Roll No: | | | | | | | | | | | |

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY

Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956
Approved by AICTE, New Delhi | Approved By BCI
Bengaluru

Mid Term Examinations - October 2026

Date: 05/10/2026 **Time:** 02:00 PM - 03:30 PM

Course Code: ECE6015 **Course Name:** Vehicle Electronics and Communication

Semester: Third Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2	CO3	CO4
Marks	24	22	22	22

PART-A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	What is meant by Vehicle-to-Vehicle (V2V) communication in a VANET? What kind of information is typically exchanged?	2	CO1	BT2
2	Vehicular Ad Hoc Networks borrow their basic principles, such as infrastructure-less operation, multi-hop relaying and dynamic topology, from a more general family of wireless networks formed by moving devices. Identify this parent network class.	2	CO1	BT2
3	The Ad hoc On-Demand Distance Vector (AODV) protocol is classified as a reactive routing protocol. Explain briefly why this is so.	2	CO2	BT2
4	Distinguish between a piconet and a scatternet in Bluetooth.	2	CO3	BT2
5	Vehicle density on a highway is 30 vehicles/km and OBU range is 200 m. Find the expected number of one-hop neighbours.	2	CO4	BT3

PART-B: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	With a neat diagram, explain the architecture of a VANET, clearly bringing out the roles of the OBU, RSU and TA and the V2V, V2I and I2I communication modes.	10	CO1	BT2
7	(a) Present a taxonomy of the routing schemes used in VANETs, outlining the underlying mechanism of each scheme along with a suitable example. (b) Substantiate, with appropriate reasoning, the suitability of location-aware routing over conventional topology-based routing for networks with rapidly changing vehicular topologies.	10	CO1	BT2

PART-C: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
8	Describe the layered architecture of the IEEE 1609 WAVE framework operating over IEEE 802.11p in vehicular networks. Justify the use of WSMP for transmitting safety-critical messages.	10	CO2	BT2

9	Discuss the key issues that affect the design and practical deployment of Vehicular Ad Hoc Networks.	10	CO2	BT2

PART-D: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
10	(a) Explain the log-distance path loss model with shadowing. (b) An OBU transmits 20 dBm at 5.9 GHz. The reference path loss is 48 dB at d_0 = 1 m, the highway path-loss exponent is n = 2.7 and antenna gains are 0 dBi. (i) Find the mean received power at 200 m. (ii) If the receiver sensitivity is −92 dBm, find the maximum communication range. (iii) Find the range in an urban area with n = 3.5.	10	CO3	BT2
11	A point-to-point Wi-Fi link is to be installed between two campus buildings separated by 500 m. (a) Calculate the free-space path loss at 2.4 GHz and at 5.8 GHz using the practical dB formula. (b) Explain the difference between the two values. Does the frequency really "attenuate" the signal in free space? (c) At 2.4 GHz, the transmitter output is 20 dBm, each antenna has a gain of 8 dBi, the total cable and connector loss is 2 dB, and the receiver sensitivity is −82 dBm. A fade margin of 10 dB is required. Find the maximum allowable path loss and the maximum link distance under free-space conditions.	10	CO3	BT2

PART-E: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
12	Distinguish between beacon messages and event-driven messages in VANETs. With a flowchart, explain the message dissemination and multi-hop forwarding process at a receiving OBU.	10	CO4	BT3
13	Define an ad hoc network. Explain the principle of multi-hop relaying, and illustrate it using the Bluetooth piconet and scatternet.	10	CO4	BT3