BRIDGE COURSES OF MASTER OF COMPUTER APPLICATIONS (Programme Code for ODL mode: MCA_NEW)

ASSIGNMENTS

(For July – December 2022)

MCS-201, MCS-208 and BCS-012

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068

CONTENTS

Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to PGDCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the PGDCA Programme Guide.
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	**:**	**MCS-201**
Course Title	**:**	**Programming in C and PYTHON**
Assignment Number	**:**	**PGDCA(I)/201/Assignment/2022**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Date of Submission	**:**	**31stOctober, 2022 (for July session)**

There are sixteen questions in this assignment which carries 80 marks. Each question carries 5 marks. Rest 20 marks are for viva-voce. Answer all the questions from both the sections i.e. Section A and Section B. You may use illustrations and diagrams to enhance the explanations. Include the screen layouts also along with your assignment responses. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

SECTION-A (C-Programming)

Question1: Write an algorithm, draw a flow chart and write its corresponding C program to convert a Binary number to its equivalent Decimal number. **(5 Marks)**

Question 2: Write an algorithm and flowchart to calculate the roots of quadratic equation $AX^2 + BX + C = 0$.Transform your algorithm in to an equivalent C program. **(5 Marks)**

Question 3: Write a C program to generate the following pattern: **(5 Marks)**

```
*
* *
* * *
* *
*
```

Question 4: Write a C program to perform the following operation on matrices of dimension (3 X 3)
a) Addition b) Multiplication **(5 Marks)**

Question 5: Write a C program to take a list of N numbers, separate even and odd numbers and put them in two appropriate files (evenfile and oddfile). Use File Handling concept. **(5 Marks)**

Question 6: Write a program to enter a list of strings and rearrange them in alphabetical order, using a one-dimensional array of pointers, where each pointer indicates the beginning of a string. **(5 Marks)**

Question 7: Write a C program to sort a list of N numbers **(5 Marks)**

Question 8: Write a C program to print reverse of a string (without using strrev() function), and checks that the entered string is a palindrome or not **(5 Marks)**

SECTION-B (PYTHON-Programming)

Question 9: Write a program in Python Program to display the Fibonacci Sequences up to nth term where n is provided by the user **(5 Marks)**

Question 10: Write a Program in Python that Accepts a Sentence and Calculate the Number of Digits, Uppercase and Lowercase Letters **(5 Marks)**

Question 11: Create a module series.py containing functions to determine Fibonacci series and Exponential series. Import the module created to make it accessible, and Call the functions of that module with module name . Demonstrate the access of functions in the module created. **(5 Marks)**

Question 12: Differentiate Between Modules and Scripts, give suitable python code for each **(5 Marks)**

Question 13: Differentiate Between Co-routines and Sub-routines, give suitable python code for each **(5 Marks)**

Question 14: Write Short notes on Generators, Iterators and Decorators give suitable python code for each **(5 Marks)**

Question 15: Write a Program in Python to check if a given year is a leap year **(5 Marks)**

Question 16: Briefly discuss the Lambda, map() and filter() function; with suitable code for each **(5 Marks)**

Course Code	**:**	**MCS-208**
Course Title	**:**	**Data Structures and Algorithms**
Assignment Number	**:**	**PGDCA(II)/208/Assign/2022/23**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Dates for Submission	**:**	**31st October, 2022 (for July Session)** **15th April, 2023 (for January Session)**

There are four questions in this assignment, which carry 80 marks. Each question carries 20 marks. Rest 20 marks are for viva voce. All algorithms should be written nearer to C programming language. You may use illustrations and diagrams to enhance the explanations, if necessary. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Question 1: **(20 Marks)**

What are Sparse Matrices? Explain with example(s)

Question 2: **(20 Marks)**

How many different traversals of a Binary Tree are possible? Explain them with example(s).

Question 3: **(20 Marks)**

What are AVL trees? How do they differ from Splay trees.

Question 4: **(20 Marks)**

What are Tries? How do they differ from Binary Tries?

Course Code	**:**	**BCS-012**
Course Title	**:**	**Basic Mathematics**
Assignment Number	**:**	**BCA(1)012/Assignment/2022-23**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**31st October, 2022 (For July Session)** **15th April, 2023 (For January Session)**

Note: This assignment has 15 questions of 80 marks (Q.no.1 to 14 are of 5 marks each, Q15 carries 10 marks). Answer all the questions. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1. Solve the following system of equations by using Matrix Inverse Method.

1. $3x + 4y + 7z = 14$
2. $2x - y + 3z = 4$
3. $2x + 2y - 3z = 0$

Q2. Use principle of Mathematical Induction to prove that:
$\frac{1}{1*2} + \frac{1}{2*3} + \ldots\ldots\ldots\ldots + \frac{1}{n(n+1)} = \frac{n}{n+1}$

Q3. How many terms of G.P $\sqrt{3}$, 3 , $3\sqrt{3}$, ……….. Add up to 39 + 13

Q4. If $y = a.e^{mx} + b.e^{-mx}$, Prove that $d^2y/dx^2 = m^2 y$

Q5. For what value of 'k' the points (-k + 1, 2k), (k, 2 - 2k) and (- 4 - k, 6 - 2k) are collinear.

Q6. Evaluate $\int \frac{x\,dx}{[(x+1)\,(2x-1)]}$ and $\int \frac{dx}{(e^x-1)^2}$

Q7. If 1, w, w^2 are Cube Roots of unity show that $(1+ w)^2 - (1 + w)^3 + w^2 = 0$.

Q8. If α, β are roots of equation $2x^2-3x-5=0$ form a Quadratic equation whose roots are α^2, β^2

Q9. Solve the inequality $\frac{3}{5}(x-2) \leq \frac{5}{3}(2-x)$ and graph the solution set.

Q10. A spherical balloon is being Inflated at the rate of 900 cm^3/sec. How fast is the Radius of the balloon Increasing when the Radius is15 cm.

Q11. Find the area bounded by the curves $x^2 = y$ and $y=x$.

Q12. Determine the values of x for which $f(x) = x^4 - 8x^3 + 22x^2 - 24x + 21$ is increasing and for which it is decreasing.

Q13. Using integration, find length of the curve $y = 3 - x$ from (-1, 4) to (3, 0).

Q14. Show that the lines $\frac{X-5}{4} = \frac{y-7}{-4} = \frac{z-3}{-5}$ and $\frac{X-8}{4} = \frac{y-4}{-4} = \frac{z-5}{4}$ Intersect.

Q15. A manufacturer makes two types of furniture, chairs and tables. Both the products are processed on three machines A1, A2 and A3. Machine A1 requires 3 hours for a chair and 3 hours for a table, machine A2 requires 5 hours for a chair and 2 hours for a table and machine A3 requires 2 hours for a chair and 6 hours for a table. The maximum time available on machines A1, A2 and A3 is 36 hours, 50 hours and 60 hours respectively. Profits are INR 200 per chair and INR 300 per table. Formulate the above as a linear programming problem to maximize the profit and solve it.