



# SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

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COIMBATORE-641 035, TAMIL NADU



## DEPARTMENT OF AUTOMOBILE ENGINEERING

19AUE402 – Intelligent Vehicle Technology

IAE – 3 - Question Bank – Answers and reference materials

### 2 Marks

**1. Mention the significance of a driver information system in modern vehicles.**

A Driver Information System significantly enhances the driver's experience by providing real-time information, promoting safety, optimizing fuel efficiency, and offering connectivity and entertainment options. It serves as a central interface for drivers to interact with their vehicles and stay informed about critical aspects of vehicle performance and operation

**2. Recall and list the primary sensors used in a Collision Avoidance System?**

- Radar Sensors
- Lidar Sensors
- Camera Systems
- Ultrasonic Sensors
- Infrared Sensors
- GPS (Global Positioning System)
- V2X Communication (Vehicle-to-Everything)
- Wheel Speed Sensor

**3. Describe how a Lane Warning System would operate to alert the driver about unintentional lane departure.**

A Lane Departure Warning System (LDWS) is designed to alert drivers when their vehicle unintentionally drifts out of its lane.

**4. Brief the basic function of an Anti-lock Braking System**

The basic function of an Anti-lock Braking System (ABS) is to prevent wheel lock-up during braking, enhancing vehicle control and stability in emergency braking situations.

**5. How does a GPS navigation system determine your current location?**

A GPS (Global Positioning System) navigation system determines your current location through a process that involves signals from satellites in orbit around the Earth

**6. Write short notes on Automated Highway system**

Automated Highway Systems (AHS) refer to advanced transportation systems that use various technologies to automate and optimize the operation of vehicles on highways

**7. How does data communication contribute to the overall functionality of modern vehicles?**

Data communication forms the backbone of modern vehicle functionality, enabling connectivity, safety features, maintenance efficiency, and the implementation of advanced technologies that enhance the overall driving experience

**8. How would you apply a Driver Information System to improve fuel efficiency during a long-distance drive?**

Driver Information System (DIS) to improve fuel efficiency during a long-distance drive involves providing the driver with real-time information, guidance, and feedback to encourage behaviors that optimize fuel consumption.

**9. What is the purpose of diagnostic systems in commercial vehicles?**

Diagnostic systems in commercial vehicles are instrumental in maintaining vehicle health, preventing breakdowns, optimizing performance, and ensuring compliance with regulatory standards. They are essential tools for fleet management, helping operators keep their vehicles in top condition and operate safely and efficiently.

**10. What is the primary function of in-vehicle computing?**

The primary function of in-vehicle computing is to enhance the functionality, safety, and connectivity of vehicles through the integration of computing technology. In-vehicle computing involves the use of embedded computer systems and software within the vehicle to perform various tasks.

