



UNIVERSITY OF EDUCATION, WINNEBA  
INSTITUTE FOR TEACHER EDUCATION AND CONTINUING  
PROFESSIONAL DEVELOPMENT (ITECPD)  
END OF SECOND SEMESTER EXAMINATIONS, OCTOBER, 2024



COURSE CODE: JBH 244

COURSE TITLE: BASIC ELECTRICALS AND ELECTRONICS

TIME ALLOWED: 2 HRS

STUDENT'S INDEX NUMBER:



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- This paper is made up of ONE SECTION.
- The Section is made up of five essay type questions.
- Answer any THREE questions in your answer booklet.
- Each question carries equal marks. You are expected to start each question on a new page.
- You are expected to hand over your answer booklet to the invigilator before you leave the examination hall.

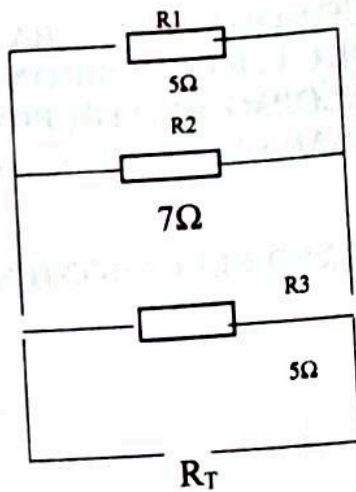
**Instruction:** Answer any three (3) questions in the answer booklet provided.

**Q1**

- A. State the main effects of electric current? (3 marks)
- B. Draw the circuit diagram of a full wave rectifier using four diodes. (7 marks)
- C. An electric kettle has a resistance of 30 Ohms. What current will flow when it is connected to a 240v supply? Find the power rating of the kettle. (7 marks)
- D. What are the majority charge carriers in a p-type semiconductor material? (3 marks)

**Q2**

- A. A The transistor is made up of three terminals. Name them. (3 marks)
- B. The values of Resistors  $R_1$ ,  $R_2$  and  $R_3$  are 5ohms, 7ohms and 5ohms respectively. Calculate the total resistance of the circuit. (7marks)



c. Define the following.

- i fuse
- ii. Capacitor
- iii. Resistors
- iv. Diode
- v. Doping

(10 marks)

Q3

A. 100w electric bulb is connected to a 240volts supply. Determine:

- i. The current flowing through the bulb.
- ii. The resistance of the bulb.

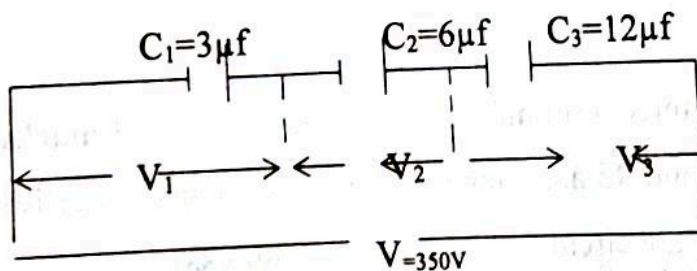
(5 marks)

B. State the **three (3)** types of circuits connections that we have.

(3 marks)

C. Capacitances of 3 NF, 6 NF and 12 MF are connected in series across a 350v supply. Calculate

- (i) The equivalent circuit capacitance
- (ii) The charge on each capacitor.



(7marks)

D. Re-arrange the table below to match the items given in column I suitably with those given in column II.

Column I	Column II
1. Closed path	a. Good conductor
2. LED	b. Deflection of compass
3. Carbon rod	c. Positive charged ion
4. Galvanisation	d. Poor conductor of electricity
5. Distilled water	e. Coating of zinc
6. Salt solution	f. Electrodes
7. Cation	g. Light emitting diode
8. Magnetic effect of current	h. Electric circuit
9. Chromium	i. Negatively charged ion
10. Anion	j. Electroplating

(5 marks)

Q4

A. What is an atom? (2marks)

B. Explain the following sub particles of an atom (3marks)

- i. Proton
- ii. Electron
- iii. Neutron

C. Draw the atomic structure of germanium atom given that the atomic number of germanium is 32 (5marks)

D. What is biasing of diode? (4 marks)

E. With the aid of diagrams explain the following as applied to p-n junction diode



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i. Forward bias

ii. Reverse bias

(6 marks)

Q5.

A. What is a resistor?

(1 marks)

B. Give **two (2)** reasons why resistors are included or added in an electrical circuit?

(2 marks)

C. What is a linear resistor?

(2 marks)

D. Figure 3 shows four different arrangements of resistors.

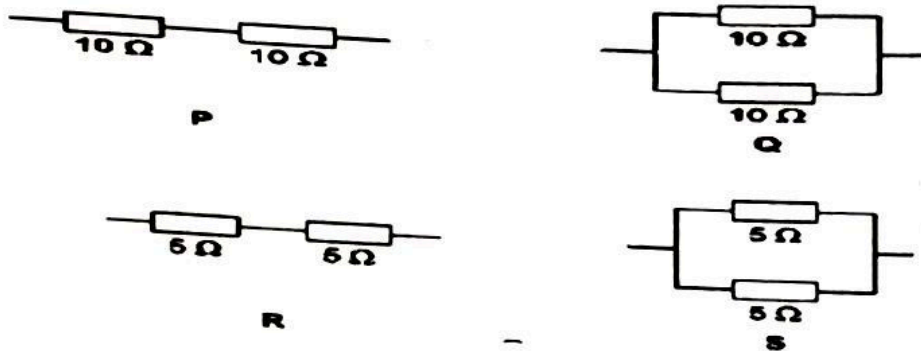


Figure 3: Two of the arrangements are in series and two are in parallel.

(i) Describe any **three (3)** differences between a series and a parallel arrangement.

(6 marks)

(ii) Which arrangement has a resistance of  $10\ \Omega$ ?

(3 marks)

(iii) Which arrangement has the highest resistance?

(3 marks)

(iv) State one place each where series and parallel connections can be applied/used?

(3 marks)



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