

**K. J. Somaiya Institute of Technology, Sion, Mumbai-22**  
**(Autonomous College Affiliated to University of Mumbai)**

Nov – Dec 2025

(B. Tech) Program: AIDS Scheme III

Regular Examination: TY Semester: V Course Code: AIDLC5041 and Course Name: AI in Computer Networks

Date of Exam: 28/11/2025

Duration: 02.5 Hours

Max. Marks: 60

**Instructions:**

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
<b>Q 1</b>	<b>Solve any two questions out of three: (05 marks each)</b>	10		
a)	What are the functions of layers in the TCP/IP model?		CO1	Un
b)	Compare circuit switching, packet switching, and message switching.		CO2	Un
c)	Define piggybacking and its benefits.		CO3	Un
<b>Q 2</b>	<b>Solve any two questions out of three: (05 marks each)</b>	10		
a)	Define the layer of the OSI model at which the following devices operate: Hub, Bridge, Switch, Router, Gateway.		CO2	Un
b)	For each ARQ method (Stop-and-Wait, Go-Back-N, Selective Repeat), discuss the maximum window size allowed and provide the justification for Selective Repeat ARQ method.		CO5	Un
c)	Explain SDN architecture in detail.		CO6	Un
<b>Q.3</b>	<b>Solve any two questions out of three. (10 marks each)</b>	20		
a)	A binary data word <b>1101111001</b> is encoded using CRC with the divisor <b><math>x^6 + x^4 + x + 1</math></b> . Find the resulting CRC remainder.		CO3	Ap
b)	<b>What is classless addressing? How is it different from classful addressing?</b> An address in a block is given as <b>10.11.200.15/22</b> . Find: <ol style="list-style-type: none"> <li>1. The <b>number of addresses</b> in the block.</li> <li>2. The <b>network address</b> (first address).</li> <li>3. The <b>broadcast address</b> (last address).</li> <li>4. The <b>first usable</b> and <b>last usable</b> host addresses.</li> </ol>		CO4	Ap

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c)	<p>Explain <b>step-by-step</b> how the 3-way handshake takes place.            Draw the timing diagram and show:</p> <ul style="list-style-type: none"> <li>• all sequence and acknowledgment numbers</li> <li>• SYN, ACK flags</li> <li>• how both sides synchronize before sending actual data</li> </ul> <p>Later, the client terminates the connection first.            Using the same example, demonstrate the handshake for connection release.            Use a client with Initial Sequence Number (ISN) <b>1400</b> wants to establish a TCP connection with a server whose ISN is <b>6200</b>.</p>	CO5	Un
Q.4	<b>Solve any two questions out of three. (10 marks each)</b>	20	
a)	What is congestion and what are its causes? Explain token bucket and leaky bucket algorithm for congestion control.	CO4	Un
b)	Write a short note on application layer protocols, 1. HTTP 2. DNS.	CO5	Un
c)	Explain in detail the <b>IEEE 802.3 Ethernet standard</b> with frame format. Explain the evolution of Ethernet from 10 Mbps to 100 Gbps.	CO3	Un

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