TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY (DICT 14S)

EEE 2135: ELECTRONICS

END OF SEMESTER EXAMINATION
SERIES: APRIL 2015
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consists of **FIVE** questions.
Attempt question **ONE (Compulsory)** and any other **TWO** questions
Maximum marks for each part of a question are as shown

This paper consists of **FOUR** printed pages

Question One (Compulsory)

a) Given the colour codes of the following resistors, find the value of each resistor:-

(i) Yellow, purple, Red, Silver **(2 marks)**

(ii) Brown, Orange, Brown, Gold **(2 marks)**

(iii) Orange, Orange, Orange, Red **(2 marks)**

(iv) Yellow, Orange, Red **(2 marks)**

b) Calculate the total Resistance $R_{T,}$ of figure 1 **(4 marks)**

5K

c) Use nodal analysis to calculate Vx in the following circuit. **(8 marks)**

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Question Two

a) Design rectifier with given specification. Specification = Vdc = 12V, Vr < 0.12V, Idc = 3A Assumption Vou = 1V input frequency = 60Hz. Use full-wave bridge rectifier.

b) Find dc output voltage, output current, ripple voltage, conduction interval conduction angle of RC loaded half-wave rectifier. GIVEN DATA:

Secondary voltage Vrms = 13.4 (50Hz), R = 12Ω, C = 50,000μF, Vou = 1V

Question Three

a) Find the therein equivalent of the circuit between node A and B by performing a sequence of Norton ◄► therein transformations.

Figure 5

b) Calculate the therein and Norton equivalent network at the terminal A and B in figure below in two ways a) by combining resistors to simplify the circuit and b) by using nodal analysis.

Figure 4

c) Draw the therening equivalent circuit network below and find the value of its components of figure 5 below **(6 marks)**

9K

Question Four

a) (I) The SCR shown has a gate trigger voltage VT = 1V. gate trigger current IT = 5mA and IH = 3mA

Z

(i) What is the Vout when SCR is OFF?
(ii) What is vin that trigger the SCR?
(iii) If VCC is decreased until the SCR open, what is the value of VCC? **(9 marks)**

(II) Draw and explain the V-I characteristic of SCR? **(6 marks)**

Question Five

$\beta = 40$

a) Design pup BJJ circuit such that VEC = 1.8V take **(6 marks)**

Figure 7

b) Calculate the value of IC, IB, IE, VC, VB of the following 'UPU' circuit $\beta = 120$. Also state the mode of transistor **(8 marks)**

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