

BASIC ELECTRONICS

For candidates in Nigeria only

EXAMINATION SCHEME

There will be three papers, Papers 1, 2 and 3, all of which must be taken. Papers 1 and 2 shall be a composite paper to be taken at one sitting.

PAPER 1: will consist of fifty multiple-choice objective questions all of which are to be answered in 1 hour for 50 marks.

PAPER 2: will consist of seven short-structured questions. Candidates will be required to answer any five in 1 hour for 50 marks.

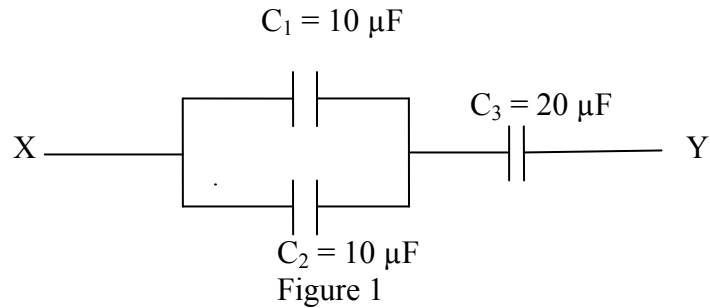
PAPER 3: will be a practical paper of two experiments both of which are to be carried out by candidates in 3 hours for 100 marks.

SAMPLE QUESTIONS

PAPER 1 **OBJECTIVE**

1. The decimal equivalent of the binary number 1000_2 is
 - A. 12.
 - B. 11.
 - C. 9.
 - D. 8.
2. *Modulation* is a process in which
 - A. radio signal travels between two transmitters.
 - B. telephone subscribers are connected to one other.
 - C. audio signals are carried over radio waves.
 - D. audio signals are amplifier.
3. Which of the following electrical appliances operates on the principle of a *closed-loop system*?
 - A. Immersion heater
 - B. Refrigerator
 - C. Electric fan
 - D. Electric kettle

Use figure 1 to answer Questions 4 and 5.



4. The total capacitance between X and Y is
 - A. 10.0 μF.
 - B. 20.0 μF.
 - C. 30.0 μF.
 - D. 40.0 μF.
5. The total capacitance when C₃ is removed from the circuit is
 - A. 2.0 μF.
 - B. 5.0 μF.
 - C. 10.0 μF.
 - D. 20.0 μF.

PAPER 2
ESSAY

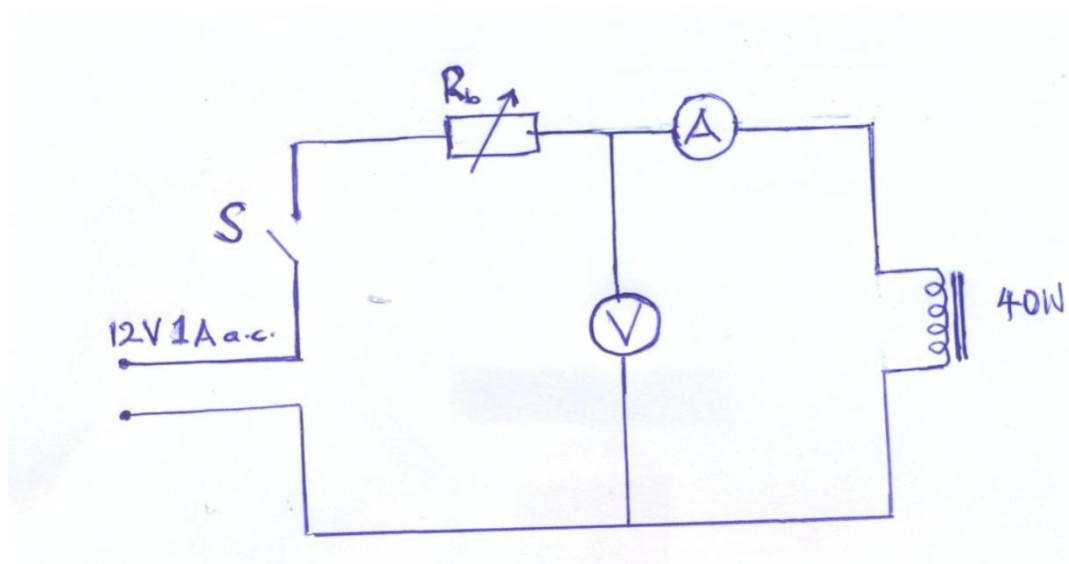
- 1.(a) (i) Draw the circuit diagram of a Colpitts oscillator
(ii) Label any three parts of the figure in 1a(i).
(b) Explain the working principle of a Colpitts oscillator.
2. (a) (i) With the aid of sketches, distinguish between dynamic and electrostatic transducers.
(ii) State two advantages of electrostatic transducers over dynamic transducers.
(c) List two electromechanical transducers.

PAPER 3
PRACTICAL

Apparatus

- one** 12 V d.c. power supply;
- one** 12 V, 1 A a.c. power supply;
- one** d.c. voltmeter (0 – 12 V);
- one** a.c. voltmeter (0 – 12 V);
- one** d.c. ammeter (0 – 10 A);
- one** a.c. milliammeter (0 – 100 mA);
- one** decade resistance box R_b (0 – 200 Ω);
- one** 40 W choke;
- one** single-pole switch;
- one** set of handtools;
- connecting wires.

1. AIM: To determine the resistance of a choke.



- (a) Connect the circuit as shown in Fig. 1
- (b) Ask the supervisor to check the circuit connection.
- (c) Copy Table 1 into your answer booklet.

Table 1

$R_b(\Omega)$	$I(A)$	$V_L(V)$
0		
10		
20		
30		
40		
50		
60		
70		

- (d) Close switch S.
- (e) Read and record in Table 1 the readings on the ammeter A and voltmeter V_L .
- (f) Open switch S.
- (g) Increase the resistance value of R_b in steps of 10Ω .
- (h) Repeat steps (d) to (g) for up to 70Ω as shown in Table 1.
- (i) Plot a graph of voltage V_L (V) on the vertical axis against current I (A) on the horizontal axis.
- (j) Determine the gradient of the graph.