THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

CERTIFICATE IN ELECTRICAL POWER ENGINEERING
CERTIFICATE IN ELECTRONICS & AUTOMATION ENG.

ENGINEERING SCIENCE I

END OF SEMSTER I EXAMINATIONS

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer booklet*
- *A non-programmable scientific calculator*

Answer question **ONE (COMPULSORY)** and any other **TWO** questions
This paper consists of **THREE** printed pages

Question 1 (Compulsory)

a) (i) Define the term work and state its SI unit   (2 marks)
   (ii) A boy of mass 40kg, walks up a flight of 12 steps. If each step is 20 cm high, calculate the work done by the boy. (Take g=9.81N/Kg.   (5 marks)

b) (i) Define the term power and state its SI unit   (2 marks)

   (ii) An electric motor rated 2.5KW is used to lift bales of hay to a store in a dairy farm. A single bale has a mass of 5kg. If the store is 4 metres above the ground, how many bales can the motor raise in 2 minutes?   (Take g=9.81N/Kg)   (6 marks)

c) (i) State Newton's Laws of Motion   (3 marks)

   (ii) a) Explain the term impulse and state its SI units   (3 marks)
        b) A truck of mass 2000kg starts from rest on horizontal rails. Calculate the speed 3 seconds after starting, if the tractive force by the engine is 1000N.   (5 marks)

d) (i) State Ohms' Law.   (1 mark)
   (ii) For the network in figure 1, calculate
        a) The supply voltage
        b) I_2 and I_3
        c) Total current

Question 2

a) (i) Define the term energy and state it's SI units   (2 marks)
       (ii)   State any TWO sources of energy   (2 marks)
       (iii)   Explain the TWO classification of energy   (5 marks)
       (iv)   State any ONE examples for each classification named in (a) (iii) above
                                                                                                     (2 marks)
b) A car travelling at a speed of 72km/hr is uniformly retarded by application of brakes and comes to rest after 8 seconds. If the car with its' occupants has a mass of 1250 kg, calculate;
       i)   The braking force
       ii)   The work done in bringing the car to rest   (7 marks)

c) State the Law of conservation of energy   (2 marks)

Question 3

a) (i) State Kirchoff's Laws

   (ii) Use Kirchoff's Laws
Question 4

Question 5