BRIDGE COURSES OF MASTER OF COMPUTER APPLICATIONS MCA_NEW

ASSIGNMENTS

(January - 2023 & July - 2023)

MCS-201, MCS-208 and BCS-012

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
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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_NEW(I)/201/Assignment/2023**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Date of Submission	**:**	**30th April 2023 (for January Session)** **31st October 2023 (for July Session)**

There are sixteen questions in this assignment (eight in each section i.e. Section A and Section B) 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)

Q1: Compare flowchart and algorithm. Write Algorithm and also draw flowchart to perform following:

a. Find factorial of a number entered by user.
b. Print Fibonacci series up to the number of terms entered by the uses

Q2: Differentiate between Recursion and Iteration. Give suitable code to find factorial of a number entered by user in C for each.

Q3: Explain the concept of call by reference, with suitable code in C for each. Give advantage and disadvantage of call by reference

Q4: Write an algorithm to find the HCF (Highest Common Factor) of the two numbers entered by a user. Transform your algorithm into a C program, support your program with suitable comments.

Q5: Briefly discuss the relation between pointers and arrays, giving suitable example. Write a program in C, to print transpose of a 2D matrix entered by a user. Also give comments.

Q6: Write the syntax of looping control statements. Also draw the flowchart for each statement. Write a program in C to generate the following pattern :

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

Q7: Differentiate between Random access and Sequential access of files in C. Discuss the syntax and role of fseek( ) and rewind( ) function, while accessing any file.

Q8: Compare any two of the following (give suitable C code for each) :

c. Break and Continue Statement
d. Structure and Union

SECTION-B (PYTHON-Programming)

Q9: What is C-Python ? Briefly discuss the relation between framework, library, package and module in Python.

Q10: Differentiate between mutable and immutable data types in Python. Briefly discuss the following data types of Python :

e. Lists
f. Tuples
g. Dictionary

Q11: What is the utility of map( ) function do ? Write a program in Python to print the square of the numbers present in the list, by using map( ) function.

Q12: Compare overloading and overriding in Python. Give suitable example code for each in Python.

Q13: Write Python code to perform the following :

h. Reading data from a file
i. Creating a file and add content to it

Q14: What are Lambda functions ? How do Lambda functions differ from Built-in functions ? Write lambda function to calculate cube of a number. Also write the program to find cube of a number without using lambda function.

Q15: Differentiate between the following with the help of suitable example for each :

j. Co-routines and subroutines
k. Co-routines and threads

Q16: What are Cursor Objects ? Briefly discuss the utility of cursor objects. Write Python code for a cursor to execute the SQL query, to print the version of database. Support your program with suitable comments.

Course Code	**:**	**MCS-208**
Course Title	**:**	**Data Structures and Algorithms**
Assignment Number	**:**	**PGDCA_NEW(II)/208/Assignment/2023**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Dates for Submission	**:**	**30thApril 2023 (for January Session)** **31st October 2023 (for July 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.

Q1: **(20 Marks)**

What are Sparse Matrices? Explain with example(s)

Q 2: **(20 Marks)**

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

Q 3: **(20 Marks)**

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

Q 4: **(20 Marks)**

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

Course Code	**:**	**BCS-012**
Course Title	**:**	**Basic Mathematics**
Assignment Number	**:**	**BCA(I)012/Assignment/2023**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**30th April 2023 (for January Session)** **31st October 2023 (for July 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 ballon is being Inflated at the rate of 900 cm^3/sec. How fast is the Radius of the ballon 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 $ 20 per chair and $ 30 per table. Formulate the above as a linear programming problem to maximize the profit and solve it.