

# **MASTER OF COMPUTER APPLICATIONS (MCA\_NEW)**

**MCA\_NEW 1<sup>st</sup> Semester Assignments**

**(January, 2026 & July, 2026 sessions)**

**MCS-211, MCS-212, MCS-213, MCS-214, MCS-215**

**MCSL-216, MCSL-217**



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

## CONTENTS

Course Code	Assignment No.	Submission-Schedule		Page No.
		For January-June Session	For July-December Session	
MCS-211	MCA_NEW(I)/211/Assignment/2026	30 <sup>th</sup> April, 2026	31 <sup>st</sup> October, 2026	3
MCS-212	MCA_NEW(I)/212/Assignment/2026	30 <sup>th</sup> April, 2026	31 <sup>st</sup> October, 2026	6
MCS-213	MCA_NEW(I)/213/Assignment/2026	30 <sup>th</sup> April, 2026	31 <sup>st</sup> October, 2026	8
MCS-214	MCA_NEW(I)/214/Assignment/2026	30 <sup>th</sup> April, 2026	31 <sup>st</sup> October, 2026	9
MCS-215	MCA_NEW(I)/215/Assignment/2026	30 <sup>th</sup> April, 2026	31 <sup>st</sup> October, 2026	12
MCSL-216	MCA_NEW(I)/L-216/Assignment/2026	30 <sup>th</sup> April, 2026	31 <sup>st</sup> October, 2026	14
MCSL-217	MCA_NEW(I)/L-217/Assignment/2026	30 <sup>th</sup> April, 2026	31 <sup>st</sup> October, 2026	16

### Important Notes

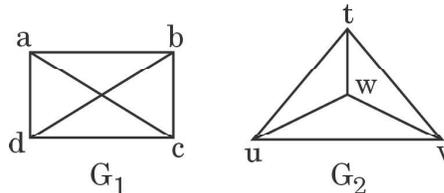
1. Submit your assignments to the Coordinator of your Study Centre on or before the due date. Also, be in touch with concerned IGNOU RC for any updates regarding assignments schedule etc.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to Programme Guide of MCA\_NEW.
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 Programme Guide of MCA\_NEW.
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-212
Course Title	:	Discrete Mathematics
Assignment Number	:	MCA_NEW(I)/212/Assign/2026
Maximum Marks	:	100
Weightage	:	30%
Last Dates for Submission	:	30 <sup>th</sup> April 2026 (for January Session) 31 <sup>st</sup> October 2026 (for July Session)

This assignment has twenty questions of 80 Marks; all questions carry equal marks i.e. 4 marks. Answer all questions. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

- Q1:** Use Mathematical Induction to prove that :  $1^2 + 2^2 + \dots + n^2 = n(n+1)(2n+1)/6$
- Q2:** How many different permutations are possible of the letters, taken all at a time, of the word: ASSESSES?
- Q3:** A die is rolled once. What are the probabilities of the following events:
- Getting an odd number
  - Getting at least a value 2
  - Getting at most a value 2
  - Getting at least 7

- Q4:** Draw a hypercube graph  $Q_3$  (also called the cubical hypercube). Check whether the hypercube  $Q_3$  is Hamiltonian
- Q5:** What is isomorphism? Find, if the following graphs  $G_1$  and  $G_2$  are isomorphic or not. Explain how you arrived at your answer.



- Q6:** What is a finite automata ? Why is it needed? How is a finite automata represented?. Also explain the term regular expression with the help of an example.
- Q7:** Differentiate between
- Deterministic and Non-deterministic finite automata
  - Deterministic and Non-deterministic Turing Machine
  - Moore and Mealy Machine
- Q8:** Describe the divide-and-conquer approach to solve recurrences ? Explain how this approach can be used to apply binary search in a sorted list.
- Q9:** What is proposition ? Explain with the help of an example. Explain Disjunction and Conjunction with the help of truth table for each.
- Q10:** Prove the following theorem by direct proof method: “The square of an even integer is an even integer.”
- Q11:** Given the Boolean expression  $(a' \vee (b \wedge c')) \vee (b \vee d')$ , draw the corresponding circuit, where  $a$ ,  $b$ ,  $c$  and  $d$

are the inputs to the circuitry.

**Q12:** Define the terms Domain, Co-domain and Range in the context of a function. Also find the domain, co-domain and range for a function  $A$  to  $B$ , where  $A = \{1, 2, 3, 4\}$  and  $B = \{1, 4, 9, 16, 25\}$ .

**Q13:** A committee consisting of 2 male and 2 female workers is to be constituted from 8 male and 9 female workers. In how many distinct ways can this be done?

**Q14:** In a tennis tournament, each entrant plays a match in the first round. Next, all winners from the first round play a second-round match. Winners continue to move on to the next round, until finally only one player is left as the tournament winner. Assuming that tournaments always involve  $n = 2^k$  players, for some  $k$ , find the recurrence relation for the number rounds in a tournament of  $n$  players.

**Q15:** Show, using the pigeonhole principle, that in any group of 30 people, 5 people can always be found who were born on the same day of the week.

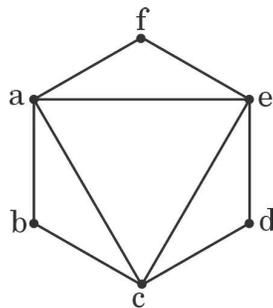
**Q16:** Define the following in the context of graph, with the help of an example:

- Complete graph
- Degree of a vertex
- Cycle
- Path
- Circuit

**Q17:** What is a bipartite graph? Explain with the help of an example. Give one or two applications of bipartite graphs.

**Q18:** How Hamiltonian graphs differ from the Eulerian graphs? Give Dirac's and Ore's criterion for the Hamiltonian graphs.

**Q19:** Differentiate between Eulerian graph and Eulerian circuit. Find the Eulerian circuit in the graph given below (if it exists).



**Q20:** Write Short notes on following.

- Travelling Salesman Problem
- Vertex Coloring
- Edge Coloring
- Planar graphs
- Pascal's Formula