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

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2019

AU3CO09 / OE00022 Automotive Electricals and Electronics

Programme: B.Tech. Branch/Specialisation: All

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. Which of the following is true of a 12-volt automobile battery? **1**

(a) It has six cells connected in series.
(b) It has three cells connected in series.
(c) It has six cells connected in parallel.
(d) It has three cells connected in parallel

ii. Battery corrosion may be cleaned with: **1**

(a) Water
(b) A solution of baking soda and water.
(c) Water and baking flower.
(d) Kerosene.

iii. The magnetic field required for starting motor operation is provided by the: **1**

(a) Armature assembly. (b) Field-winding assembly.
(c) Solenoid. (d) None of these

iv. An open fault in the hold-in winding of a starter solenoid switch will most likely cause: **1**

(a) The battery to run down.
(b) The solenoid to move in and out, or chatter.
(c) The starter drive to remain engaged after the engine is running.
(d) Excessively high current drawn from the starter.

v. To limit the flow of current in fluorescent lighting, uses: **1**

(a) A ballast (b) A resistance
(c) A load (d) None of these

P.T.O.

vi. Water temperature warning lights, lighting a green signal when temperature is: **1**
(a) Below 45°C. (b) Above 45°C.
(c) Below 120°C. (d) Above 120°C.

vii. The main active component of most types of oxygen sensors is: **1**
(a) Platinum dioxide. (b) Platinum oxide.
(c) Zirconium dioxide. (d) Zirconium oxide.

viii. 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.

ix. Closed loop operation in a fuel injection system is based on: **1**
(a) Oxygen content of exhaust gases.
(b) Volume of intake air.
(c) Fuel pressure.
(d) None of these

x. The multi-point fuel injection system can be functionally divided into: **1**
(a) Electronic control system (b) Fuel system
(c) Air induction system (d) All of these

Q.2 i. Write the expression for battery efficiency with their nomenclature. **2**
ii. Why a per-cell of battery generate 2 volts only? **3**
iii. Explain the different components of lead acid battery with neat sketches. **5**
OR iv. Discuss in detail various tests for ascertaining the fitness of a battery to be used in a vehicle. **5**

Q.3 i. State the ideal charging voltage and time for a 12V battery. **2**
ii. Describe with the help of neat sketch construction and working of a direct current generator of an automobile. **8**
OR iii. Draw an electric circuit diagram of cranking motor with an arrangement of solenoid switch? **8**

Q.4 i. Name the different lights used in a modern car. **3**
ii. Draw a simplified wiring circuit for the lighting system of a car and discuss the same. **7**
OR iii. Describe with the help of neat diagram the working of thermostatic type temperature gauge. **7**

Q.5 i. Discuss any four need of electronic engine control system. **4**
ii. Name different types of sensors used in electronic engine control system. Explain in brief working of detonation sensor with neat sketch. **6**
OR iii. What are the purpose of actuators? Explain in brief the idle-air-control valve with neat sketch. **6**

Q.6 Attempt any two:
i. Explain magneto ignition system of automobile with the help of neat sketch. **5**
ii. Discuss the construction of typical spark plug with neat sketch? **5**
iii. Explain multi point fuel injection system with the help of neat sketch. **5**

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Marking Scheme

AU3CO09 / OE00022 Automotive Electricals and Electronics

Q.1	i.	Which of the following is true of a 12-volt automobile battery? (a) It has six cells connected in series.	**1**
	ii.	Battery corrosion may be cleaned with: (b) A solution of baking soda and water.	**1**
	iii.	The magnetic field required for starting motor operation is provided by the: (b) Field-winding assembly.	**1**
	iv.	An open fault in the hold-in winding of a starter solenoid switch will most likely cause: (b) The solenoid to move in and out, or chatter.	**1**
	v.	To limit the flow of current in fluorescent lighting, uses: (a) A ballast	**1**
	vi.	Water temperature warning lights, lighting a green signal when temperature is: (a) Below 45℃.	**1**
	vii.	The main active component of most types of oxygen sensors is: (c) Zirconium dioxide	**1**
	viii.	The TPS (Throttle Position Sensor) input is used to do all of the following, except (d) Determine idle speed RPM.	**1**
	ix.	Closed loop operation in a fuel injection system is based on: (a) Oxygen content of exhaust gases.	**1**
	x.	The multi-point fuel injection system can be functionally divided into: (c) Air induction system	**1**

Q.2	i.	Expression for battery efficiency		**2**
		Nomenclature.	1 mark	
		Formula	1 mark	
	ii.	Per-cell of battery generate 2 volts only		**3**
	iii.	Components of lead acid battery		**5**
		Any six 0.5 mark for each (0.5 mark * 6)	3 marks	
		Diagram	2 marks	
OR	iv.	Any five tests for ascertaining the fitness of a battery		**5**
		1 mark for each	(1 mark * 5)	
Q.3	i.	Ideal charging voltage and time for a 12V battery. Statement justifying		**2**
	ii.	Direct current generator of an automobile		**8**
		Construction	2 marks	
		Working	3 marks	
		Diagram	3 marks	
OR	iii.	Draw an electric circuit diagram of cranking motor with an arrangement of solenoid switch		**8**
		Diagram	2 marks	
		Construction	3 marks	
		Working	3 marks	
Q.4	i.	Name the different lights used in a modern car.		**3**
		Any six 0.5 mark for each	(0.5 mark * 6)	
	ii.	Wiring circuit for the lighting system of a car and discuss the same		**7**
		Diagram	3 marks	
		Explanation	4 marks	
OR	iii.	Working of thermostatic type temperature gauge.		**7**
		Diagram	3 marks	
		Working	4 marks	
Q.5	i.	Any four need of electronic engine control system		**4**
	ii.	Any four types of sensors (0.5 mark * 4)	2 marks	**6**
		Working of detonation sensor	2 marks	
		Diagram	2 marks	
OR	iii.	Purpose of actuators	2 marks	**6**
		Idle-air-control valve	2 marks	
		Diagram	2 marks	
Q.6		Attempt any two:		
	i.	Magneto ignition system of automobile		**5**
		Working	3 marks	
		Diagram	2 marks	
	ii.	Construction of typical spark plug	3 marks	**5**
		Diagram	2 marks	
	iii.	Multi point fuel injection system		**5**
		Working	3 marks	
		Diagram	2 marks	

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