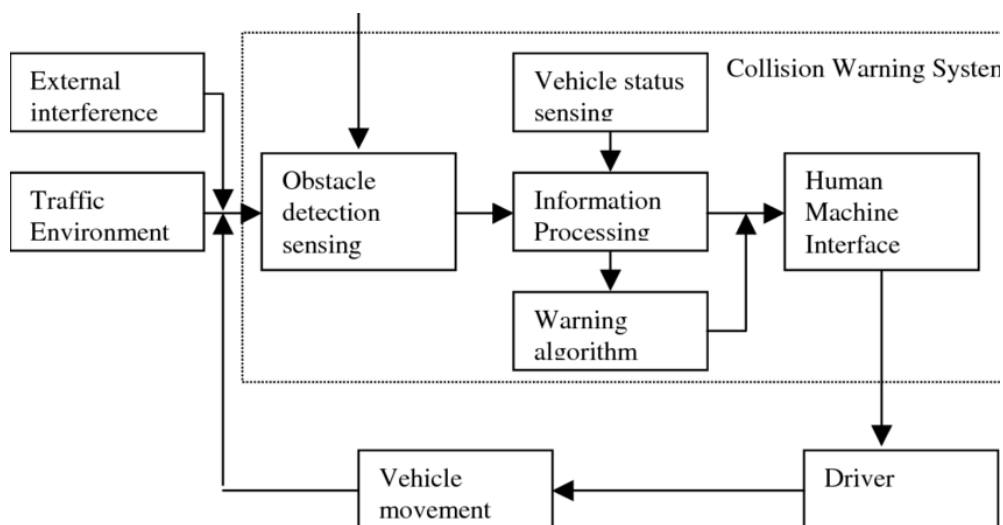
**14 Marks**

**1. Compare and contrast the different technologies used in collision avoidance systems, such as radar and lidar**

➤ **Reference Link:** <https://loconav.com/blog/what-is-collision-avoidance-system/>

➤ **Key Points:**

Collision avoidance systems play a crucial role in enhancing vehicle safety by detecting potential collisions and taking preventive measures. Two common technologies used in these systems are radar (Radio Detection and Ranging) and lidar (Light Detection and Ranging).



**2. Evaluate the potential benefits and challenges of implementing an Automated Highway Systems on a large scale.**

➤ **Reference Link:** <https://usharama.edu.in/blogDetail/automated-highway-systems-i>

➤ **Key Points:**

*Potential Benefits of Implementing Automated Highway Systems (AHS) on a Large Scale:*

- ✓ Improved Safety
- ✓ Enhanced Traffic Flow
- ✓ Increased Fuel Efficiency
- ✓ Reduced Traffic Congestion
- ✓ Enhanced Accessibility
- ✓ Time Savings
- ✓ Optimized Infrastructure Use

*Challenges of Implementing Automated Highway Systems on a Large Scale:*

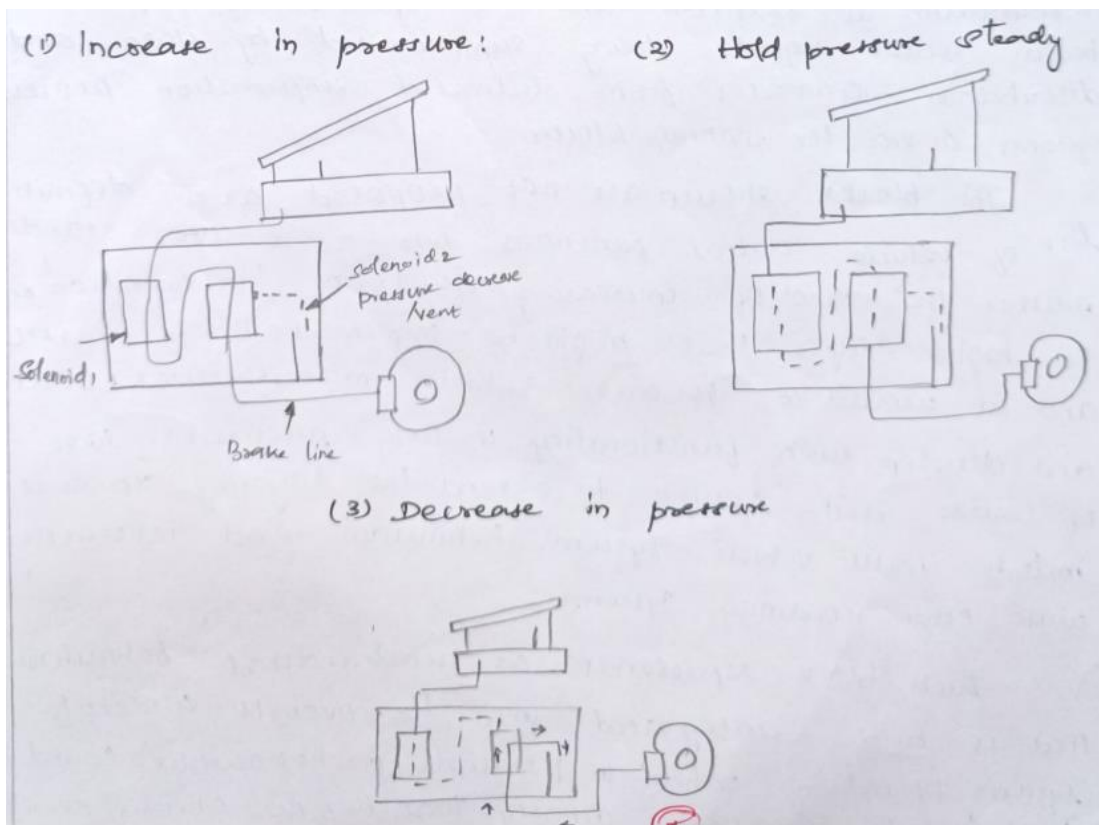
- Technical Challenges
- Infrastructure Upgrades
- Cybersecurity Concerns
- Legal and Regulatory Framework
- Public Acceptance and Trust
- Mixed Traffic Conditions
- Costs and Affordability

