

Total No. of Questions: 6

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Enrollment No.....



Faculty of Engineering  
End Sem (Odd) Examination Dec-2018  
AU3EL02 Automotive Safety System

Programme: B.Tech.

Branch/Specialisation: AU

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. The vehicle ride will be comfortable if 1  
(a) Unsprung mass is kept minimum  
(b) Sprung mass is kept minimum  
(c) Vehicle mass is kept minimum  
(d) All of the mentioned
- ii. Suggest the vehicle speed (miles per hour) used for deceleration test of vehicle and passenger compartment 1  
(a) 15 mph (b) 20 mph (c) 40 mph (d) All of these
- iii. Vehicle active safety indicates 1  
(a) Driving Safety (b) Conditional Safety  
(c) Operational Safety (d) All of these
- iv. Vehicle passive safety indicates 1  
(a) Exterior Safety (b) Interior Security  
(c) Both (a) and (b) (d) None of these
- v. The most commonly used supplementary restraint system (SRS) component is 1  
(a) Seat belt (b) Brake (c) Airbag (d) Steering
- vi. A bucket seat can accommodate with how many persons 1  
(a) Single (b) Two (c) Four (d) None of these
- vii. Which component is used for anti-collision warning application 1  
(a) Breaking System (b) Radar Antenna  
(c) Alarm System (d) Airbag

P.T.O.

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- viii. The main applications of object detection technique is **1**  
(a) Side objects detection (b) Parking aid system  
(c) Both (a) and (b) (d) None of these
- ix. The condition that causes vapour locking in a brake system is **1**  
(a) Overheating of the fluid due to frequent brake application  
(b) Overcooling of the brakes during high speed driving  
(c) Keeping the vehicle without use for an extended period  
(d) An excessively high engine speed on a downhill road
- x. Which safety features used in Garage Door **1**  
(a) Force guard control (b) Rolling code technology  
(c) Motion sensors (d) All of these
- Q.2 i. Write the essential features required for a safe vehicle body. **2**  
ii. Explain the procedure to conduct test for the deceleration **8**  
behaviour after the crash with a stationary obstacle.
- OR iii. Explain the principle of safety sandwich construction and **8**  
representative properties of sandwich panels.
- Q.3 i. Classify and differentiate between active safety and passive safety. **4**  
ii. Explain the deformation behaviour of vehicle body. **6**
- OR iii. Explain the term "interior safety" on passenger car, showing **6**  
diagrams of equipment's.
- Q.4 i. Explain the function of seat belts in passenger car. **3**  
ii. What is the function of collapsible steering column with briefly **7**  
explain the elements involve on it for driver safety.
- OR iii. Write the function of passenger car airbags. How fast do you have **7**  
to be going for vehicle airbags to be deployed?
- Q.5 i. Differentiate between direct and indirect tyre pressure monitoring **4**  
system.
- ii. Explain the frontal and rear vehicle object detection, with some **6**  
examples using sketches.
- OR iii. Explain the schematic layout of object detection system with **6**  
braking system interactions.

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- Q.6 i. Briefly classify the garage door openers. **2**  
ii. Explain the schematic layout and function of central switch, **8**  
contacts in door-lock mechanisms, control unit and servomotors  
in Central Locking System.
- OR iii. What is the function of windshield, optical coupling, heater, rain **8**  
droplets, light conductor, LED and photodiode in rain sensor  
system?

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**Marking Scheme**  
**AU3EL02 Automotive Safety System**

Q.1	i.	The vehicle ride will be comfortable if (a) Unsprung mass is kept minimum	1				
	ii.	Suggest the vehicle speed (miles per hour) used for deceleration test of vehicle and passenger compartment (d) All of these	1				
	iii.	Vehicle active safety indicates (d) All of these	1				
	iv.	Vehicle passive safety indicates (c) Both (a) and (b)	1				
	v.	The most commonly used supplementary restraint system (SRS) component is (c) Airbag	1				
	vi.	A bucket seat' can accommodate with how many persons (a) Single	1				
	vii.	Which component is used for anti-collision warning application (b) Radar Antenna	1				
	viii.	The main applications of object detection technique is (c) Both (a) and (b)	1				
	ix.	The condition that causes vapour locking in a brake system is (a) Overheating of the fluid due to frequent brake application	1				
	x.	Which safety features used in Garage Door (d) All of these	1				
Q.2	i.	Any two features required for a safe vehicle body. 1 mark for each	2				
	ii.	Diagram Explanation	2 marks 6 marks	8			
OR	iii.	Construction Properties of sandwich panels.	4 marks 4 marks	8			
Q.3	i.	Classification Any four differences b/w active safety and passive safety. 0.5 mark for each (0.5 mark * 4)	2 marks 2 marks	4			
	ii.	Any three condition		6			
	OR	iii.			2 marks for each "interior safety" on passenger car Diagram Explanation	(2 marks * 3) 2 marks 4 marks	6
	Q.4	i.		3	Any three function of seat belts in passenger car. 1 mark for each	(1 mark * 3)	
		ii.		7	Diagram Functions Elements	2 marks 3 marks 2 marks	
		OR		7	iii.	Function of passenger car airbags Vehicle airbags to be deployed	4 marks 3 marks
	Q.5	i.		4	Any four differences b/w direct and indirect tyre pressure monitoring system. 1 mark for each	(1 mark * 4)	
		ii.		6	Diagram Explanation	2 marks 4 marks	
		OR		6	iii.	Diagram Explanation	2 marks 4 marks
	Q.6	i.		2	Classification the garage door openers.		
		ii.		8	Schematic layout and function of Central switch Contacts in door-lock mechanisms Control unit Servomotors in Central Locking System	2 marks 2 marks 2 marks 2 marks	
		OR		8	iii.	Function of Windshield Optical coupling Heater Rain droplets Light conductor LED Photodiode in rain sensor system	1 mark 1 mark 1 mark 1 mark 1 mark 2 marks

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