees **c)** Margin of Safety **d)** Sales required to earn a profit of Rs.30,000

| Particulars | Amount Rs |
|-------------------------|------------|
| Selling price per unit | 40.00 |
| Variable cost per unit | 24.00 |
| Fixed cost | 12,000 |
| Present volume of sales | 2000 units |

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| UNIT-III |
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5. "Ratio analysis is the tool and technique of studying financial health of the a firm" discuss the utilities and limitations of ratio analysis in the lights of the above statement

OR

6. The ratios relating to a company are given below
- | | |
|--------------------------|----------|
| Gross profit Ratio | 15% |
| Stock Velocity | 6 months |
| Debtor collection period | 3 months |
| Creditors payment period | 3 months |
- Gross profit for the year ending on 31st December 2014 amount to Rs. 60,000. Closing stock is equal to opening stock.
Find out **a) Sales b) Cost of goods sold c) Sundry debtors d) sundry creditors e) Closing stock**

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| UNIT-IV |
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7. Define financial management. What are major decision making areas in the financial management?

OR

8. In what respect is the objective of wealth maximization superior to the profit maximization?

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| UNIT-V |
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9. Explain briefly various methods of evaluating long term investment proposals.

OR

10. AMC industries limited, wishes to purchase a CNC machine. The following are the earnings after tax of the two alternative proposal under Consideration each costing Rs.8,00,000. Calculate NPV for each proposal and select the better proposal if the company wishes to operate @ 10% rate of return.

| | 1 st year | 2 nd year | 3 rd year | 4 th year |
|--|----------------------|----------------------|----------------------|----------------------|
| Proposal -I | 6,50,000 | 3,00,000 | 3,00,000 | 100,000 |
| Proposal -II | 3,50,000 | 3,50,000 | 3,50,000 | 3,50,000 |
| Present value of Rs.1 @10% discounting rate. | 0.909 | 0.826 | 0.751 | 0.683 |

Code: 5P2B15*M.C.A. I Semester Regular Examinations January 2016***Information & Communication Technology**

Max. Marks: 60

Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60Marks)

UNIT-I

1. a) What is meant by performance? Explain how to measure it. 6M
 b) In what way the middle level programming languages are differ from machine level languages. Explain in detail. 6M

OR

2. a) Explain the importance of bus structure computer. 6M
 b) In what way the fifth generation languages are differ from fourth generation languages. Explain in detail. 6M

UNIT-II

3. a) With the help of a neat sketch, explain the static RAM cell. 4M
 b) Write a detailed note on secondary storage devices 8M

OR

4. a) Give brief description about synchronous DRAM. 6M
 b) Give block diagram for 8M x 32 memory using 512K x 8 memory chips. 6M

UNIT-III

5. Discuss in detail about the SCSI Bus Phase Sequencing 12M

OR

6. a) Give brief description about the remote connection of a video terminal over a telephone line. 6M
 b) List the steps needed to establish connection, transmit data and terminate connection. 6M

UNIT-IV

7. a) Distinguish between internet and intranet. 4M
 b) Discuss in detail about the various types of topologies. 8M

OR

8. a) What is a router? Explain its role in communication. 6M
 b) Describe in detail about the various transmission media. 6M

UNIT-V

9. a) Describe in detail about the ARP protocol. 6M
 b) UDP protocol is reliable or unreliable protocol. Justify your answer 6M

OR

10. a) Explain the importance of www in the present generation 6M
 b) In what way telnet is different from FTP. Explain. 6M

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| R-15 |
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Code: 5P2C16

M.C.A. I Semester Regular Examinations January 2016

Technical Communication & Computer Ethics

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 12 = 60Marks)

UNIT-I

1. Discuss language as a tool for communication. 12M

OR

2. Discuss the importance of listening skills for effective communication. 12M

UNIT-II

3. What is the role of kinesics in a job interview? 12M

OR

4. Discuss the importance of using different software tools for communication in the success of a business organization. 12M

UNIT-III

5. Discuss the dos and don'ts to be followed in a group discussion. 12M

OR

6. Discuss the importance of pre-interview preparation for a job. 12M

UNIT-IV

7. Discuss the importance of giving ethical training to employees of a business organization. 12M

OR

8. Discuss the difference between criminal and ethical hacking with examples. 12M

UNIT-V

9. What are the advantages and disadvantages of cookies? What are the usual methods to check and control cookies while browsing the internet? 12M

OR

10. Discuss various issues related to open source soft-wares and software patents. 12M
