BRIDGE COURSES OF MASTER OF COMPUTER APPLICATIONS MCA_NEW

ASSIGNMENTS

(January - 2024 & July - 2024)

MCS-201, MCS-208 and BCS-012

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

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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/2024**
Maximum Marks	:	**100**
Weightage	:	**30%**
Last Date of Submission	:	**30ᵗʰApril 2024 (for January Session)**
		31ˢᵗ October 2024 (for July Session)

There are eight questions in this assignment (four in each section i.e. Section A and Section B) which carries 80 marks. Each question carries 10 marks. Rest 20 marks are for viva-voce. Answer allthe questions from both the sections i.e. Section A and Section B. You can use illustrations and diagrams to enhance the explanation. 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: Briefly discuss the concept of "Call by value" and "Call by reference". Give example code in C for each. Support your code with suitable comments.

Q2: 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. Support your program with suitable comments.

Q3: Write an algorithm to find the slope of a line segment whose end point coordinates are $(x1, y1)$ and $(x2, y2)$. The algorithm gives output whether the slope is positive, negative or zero. Transform your algorithm to C program.

   Note : Slope of line segment $= (y2 - y1) / (x2 - x1)$

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

SECTION-B (PYTHON-Programming)

Q1: Discuss the *connect( )* method of MySQL. Connector interface. List the arguments involved with *connect( )* method. Write Python code to create database student_DB and to connect to student_DB (make suitable assumptions wherever necessary).

Q2: What are Pandas ? Write steps to import, read and print a CSV file using Pandas. Also, transform your steps in to suitable code in Python.

Q3: Write steps to create a package. Apply these steps to create a package named volume and create 3 modules in it named cube, cuboid and sphere, having function to calculate volume of the cube, cuboid and sphere respectively. Import the modules defined in the package and use the defined functions for calculation of volume respectively.

Q4: What does *map( )* function do ? Write a program in Python to print the cube of the numbers present in the list, by using *map( )* function.

Course Code	:	**MCS-208**
Course Title	:	**Data Structures and Algorithms**
Assignment Number	:	**PGDCA_NEW(II)/208/Assignment/2024**
Maximum Marks	:	**100**
Weightage	:	**30%**
Last Dates for Submission	:	**30th April 2024 (for January Session)**
		31st October 2024 (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. You may use illustrations and diagrams to enhance the explanation, if necessary. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: What are B-trees? Explain with example. **(20 Marks)**

Q2: Explain the process of converting a Tree into a Binary Tree with an example. **(20 Marks)**

Q3: What is Heap Sort? What is Merge Sort? Write the factors on the basis of which Heap Sort or Merge Sort is selected. **(20 Marks)**

Q4: What is a Doubly Linked List? How does it differ from Circularly Doubly Linked List?**(20 Marks)**

Course Code : BCS-012
Course Title : Basic Mathematics
Assignment Number : BCA(I)012/Assignment/2024
Maximum Marks : 100
Weightage : 25%
Last Date of Submission : 30thApril 2024 (for January Session)
31st October 2024 (for July Session)

Note: This assignment has 16 questions of 80 marks (each question carries equal marks). Answer all the questions. Rest 20 marks are for viva voce. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: If A = $\begin{pmatrix} 3 & -1 \\ 2 & 1 \end{pmatrix}$, **(5 Marks)**

Show that $A^2 - 4A + 5I_2 = 0$. Also, find A^4.

Q2: Find the sum of first all integers between 100 and 1000 which are divisible by 7. **(5 Marks)**

Q3:
 a) If p^{th} term of an A.P is q and q^{th} term of the A.P. is p, find its rth term. **(5 Marks)**
 b) Find the sum of all the integers between 100 and 1000 that are divisible by 9.

Q4: If 1, ω, ω^2 are cube roots of unity, show that **(5 Marks)**
$(2 - \omega)(2 - \omega^2)(2 - \omega^{19})(2 - \omega^{23}) = 49$.

Q5: If α, β are roots of $x^2 - 3ax + a^2 = 0$, find the value(s) of a if $\alpha^2 + \beta^2 = \frac{7}{4}$. **(5 Marks)**

Q6: If $y = In \frac{\sqrt{1+X} - \sqrt{1-X}}{\sqrt{1+X} + \sqrt{1-X}}$, find $\frac{dy}{dX}$. **(5 Marks)**

Q7: Evaluate : $\int x^2\sqrt{5x - 3dx}$ **(5 Marks)**

Q8: Use De Moivre's theorem to find $(\sqrt{3} + i)^3$. **(5 Marks)**

Q9: Solve the equation $x^3 - 13x^2 + 15x + 189 = 0$, Given that one of the roots exceeds the other by 2. **(5 Marks)**

Q10: Solve the inequality $|\frac{2}{X-1} > 5|$ and graph its solution. **(5 Marks)**

Q11: 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. **(5 Marks)**

Q12: Find the points of local maxima and local minima of **(5 Marks)**
$f(x) = x^3 - 6x^2 + 9x + 2014$, x ε **R**.

Q13: Using integration, find length of the curve $y = 3 - x$ from (-1, 4) to (3, 0). **(5 Marks)**

Q14: Show that the lines, given below, Intersect each other. **(5 Marks)**

$$\frac{X-5}{4} = \frac{y-7}{-4} = \frac{z-3}{-5} \text{ and } \frac{X-8}{4} = \frac{y-4}{-4} = \frac{z-5}{4}$$

Q15: A tailor needs at lease 40 large buttons and 60 small buttons. In the market, buttons are available in two boxes or cards. A box contains 6 large and 2 small buttons and a card contains 2 large and 4 small buttons. If the cost of a box is $3 and cost of a card is $2, find how many boxes and cards should be purchased so as to minimize the expenditure. **(5 Marks)**

Q16: Find the scalar component of projection of the vector **(5 Marks)**

$\vec{a} = 2\hat{\imath} + 3\hat{\jmath} + 5\hat{k}$ on the vector $\vec{b} = 2\hat{\imath} - 2\hat{\jmath} - \hat{k}$