Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

ME5EL43 Advanced Automotive Technology

Programme: M.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 main active component of most types of oxygen sensors is: **1**

(a) Platinum dioxide (b) Platinum oxide

(c) Zirconium dioxide (d) Zirconium oxide

ii. The TPS (Throttle Position Sensor) input is used to do all of the following, except: **1**

(a) Indicate the rate of acceleration

(b) Indicate the rate of deceleration

(c) Alter the spark advance curve

(d) Determine idle speed RPM

iii. The following is (are) the advantage(s) of Electronic Ignition system: **1**

(a) Produces maximum output voltage

(b) Better starting with cold engine

(c) Less possibility of arcing at spark plug

(d) All of these

iv. The following is known as 'Breakerless Ignition system': **1**

(a) Battery coil ignition system

(b) Magneto ignition system

(c) Electronic ignition system

(d) Capacitive discharge ignition system

v. When brakes are applied on a moving vehicle; the kinetic energy is converted to- **1**

(a) Mechanical energy (b) Heat energy

(c) Electrical energy (d) Potential energy

P.T.O.

vi. In the linkage type of power steering system, the swinging end of the pitman arm actuates- **1**
(a) A spool valve (b) A tie rod
(c) An idler lever (d) None of these

vii. What is the process called when the state vector is calculated on board the vehicle? **1**
(a) Navigation (b) Guidance
(c) Surveillance (d) Position location

viii. What is the first phase of traffic regulation? **1**
(a) Driver controls (b) Vehicle controls
(c) Traffic flow regulations (d) General controls

ix. Which of the following vehicles produces zero emissions? **1**
(a) Traditional (b) Hybrid
(c) Electric (d) Both (a) and (c)

x. Which vehicle uses a high voltage battery? **1**
(a) Electric vehicle (b) Hybrid vehicle
(c) Conventional vehicle (d) Both (b) and (c)

Q.2 i. Explain closed loop control system in brief. **3**
ii. Enlist the different type of sensors used in electronic engine control system. Explain in brief working of oxygen sensor with neat sketch. **7**
OR iii. Explain the construction and working of stepper motor with neat sketch. **7**

Q.3 i. What are the components of electronic engine management systems in SI engine? **2**
ii. Explain working of Contactless electronic ignition system with neat sketch. **8**
OR iii. Enlist the different types of electronic fuel injection system in CI engine. Explain construction and working any one of them with neat sketch. **8**

Q.4 i. What is braking control system? **3**
ii. Explain construction and working of power steering with neat sketch. **7**
OR iii. Explain working of adaptive cruise control with neat sketch. **7**

Q.5 i. Explain about driver assistance systems used in modern cars. **4**
ii. Write a short case study on future car. **6**
OR iii. Explain about Route Guidance and Navigation Systems in modern cars. **6**

Q.6 Attempt any two:
i. Explain the drive train arrangement of series hybrid electric system used in hybrid vehicle. **5**
ii. What are the advantages (any five) of hybrid electric vehicle over electric vehicle? **5**
iii. Explain construction and working of fuel cells with neat sketch. **5**

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Scheme of Marking

Faculty of Engineering
End Sem (Even) Examination May-2020
Advanced Automotive Technology (T) - ME5EL43 (T)

Programme: M.Tech. | Branch/Specialisation:

Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.

Q.1	i.	The main active component of most types of oxygen sensors is: **c) Zirconium dioxide**	1
	ii.	The TPS (Throttle Position Sensor) input is used to do all of the following, except **d) Determine idle speed RPM**	1
	iii.	The following is (are) the advantage(s) of Electronic Ignition system **d) All of the above**	1
	iv.	The following is known as 'Breakerless Ignition system' **c) Electronic Ignition system**	1
	v.	When brakes are applied on a moving vehicle; the kinetic energy is converted to **b) Heat energy**	1
	vi.	In the linkage type of power steering system, the swinging end of the pitman arm actuates **b) A tie rod**	1
	vii.	What is the process called when the state vector is calculated on board the vehicle? **a) Navigation**	1
	viii.	What is the first phase of traffic regulation? **a) Driver controls**	1
	ix.	Which of the following vehicles produces zero emissions? 1 **(c) Electric**	1
	x.	Which vehicle uses a high voltage battery? **(b) Hybrid vehicle**	1
Q.2	i.	Explain closed loop control system in brief.	3
	ii.	Enlist the different type sensors used in electronic engine control system. Explain in brief working of oxygen sensor	2 3
		neat sketch.	2
OR	iii.	construction working neat sketch.	2.5 2.5 2
Q.3	i.	What are the components of electronic engine management systems in SI engine?	2
	ii.	Explain working of Contactless (BREAKERLESS) electronic ignition system neat sketch.	3 2
OR	iii.	Enlist the different types of electronic fuel injection system in CI engine. Explain construction and working any one of them neat sketch.	3 3 2
Q.4	i.	What is braking control system?	3
	ii.	Construction working of power steering neat sketch.	2.5 2.5 2
OR	iii.	Explain working of adaptive cruise control with neat sketch.	5 2
Q.5	i.	Explain about driver assistance systems used in modern cars.	4
	ii.	Write a short case study on future car.	6
OR	iii.	Route Guidance Navigation Systems.	3 3
Q.6		Attempt any two:	
	i.	Explain the drive train arrangement of series hybrid electric system used in hybrid vehicle. Diagram	3 2
	ii.	What are the advantages of hybrid electric vehicle over electric vehicle? (Any 10)	Each 0.5
	iii.	construction working neat sketch.	2 2 1

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