**3. Explain the basic principles behind the operation of an ABS**

➤ **Reference Link:** <https://www.spinny.com/blog/index.php/anti-lock-braking-system-technical-details-explained/>

➤ **Key Points:**

The Anti-lock Braking System (ABS) is a safety feature in vehicles designed to prevent the wheels from locking up during braking, thereby maintaining steering control and reducing the risk of skidding. The basic principles of operation for ABS involve sensor input, a control unit, and hydraulic components



#### 4. Explain the terms briefly

##### ➤ Reference Links:

- <https://copst.com/vehicle-systems/driver-vision-enhancement/>
- [http://www.wirelesscommunication.nl/reference/chaptr01/roadtrin/ivhsrout.htm#:~:text=Autonomous%20\(electronic\)%20positioning%20and%20navigation,dissemination%20of%20information%20\(e.g.%20RDS\)](http://www.wirelesscommunication.nl/reference/chaptr01/roadtrin/ivhsrout.htm#:~:text=Autonomous%20(electronic)%20positioning%20and%20navigation,dissemination%20of%20information%20(e.g.%20RDS))
- <https://www.progressive.com/answers/navigation-system-for-cars/>

##### ➤ Key Points:

###### i. Vision enhancement

Driver's Vision Enhancer (DVE) is a passive thermal imaging system used to enhance a driver's viewing capabilities while operating during degraded visual conditions, such as darkness, fog, smoke or dust.

###### ii. Route guidance system

A route guidance system is a technology that provides users with navigational assistance to help them navigate from one location to another. This system typically includes features such as mapping, real-time traffic information, and turn-by-turn directions

