



**COLLEGE OF ENGINEERING, SCIENCE AND TECHNOLOGY  
SCHOOL OF ELECTRICAL AND ELECTRONIC ENGINEERING**

**TRADE DIPLOMA PROGRAMME**

**EEE460 INTRODUCTION TO ELECTRICAL AND ELECTRONIC ENGINEERING**

**FINAL EXAMINATION (TRIMESTER 2, 2016)**

DATE/TIME/ROOM – Refer to Exam Timetable

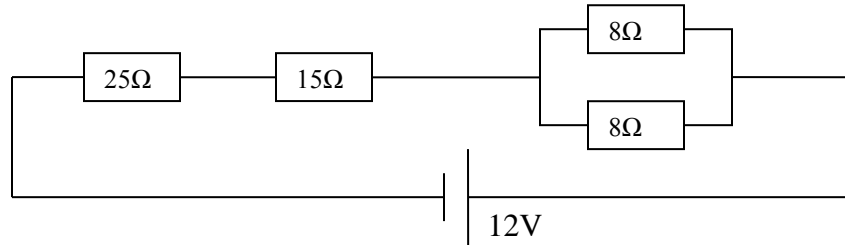
**INSTRUCTIONS TO CANDIDATES**

1. You are allowed 10 minutes extra time during which you are not to write.
2. Write all your answers in the allocated Answer Booklet.
3. Begin each answer on a fresh new page and use both sides of the sheets.
4. Write your identification number on the top of each attached sheet.
5. Insert all written foolscaps, graph paper, drawing paper, etc in their correct sequence and secure with string provided.
6. For all sheets of paper in which has been done, cross it through and you must attach to your answer script.
7. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
8. There are 12 Questions in this Exam Paper. Attempt Any 10 Questions .

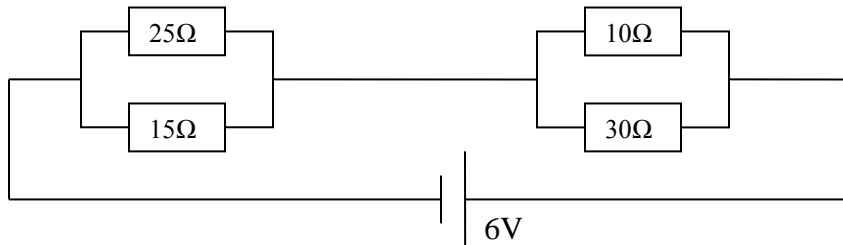
. . . .

### Question 1

- a) A series/parallel circuit is set up as shown below. Find the total resistance of the circuit and the current in the circuit. (5 Marks)



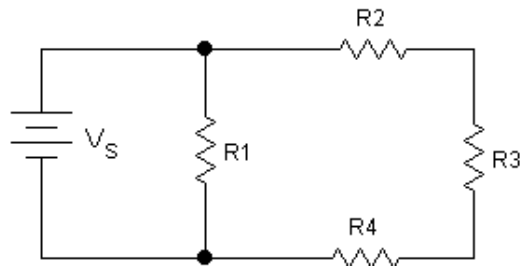
- b) Find the total resistance and the current for the circuit below: (5 Marks)



### Question 2

- a) From the series-parallel circuit below,  $V_s = 24V$ ,  $R_1 = 100\Omega$ ,  $R_2 = 200\Omega$ ,  $R_3 = 50\Omega$  and  $R_4 = 50\Omega$ . Determine the following :

- Total resistance. (2 mark)
- Total current. (1.5 mark)
- Current through  $R_1$  (1.5 marks)
- Branch current flowing in  $R_2$ ,  $R_3$  and  $R_4$  (2 marks)



- b)
- i. How much current flows in a 1000-ohm resistor when 1.5 volts are impressed across it? (1.5 Marks)
  - ii. How much resistance allows an impressed voltage of 6 V to produce a current of 0.006 A? (1.5 Marks)

### Question 3

- a) Explain the basic Principle of operation of a transformer. (5 Marks)
- (b) A step down transformer is to be designed. Its primary winding is to be 1000 turns, primary voltage to be 240V ac and secondary voltage to be 110V ac.
  - i. Determine its secondary winding. (2 Marks)
  - ii. Calculate this transformers supply current if its load current is 0.7 A. (2 Marks)
  - iii. What would be the number of turns in the secondary of this transformer if the design requires an isolation transformer to be created? (1 Mark)

### Question 4

Illustrate the concept of electrical motor by sketching a basic motor model and labeling the armature, stator, brushes and commutator. Also state the functions of the parts labeled. (10 Marks)

### Question 5

- a) What are the different types of switches? Explain with symbol and description. (5 Marks)
- b) What is Actuator? Classify the types of actuator and Explain. (5 Marks)

### Question 6

a) Convert the following decimal numbers to binary numbers. Show full working

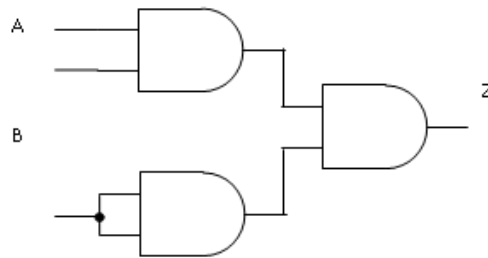
- i. 100 (1 Mark)
- ii. 50 (1 Mark)
- iii. 200 (1 Mark)
- iv. 90 (1 Mark)

b) Illustrate the circuit symbol and truth table for the following logic gates :

- i. NAND (2 Marks)
- ii. NOR (2 Marks)
- iii. XOR (2 Marks)

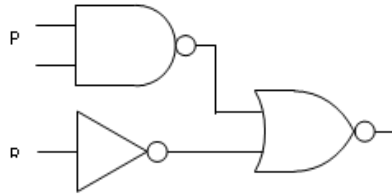
### Question 7

a) Derive Boolean expression for the output of the following logic circuits and complete the truth table below (5 Marks)



A	B	C	Z(output)
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

- b) Derive Boolean expression for the output of the following logic circuits and complete the truth table below (5 Marks)



P	Q	R	Z(Output)
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

### Question 8

- a) Explain the basic power supply system using IC Regulator? Illustrate how this IC Regulator is tested. (7 Marks)
- b) Sketch the block diagrams of basic Power supply. (3Marks)

### Question 9

- a) Explain the Zener diode with characteristics. (5 marks)
- b) What is a Bipolar Transistor? Classify different Types of Transistor with circuit Symbol. (5 Marks)

### Question 10

Write short notes on

- a) Universal Logic Gates (5 Marks)
- b) PN Junction Diode (5 Marks)

**Question 11**

- a) Describe with the aid of a diagram how a *relay switch* work. (5 Marks)
- b) Explain the difference between a *latching relay* and a *reed relay*. (5 Marks)

**Question 12**

- a) Describe the term “Flip Flop” in Electrical Engineering? Explain the types of Flip Flop. (5 Marks)
- b) Explain SR NOR Latch Flip Flop with Truth Table . (5 Marks)