



Faculty of Engineering

End Semester Examination May 2025

AU3CO21 Automotive Electrical & Electronics

Programme : B.Tech.

Branch/Specialisation : AU

Duration : 3 hours

Maximum Marks : 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary.

Notations and symbols have their usual meaning.

Section 1 (Answer all question(s))

Marks CO BL

- | | |
|---|--------------------|
| <p>Q1. What is the percentage of acid and water present in the electrolyte of a lead-acid battery in a fully charged condition?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><input checked="" type="radio"/> 39% acid and 61% water</p> <p><input type="radio"/> 30% acid and 70% water</p> </div> <div style="width: 48%;"> <p><input type="radio"/> 45% acid and 65% water</p> <p><input type="radio"/> 25% acid and 75% water</p> </div> </div> | <p>1 1 1</p> |
| <p>Q2. Which of the following is the advantage of alkaline battery?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><input type="radio"/> High energy density</p> <p><input checked="" type="radio"/> The specific gravity of electrolyte remains the same</p> </div> <div style="width: 48%;"> <p><input type="radio"/> Good discharge characteristics over a wide range of temperature</p> <p><input type="radio"/> Cheap raw materials are used</p> </div> </div> | <p>1 1 1</p> |
| <p>Q3. Which statement is correct about DC series motor?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><input type="radio"/> Has its field winding consisting of thick wire and more turns</p> <p><input type="radio"/> Can be started easily without load</p> </div> <div style="width: 48%;"> <p><input type="radio"/> Has a poor torque</p> <p><input checked="" type="radio"/> Has its field winding consisting of thick wire and less turns</p> </div> </div> | <p>1 1 1</p> |
| <p>Q4. In which of the following applications DC series motor is invariably tried?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><input checked="" type="radio"/> Starter for a car</p> <p><input type="radio"/> Fan motor</p> </div> <div style="width: 48%;"> <p><input type="radio"/> Drive for a water pump</p> <p><input type="radio"/> Home appliances</p> </div> </div> | <p>1 2 1</p> |
| <p>Q5. Ground resistance should be designed such that-</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><input checked="" type="radio"/> Grounding resistance should be as low as possible</p> <p><input type="radio"/> Grounding resistance should be always zero</p> </div> <div style="width: 48%;"> <p><input type="radio"/> Grounding resistance should be as high as possible</p> <p><input type="radio"/> None of the above</p> </div> </div> | <p>1 2 1</p> |
| <p>Q6. Measurement of elevated temperatures is defined as _____.</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><input type="radio"/> Thermometry</p> <p><input type="radio"/> Metallography</p> </div> <div style="width: 48%;"> <p><input checked="" type="radio"/> Pyrometry</p> <p><input type="radio"/> Radiography</p> </div> </div> | <p>1 2 1</p> |
| <p>Q7. Which class of sensors includes devices that provide continuous output signals?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><input checked="" type="radio"/> Analog sensors</p> <p><input type="radio"/> Scalar sensors</p> </div> <div style="width: 48%;"> <p><input type="radio"/> Digital sensors</p> <p><input type="radio"/> Vector sensors</p> </div> </div> | <p>1 3 1</p> |
| <p>Q8. Which error arises due to the lag between the input and output of a sensor?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><input type="radio"/> Bias error</p> <p><input checked="" type="radio"/> Hysteresis error</p> </div> <div style="width: 48%;"> <p><input type="radio"/> Drift error</p> <p><input type="radio"/> Quantization error</p> </div> </div> | <p>1 3 1</p> |
| <p>Q9. Which of the following key benefit of direct fuel injection technology?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><input type="radio"/> Reduce fuel efficiency</p> <p><input type="radio"/> Higher carbon emission</p> </div> <div style="width: 48%;"> <p><input checked="" type="radio"/> Improve engine efficiency</p> <p><input type="radio"/> Increase engine noise</p> </div> </div> | <p>1 4 1</p> |

Q10. Formation of ice on the _____ plate is eliminated in electronic fuel injection.

1 4 1

☒ Throttle

☐ Nozzle

☐ Engine

☐ None of the mentioned

Section 2 (Answer all question(s))

Marks CO BL

Q11. Write any four characteristics of a battery.

2 1 1

Rubric	Marks
For Each characteristic of battery 0.5 Marks	2

Q12. Explain the charging method of the battery.

3 1 1

Rubric	Marks
Explanation	3

Q13. (a) Explain the principal and construction of lead acid battery.

5 1 1

Rubric	Marks
construction of lead acid battery	2
Explain the principal of lead acid battery	3

(OR)

(b) Explain the basic principle and construction of an alkaline battery.

Rubric	Marks
construction of alkaline battery	2
Explain the basic principal of alkaline battery	3

Section 3 (Answer all question(s))

Marks CO BL

Q14. Write down the characteristics of DC and AC supply.

2 2 1

Rubric	Marks
1 Mark for each	2

Q15. Explain the Working principal of DC motor.

3 2 2

Rubric	Marks
Working Principle	3

Q16. (a) Demonstrate the construction features of starter motor using a suitable diagram.

5 2 2

Rubric	Marks
Construction features of starter motor	3
Diagram	2

(OR)

(b) Define voltage regulation. Explain its concept using a formula and one example.

Rubric	Marks
Definition	1
Concept	3
Example	1

Section 4 (Answer all question(s))

Marks CO BL

Q17. What is earth return system?

2 3 1

Rubric	Marks
Earth return system	2

Q18. State the positive and negative earth system.

3 2 1

Rubric	Marks
Positive earth system	1.5
Negative earth system	1.5

Q19. (a) Define headlight dazzling and also explain its preventive methods.

5 3 1

Rubric	Marks
Headlight Dazzling	2
Preventive Methods	3

(OR)

(b) Define the working characteristics and applications of a speedometer.

Rubric	Marks
working characteristics	3
Applications	2

Section 5 (Answer any 2 question(s))

Marks CO BL

Q20. What are sensors? Explain the types of sensor.

5 4 2

Rubric	Marks
Sensors	1
Types of sensors (any two)	4

Q21. Explain the vehicle control system using a block diagram.

5 4 2

Rubric	Marks
Explanation	3
Block diagram	2

Q22. Explain the working of a stepper motor using a circuit diagram.

5 4 2

Rubric	Marks
Explanation of working	3
Block diagram	2

Section 6 (Answer any 2 question(s))

Marks CO BL

Q23. Explain the fuel injection system with their types.

5 5 1

Rubric	Marks
Explain fuel injection systems	2
Types	3

Q24. What is the electronic ignition system? Explain its working principle.

5 5 3

Rubric	Marks
Electronic ignition system	2
Explanation of working principle	3

Q25. Write the types of solid-state ignition systems and explain the principle of operation.

5 3 3

Rubric	Marks
Types of solid-state ignition systems	2
Principle of operation	3
