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Total No. of Printed Pages:3

Enrollment No.....



Faculty of Engineering
End Sem Examination Dec-2023

AU3CO45 Automotive Electrical & 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. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1 i. When a lead acid battery is discharged, what is the end state of the electrolyte (liquid)? **1**
(a) Sulfuric acid (H_2SO_4) (b) Water (H_2O)
(c) Hydrochloric acid (HCl) (d) Lead Sulphate ($PbSO_4$)
- ii. The paper separator soaked with _____ holds the electrolyte in between cathode (MnO_2) and anode (Zn). **1**
(a) Potassium hydroxide (KOH)
(b) Sulfuric acid (H_2SO_4)
(c) Potassium peroxide (K_2O_2)
(d) Potassium oxide (K_2O)
- iii. In a starter motor, the field windings are wound around, **1**
(a) Pole shoes (b) Commutator
(c) Brush (d) Armature
- iv. The purpose of having diodes in the alternator is- **1**
(a) To prevent high output current from the alternator
(b) To prevent reverse current flow in the alternator
(c) Convert alternating current into direct current
(d) Convert direct current into alternating current
- v. HID in head light means- **1**
(a) High-intensity distribution
(b) High-intensity discharge
(c) High-illumination discharge
(d) High-illumination distribution

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- vi. A gauge that measures and displays the instantaneous speed of a vehicle is the- **1**
 (a) Odometer (b) Trip meter
 (c) Speedometer (d) Tacheometer
- vii. The oxygen sensor measures the residual oxygen content of the exhaust gas and adjusts the- **1**
 (a) Amount of fuel injected to obtain an optimum mixture
 (b) Amount of air supplied to obtain an optimum mixture
 (c) Amount of exhaust recirculated to obtain an optimum emission
 (d) Ignition timing to obtain an optimum combustion
- viii. The system which maintains a safe distance between the car in front of you and your car at a consistent pace by using the forward-mounted sensors is called as- **1**
 (a) Cruise control
 (b) Adaptive cruise control
 (c) Automatic cruise control
 (d) Auto pilot
- ix. A coil on plug ignition is a system which eliminates, the need for- **1**
 (a) HT cables and distributor
 (b) HT cables and ECU
 (c) ECU and distributor
 (d) HT cables and LT cables
- x. In the sequential MPFI system, fuel injection is done at the intake port- **1**
 (a) For all the cylinders at the same time
 (b) Which is timed to overlap with intake stroke of each cylinder
 (c) When the intake valve is open as well as when it is closed
 (d) When the intake valve is open as well as into the cylinder
- Q.2 i. State the working principle of Lead-Acid Batteries. **2**
 ii. Name any three charging methods of Lead-Acid Batteries. Write the basics of each test in one line each. **3**
 iii. Explain how open-circuit voltage test, specific gravity test and load testing are done on a lead-acid battery. **5**
- OR iv. Write about the construction of lead-acid batteries. Also write about the chemistry of lead acid battery. **5**

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- Q.3 i. Write a short note on solenoid switch. **2**
 ii. What are the required characteristics of a starting system? Explain about inertia type starter with a suitable sketch. **8**
- OR iii. Why proper voltage regulation is essential in a car? Explain the alternator circuit with the rectifier with a suitable sketch. **8**
- Q.4 i. What are the disadvantages of positive grounding system? **3**
 ii. Name any four types of head lights in practice in present day vehicles. Explain any two in detail. **7**
- OR iii. What are the components in a wiper system? Explain each component briefly. **7**
- Q.5 i. Write a short note on the role of throttle position and crank angle position sensors? **4**
 ii. What do you understand by the knock sensor? Explain how the knock sensor works. **6**
- OR iii. What are the advantages of ABS over the conventional braking system? Explain how the anti-lock braking system improves the safety during braking. **6**
- Q.6 Attempt any two:
 i. What is throttle body injection? What are the limitations of this system over a MPFI system? **5**
 ii. What are the advantages of electronic ignition system over conventional system? Explain the operational principle briefly. **5**
 iii. What is meant by a feedback carburettor? How this differs from the conventional carburettor? Name any two sensors used in a feed back carburettors. **5**
