TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT ELECTRICAL AND ELECTRONICS ENGINEERING

UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN TECHNOLOGY

EEP 1101: ENGINEERING SCIENCE 1

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2HOURS

DATE:

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of five questions. Answer ANY THREE QUESTIONS.

Do not write on the question paper.

QUESTION 1

(a) i. With a aid of a labeled diagram, explain the operation of a voltage (voltaic) cell.

ii. Explain the difference between primary and secondary cells. (10 marks)

(b) (i) Draw a labeled diagram of a common dry cell and describe what takes place inside it when it is producing a current.

(ii) State two advantages which a lead accumulator has over a dry cell. (10 marks)

QUESTION TWO

a) i. Explain the meaning of a parallel circuit.

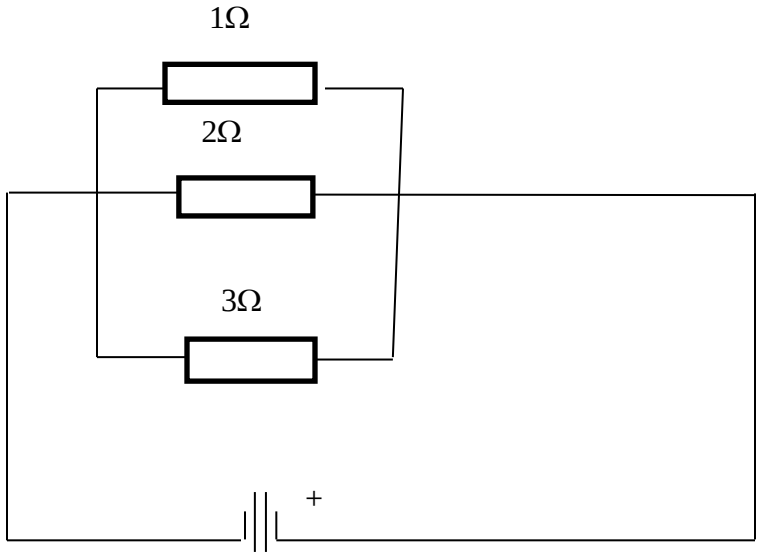
ii. Two resistors of values 10Ω and 20Ω are connected in parallel with one another, the combination rose a current of 10 A from the supply. Calculate:-

I) Current in each resistor

II) P.D. across parallel circuit

(8 marks)

b) In this circuit, three resistors receive the same amount of voltage (24volts) from single source. Calculate the amount of current "drawn" by each resistor, as well as the amount of power dissipated by each resistor.



24volts (8 marks)

(c) Prove that four resistance connected in series total resistance RT=R1+ R2+ R3+ R4 (4 marks)

QUESTION THREE

a) I) Define the following magnetic quantities:-

i. Magnetic field
ii. Magnetic flux (Q)
iii. Magnetic flux density (B)
iv. Magnetomotive force (mmf)
v. Magnetic field strength

ii. A magnetic pole face has a rectangular section having dimensions 200mm by 100 mm. If the total flux emerging from the pole is 150 μ, determine the flux density (10 marks)

(b). (i) With the aid of sketches describe interactions of field on current carrying conductors.

I In the same direction
II In opposite direction

(ii) A flux of 400μ webers passing through a 150 turns coil reversed in 40ms .
Determine the average induced e.m.f (10 marks)

QUESTION FOUR

a (i) State :-

I. Norton's theorem
II. Thevenn's theorem
III. Maximum power transfer theorem (8 marks)

b. For the circuit in figure 1 below calculate using superposition theorem.

I. The current through the 3Ω resistor
II. The P.D. across AB

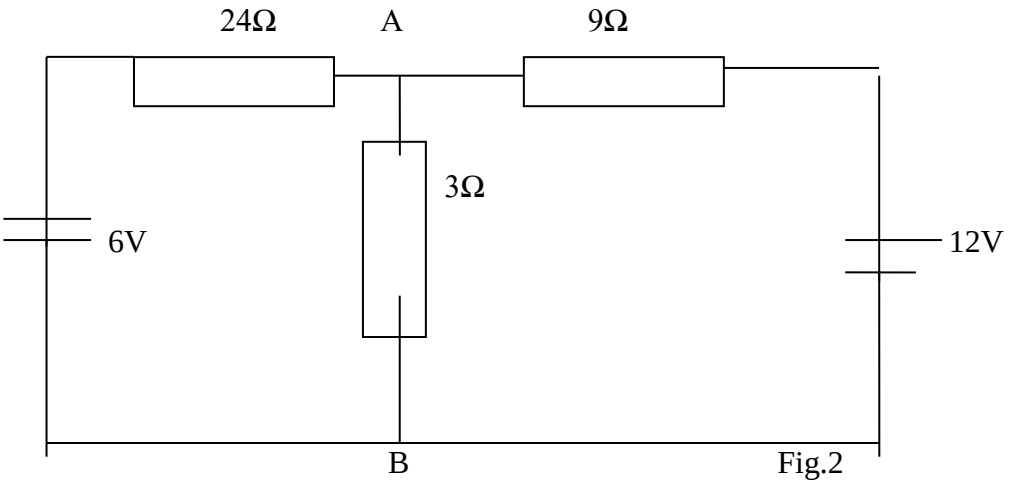


Fig.2

(8 marks)

(c) Explain the meaning of a series circuit (4 marks)

QUESTION FIVE

(a) i. Define joule

ii. Calculate the work done in raising 5kg mass of steel through a height of 30 meters, take g=9.81 m/s^2 (7 marks)

b) i. A vehicle which has a mass of 50kg is moving at a velocity of 50km/h , Calculate its kinetic energy. (5marks)

ii. Calculate kinetic energy of a trolley of mass 80 kg moving with a velocity of 6/ms (5marks)

c) State the principle of the conservation of energy (3 marks)