

[LF 0212]

AUGUST 2014

Sub.Code :2414

**B.Sc. PROSTHETICS & ORTHOTICS  
SECOND YEAR  
PAPER IV – FUNDAMENTALS OF ELECTRICITY & ELECTRONICS**

*Q.P. Code: 802414*

**Time: Three hours**

**Maximum : 100 Marks**

**Answer All questions**

**I. Elaborate on:**

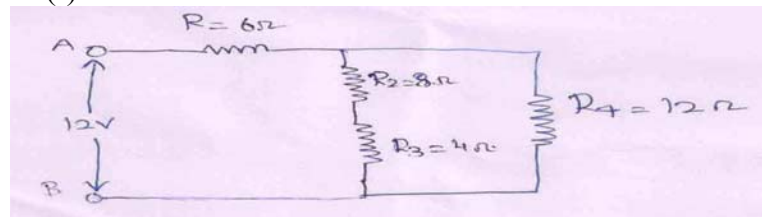
**(3 x 10 = 30)**

1. Explain Transformer in detail.
2. Explain Operational Amplifier and their ideal characteristics.
3. Explain in detail the simple safety procedure to be followed when servicing equipments.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Define a) AC Circuit  
b) Sine Wave  
c) Frequency  
d) Time Period
2. What are the differences between Extrinsic and Intrinsic Semiconductor?
3. Derive Negative Feedback Equation
4. Explain the working principles of Light Transducers
5. Explain the function of Line, Neutral and Earth in single phase system
6. Explain Miniature Circuit Breaker
7. Describe the principles of Electromyography ( EMG)
8. Calculate Current(I)



**III. Short answers on:**

**(10 x 3 = 30)**

1. Define Bio-electricity
2. A circuit has 10  $\Omega$  resistances and voltage across it is 200 V. Find Current through the circuit.
3. Define Transformer Ratio(k)
4. Explain the concept of insulator.
5. Define Amplifier
6. Define Voltage gain
7. Define Feedback
8. What are the types of Sensors used in Prosthetic & Orthotic field?
9. Define Microprocessor
10. Define Fuse

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## BACHELOR IN PROSTHETICS AND ORTHOTICS

## SECOND YEAR

## PAPER IV – FUNDAMENTALS OF ELECTRICITY AND ELECTRONICS

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Answer all questions

## I. Elaborate on:

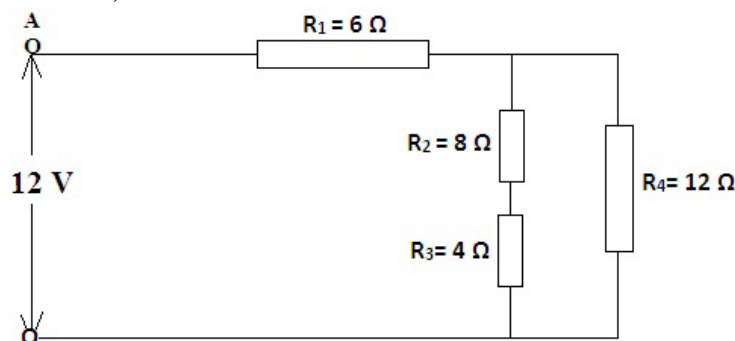
(3 x 10 = 30)

1. Explain the principle of transformer in detail.
2. Explain operational amplifier and their ideal characteristics.
3. Explain the conduction in extrinsic semiconductors.

## II. Write notes on:

(8 x 5 = 40)

1. Calculate current,



2. Write the difference between intrinsic and extrinsic semiconductors.
3. Derive negative feedback equation.
4. What is transducer? Explain pressure transducers in details.
5. Explain miniature circuit breaker.
6. Explain the function of line, neutral and earth in single phase system.
7. What is sensor? Explain types of sensors.
8. Derive root mean square value (RMS) of A.C. circuit.

## III. Short answers on:

(10 x 3 = 30)

1. Define current and its unit.
2. What is muscle action potential?
3. Write a short note on EMG (Electromyography).
4. Give the difference between A.C circuit and DC circuit.
5. Define semiconductors.
6. What is positive and negative feedback?
7. Define microprocessor. Write it's any one application in prosthetic field.
8. What are the current practice in pin connection and their colour codes?
9. What is voltage regulator?
10. Define frequency and its unit.

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**Time: Three hours**

**Maximum : 100 Marks**

**Answer All questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Explain about transformer in detail.
2. What is operational amplifier? Explain about ideal characteristic of operational amplifier.
3. What is semiconductor? Explain in detail about intrinsic semiconductor.

