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Enrollment No.....



Faculty of Engineering
End Sem (Odd) Examination Dec-2022
AU3CO21 Automotive Electricals & Electronics
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. 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 1
- provided by the-
- (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 1
- will most likely cause-
- (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 draw 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.

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- 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. What do you mean by battery efficiency? **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 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**

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- Q.4 i. Name the different lights used on 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 the need of electronic engine control system. **4**
 ii. Name different type sensors used in electronic engine control system. Explain in brief working of detonation sensor with neat sketch. **6**
- OR iii. What are the purposes 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**

Marking Scheme
AU3CO21 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°C.	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.	Definition: 1 Formula: 1	2
	ii.	Explain	3
	iii.	Diagram: 2 Explain different components any six (6×0.5=3)	5
OR	iv.	Any five with diagram (each of 1)	5
Q.3	i.	Statement	2
	ii.	Diagram: 2 Construction: 3	8

		Working: 3	
OR	iii.	Diagram: 2 Construction: 3 Working: 3	8
Q.4	i.	Any six (each of 0.5)	3
	ii.	Diagram: 3 Explanation: 4	7
OR	iii.	Diagram: 3 Working: 4	7
Q.5	i.	Explain: 4	4
	ii.	Name any four (each of 0.5) Working of detonation sensor 2 Diagram: 2	6
OR	iii.	Purpose of actuators: 2 Idle-air-control valve: 2 Diagram: 2	6
Q.6		Attempt any two:	
	i.	Diagram: 2 Working: 3	5
	ii.	Diagram: 2 Construction: 3	5
	iii.	Diagram: 2 Working: 3	5