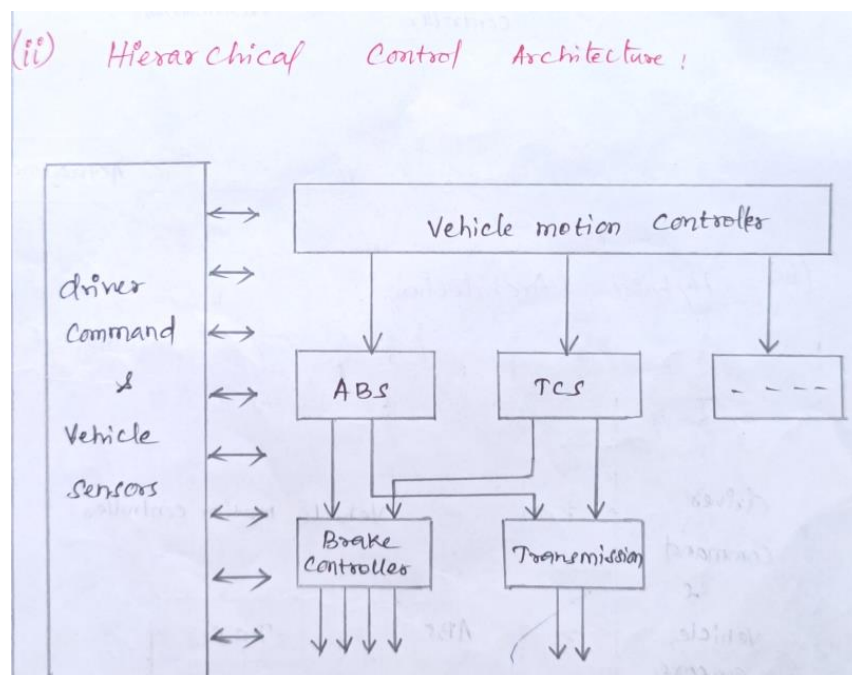
###### iii. Navigation systems

Navigation systems encompass a broad range of technologies and tools designed to help users determine and follow routes between locations. These systems are crucial for various applications, including personal navigation, transportation, aviation, marine navigation, and more

#### 5. Explain the concept of hierarchical control architecture and its organizational structure?

##### ➤ Reference Link: <https://www.mdpi.com/2076-3417/10/10/3543>

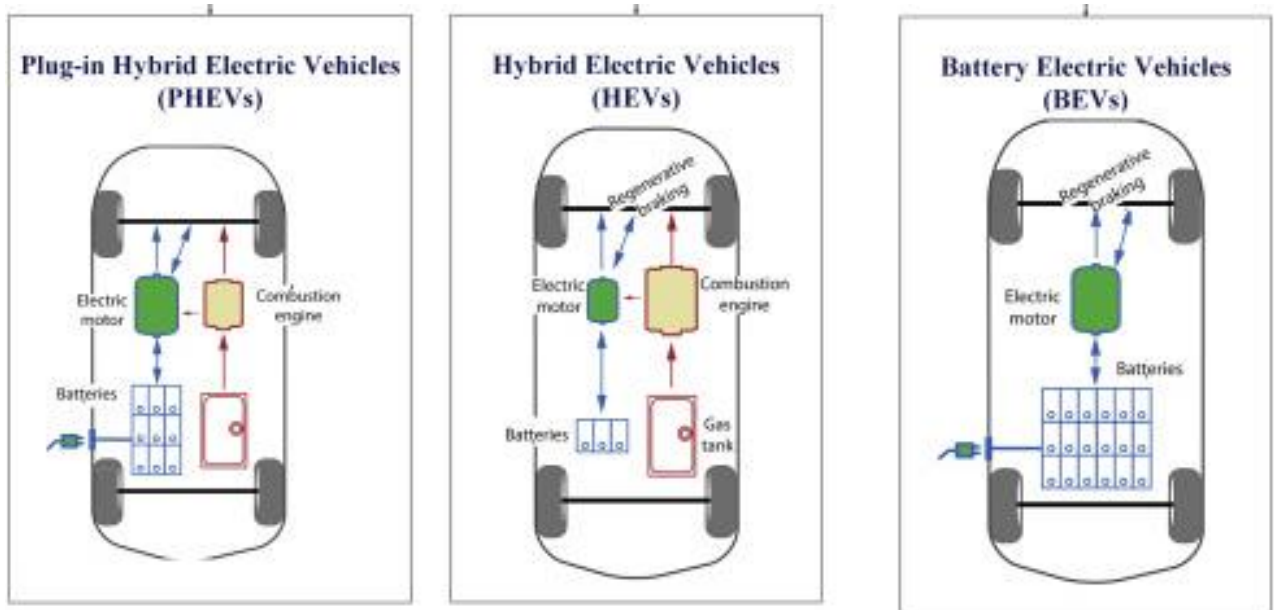
##### ➤ Key Points:



## 6. Appraise the different configurations of Electric vehicles with appropriate diagrams

➤ Reference Link: <https://e-amrit.niti.gov.in/types-of-electric-vehicles>

➤ Key Points:



## 7. Autonomous Vehicles:

Reference Link: <https://emerj.com/ai-adoption-timelines/self-driving-car-timeline-themselves-top-11-automakers/>