



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

CERTIFICATE IN AUTOMOTIVE ENGINEERING

(CAE 10J)

AUTO-ELECTRICAL TECHNOLOGY

SEMESTER I EXAMINATIONS

SERIES: APRIL, 2010.

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination:

- Answer Booklet(s)
- Drawing Instruments

This paper consists of **TWO** Sections **A** and **B**.

Attempt **TWO** questions from Section **A** and **ONE** Question from Section **B**.

All questions carry equal marks.

Maximum marks for each part of a question are as shown.

SECTION A (THEORY)

(Attempt **TWO** questions from this section)

- Q.1 (a) Explain **FIVE** factors affecting battery charging. (10 marks)
- (b) Describe the principle of operation of a lead acid battery during:
- (i) Charging
 - (ii) Discharging. (10 marks)
- Q.2 (a) Describe **FIVE** main electrical system circuits in a modern vehicle. (10 marks)
- (b) Explain **TWO** types of circuit faults. (4 marks)
- (c) Give the electrical symbols for each of the following descriptions:
- (i) Photodiode
 - (ii) Thyristor
 - (iii) Generator a.c and d.c
 - (iv) Two-way switch
 - (v) Spark gap
 - (vi) Fuse (6 marks)
- Q.3 (a) (i) Describe using diagrams how an alternating current is produced using a soft iron core and a magnet. (10 marks)
- (ii) How can the output be increased in (i) above. Illustrate using a diagram. (4 marks)
- (b) Draw and label half-wave and full-wave rectification circuits. (6 marks)

SECTION B (PRACTICE)

(Attempt **ONE** question.)

- Q.4 Describe visual inspection checks done to a battery in a vehicle system. (20 marks)
- Q.5 Outline the procedures for each of the following tests:
- (a) State-of-charge test
 - (b) Heavy-load test. (20 marks)