TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF MATHEMATICS & PHYSICS

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN APPLIED SCIENCES

(DSLT 16S)

APS 2201: PHYSICS TECHNIQUES

.

SPECIAL/ SUPPLIMENTARY EXAMINATIONS

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Sep2018

Instructions to Candidates
You should have the following for this examination
-Answer Booklet, examination pass and student ID
This paper consists of 5 questions. Attempt Question 1 and any other two.
Do not write on the question paper.

Question ONE

a) Define the following electrical quantities and state the S.I Unit for each
    i)   Voltage   (2 marks)
    ii)   Current   (2 marks)
    iii)   Resistance   (2 marks)
    iv)   Power   (2 marks)
    v)   Energy   (2 marks)
b) i) State the Ohms law   (2 marks)
    ii) illustrate the Ohms law using a graph   (2 marks)
    iii) Briefly explain the three (3) factors affecting the resistance of a conductor.   (6 marks)
c) State the values of the following resistors given their colour codes.
    a) Red, Red, Yellow, Silver.   (1 mark)
    b) Orange, Blue, Orange, Gold.   (1 mark)
    c) Purple, Black, Blue, Red.   (1 mark)
    d) White, Grey, Green.   (1 mark)
    e) Yellow, Green, Red, Gold.   (1 mark)

d) Give the colour codes of the following resistors values:

i.   1.9MΩ ± 10%   (1mark)
ii.   27 KΩ ± 5%   (1 mark)
iii.   0.33MΩ ± 20%   (1mark)
iv.   470 KΩ ± 2%   (1mark)
v.   300 MΩ ± 10%   (1mark)

Question TWO

a) Explain the following terms

i.   Self-inductance   (2 marks)
ii.   Mutual-inductance   (2 marks)

b) Differentiate between fixed and variable capacitors using symbols   (4 marks)

c) With the aid of a diagram explain the construction and operation of a capacitor   (7 marks)

Question THREE

a) With the of a diagram explain the construction and operation of a transformer   (7marks)

b) Define the following terms and state their S.I units

i.   Velocity   (2 marks)
ii.   Acceleration   (2 marks)
iii.   Displacement   (2 marks)
iv.   Momentum   (2 marks)

Question FOUR

a) With the aid of a circuit diagram, explain the operation of a half wave rectifier   (7 marks)

b) Describe the following terms with regard to semiconductor transistors

i.   Base   (2 marks)
ii.   Emitter   (2 marks)
iii.   Collector   (2 marks)

c) Using symbols differentiate between N-P-N and P-N-P transistors   (7 mraks)

Question FIVE

a) An electrical iron of power 1.5Kw works on the mains supply where the potential difference is 240 V .

Calculate;

    i.   The current passing through the heating element of the electric iron   (3 marks)

   ii.   The resistance of the heating element   (3 marks)

b) Three resistors of 12Ω, 6 Ω and 10Ω are connected in parallel. They are then connected in series with 3Ω resistor. The circuit is supplied with 5V D.C source.

    i.   Draw the circuit diagram   (3 marks)

   ii.   Calculate the effective resistance of the parallel circuit   (2 marks)

  iii.   Total current in the circuit   (2 marks)

   iv.   Total power dissipated in the circuit   (2 marks)