

**AUE-702****AUTOMOTIVE ELECTRICAL & ELECTRONICS SYSTEM**

Time Allotted: 3 Hours

Full Marks: 70

*The questions are of equal value.**The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.***GROUP A  
(Multiple Choice Type Questions)**

1. Answer any ten questions.

10×1 = 10

(i) Which of the following is the Temperature sensor

- (A) thermo couple (B) nozzle  
(C) strain gauge (D) LVDT

(ii) In a close loop control system

- (A) the input has control over output  
(B) input has no control over output  
(C) both (A) and (B)  
(D) none of these

(iii) A sensor is a device which

- (A) converts energy from one form to another  
(B) when actuated by energy in one transmission system, supplies energy in the same form or in another form to a second transmission system  
(C) sense physical parameters which need additional source of energy

(iv) Increase in the plate area of a capacitor

- (A) decreases capacitance (B) increase capacitance  
(C) none of these

(v) In what way you can determine the healthy condition of a battery?

- (A) from electrolyte's specific gravity (B) from terminal voltage  
(C) from internal resistance (D) none of these

(vi) The substance that strongly oppose the movement of electrons through them are referred to as

- (A) insulator (B) semiconductor  
(C) plasma (D) super conductors

(vii) It is a common practice to test ignition coils with the help of

- (A) spark-gap tester (B) neon-tube tester  
(C) high-frequency coil tester (D) oscilloscope

(viii) The LVDT is used to measure

- (A) vehicle motion (B) force  
(C) vibration (D) none of these

(ix) The increase in temperature of a conductor results

- (A) increase in resistance (B) reduction in resistance  
(C) no effect in resistance

(x) While adjusting the ignition timing results

- (A) rotation of distributor  
(B) reposition of crankshaft pulley  
(C) none of these

(xi) The heat range of a spark plug is determined by

- (A) how hot the insulator of the spark plug can get before it cranks  
(B) its spark intensity  
(C) the ability of the spark plug to transfer heat from the tip of the insulator to the water cooling system

(xii) The armature reaction phenomena happens for

- (A) d.c. motor (B) generator  
(C) spark plug (D) starter motor

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**GROUP B**  
(Short Answer Type Questions)

Answer any *three* questions.

3×5 = 15

2. What is the difference between open loop and closed loop control system?
3. Discuss the working principle of Strain gauge. What is gauge factor? Write application of strain gauge in pressure measurement.
4. For the given transfer function, find the pole and zero positions by plotting a PZ-map and also conclude about its stability:  

$$G(S) = 10(1 + 0.25 s) / s(s+1)(s^2 + 10).$$
5. What are the advantages of electronic ignition system? Discuss the basic principle of ignition system.
6. What is the working principle of odometer?
7. Write application of position sensor in a modern car. Brief the working principle of a position sensor.

**GROUP C**  
(Long Answer Type Questions)

Answer any *three* questions.

3×15 = 45

8. Briefly explain with a neat diagram the principle and construction of an automobile starter motor. Briefly explain the function of a three-point starter to control d.c. motor. 10+5
9. Write difference between Sensors and Transducer. How can you measure liquid level and pressure using capacitive sensor? 5+5+5
10. Write down the working principle of Rotary Variable Differential Transformer (RVDT). Explain the same with suitable diagram. What is the application of fuel metering in automobile system? 5+5+5

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11. How do you control the Headlight beam? Explain with schematic diagram. What is ignition warning light? Explain the same with diagram. 7.5+7.5
12. Write short notes on any *two* of the following: 7.5+7.5
  - (a) Wiper system.
  - (b) Positive and negative earth system.
  - (c) Mechanical spring device.
  - (d) Photoelectric transducer.