

MASTER OF COMPUTER APPLICATIONS (MCA_NEW/MCAOL)

SEMESTER-2 ASSIGNMENTS OF MCA_NEW/MCAOL PROGRAMME S

(July - 2026 & January - 2027)

MCS-218, MCS-219, MCS-220, MCS-221

MCSL-222, MCSL-223

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

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Important Notes

1. MCA_NEW Student need to submit the assignments to the Coordinator of your Study Centre on or before the due date.
2. MCAOL Student need to submit the assignments on LMS Portal on or before the due date.
3. 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.
4. 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.
5. 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-218**
Course Title : **Data Communication and Computer Networks**
Assignment Number : **MCA_NEW/MCAOL(II)/218/Assign/2026-27**
Maximum Marks : **100**
Weightage : **30%**
Last Dates for Submission : **31st October, 2026 (For July, 2026 Session)**
15th April, 2027 (For January, 2027 Session)

Note: Answer all the questions in the assignment which carry 80 marks in total. 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:** Explain the network topologies, with advantages & disadvantages. **(4 2.5 = 10 Marks)**
- Bus
 - Star
 - Ring
 - Mesh
- Q2:** A communication channel has a bandwidth ranging from 2000 Hz to 7000 Hz. Calculate the bandwidth of the channel. **(5 Marks)**
- Q3:** Explain the differences of the following modulation techniques? **(4 2.5 = 10 Marks)**
- Frequency modulation
 - Pulse code modulation
 - Frequency shift keying
 - Pulse amplitude modulation
- Q4:** A digital communication system uses signal amplitudes ranging from -5 V to $+7\text{ V}$. The receiver can reliably distinguish two signal levels only if they differ by at least 0.6 V . Assuming the effect of noise is within the permissible limit, determine the maximum number of amplitude levels that can be used? **(10 Marks)**
- Q5:**
- What is the significance of switching in communication networks? **(2 Marks)**
 - Also, Highlight the working of the following switching techniques? **(31= Marks)**
 - Circuit switching
 - Multistage switching
 - Packet switching
- Q6:** Explain following terms in context of retransmission strategies? **(2 2.5 = 5 Marks)**
- Piggybacking
 - Pipelining
- Include diagrams, wherever necessary.
- Q7:**
- What is a fragment burst in 802.11? Illustrate the steps with diagram. **(5 Marks)**
 - Explain the binary exponential backoff algorithm for Ethernet. **(5 Marks)**
- Q8:**
- Consider the network shown in Figure 1, where number written on each communication link represents its transmission cost. Using Dijkstra's shortest path routing algorithm, determine the shortest path from router R1 to router R7. Also calculate the total path cost.

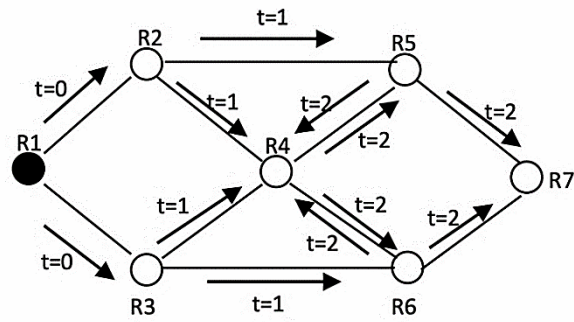


Figure 1

- b. Using the network diagram in figure 1, construct a spanning tree with R1 as the root, and show the sequence of packet forwarding during flooding. Also, compare the number of packet transmissions in flooding with and without the spanning tree. Make any further assumptions, if required. **(10+10=20 Marks)**

Q9: Explain the Data Encryption Standard with architecture and algorithm, in context of network security in data communication? **(5 Marks)**