**II. Write notes on:**

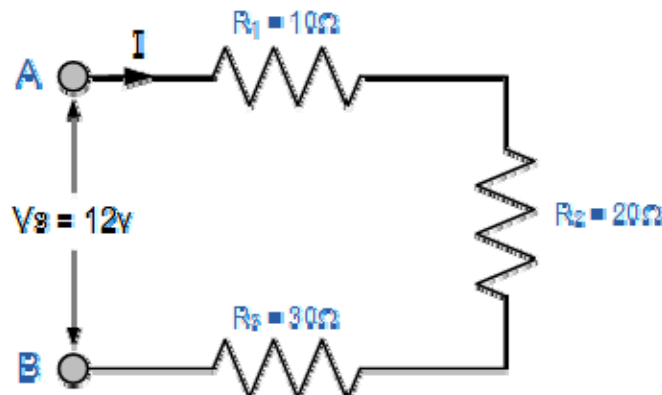
**(8 x 5 = 40)**

1. Difference between intrinsic and extrinsic semiconductor.
2. Derive RMS value of current and voltage.
3. Explain about microprocessor in detail.
4. What is resistor? Difference between resistor in series and parallel.
5. A transformer has 500 turns of the primary winding and 10 turns of the secondary winding. Determine the secondary voltage if the secondary circuit is open and the primary voltage is 120 V.
6. Explain about the function of line, neutral and Earth in single phase system.
7. Describe about MCB in detail.
8. Explain in detail about electromyography.

**III. Short answers on:**

**(10 x 3 = 30)**

1. Define Bioelectricity. What are its applications in Health Sciences?
2. Difference between alternating current and direct current.
3. What is insulator?
4. What are the current practice in pin connection and colour codes?
5. What is pressure transducer?
6. Explain about general feedback equation.
7. Find R eq.



8. Define mutual induction.
9. Difference between n-type and p-type extrinsic semiconductor.
10. What is electronics measuring instrument?

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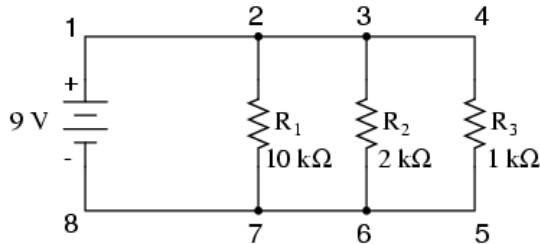
**(3 x 10 = 30)**

1. Explain the working principle of Transformer.
2. Importance of Electronics measuring instruments.
3. Discuss about the purpose of Fuses and Miniature Circuit Breakers (MCB).

**II. Write notes on:**

**(8 x 5 = 40)**

1. EMF, Charge, Current, Voltage and Energy.
2. Find the Current in the following Circuit.



3. Total Resistance equations for 3 resistors connected in series and in Parallel.
4. Draw the energy band diagram of Semiconductor and explain it.
5. Voltage Gain, Current Gain, Power Gain in Amplifier.
6. Transducers.
7. Single phase and Three Phase supply system.
8. Bionic Arms.

**III. Short answers on:**

**(10 x 3 = 30)**

1. AC Circuits.
2. RMS Value.
3. Voltage Ratio in Transformer.
4. Extrinsic Semiconductor.
5. Drift Voltage.
6. Negative Feedback.
7. Electronic Goniometer.
8. Pressure Sensor.
9. Miniature Circuit Breakers.
10. Myo-Electricity.

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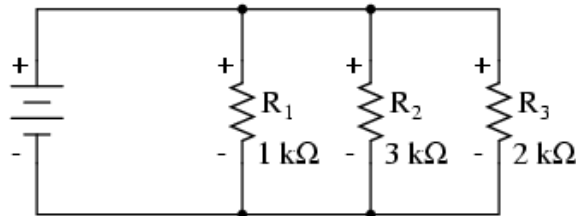
**(3 x 10 = 30)**

1. Types of Semi-Conductors.
2. Discuss about the ideal characteristics of Operational Amplifier.
3. Electromyography and Myo-Electricity Application in P and O field.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Given  $V = 20\text{v}$ ,  $R=4\Omega$  Find I. and  $V= 12\text{v}$ ,  $I= 2\text{A}$  Find R,
2. Find the total resistance of the given circuit.



3. Difference between DC Circuits and AC Circuits.
4. Draw and write short notes about Core Type and Shell Type Transformers.
5. Implanted electrodes and Surface electrodes.
6. Current practice in pin connections and color codes.
7. Voltage regulators Integrated circuits.
8. Microprocessor controlled prosthetic knee joint.

**III. Short answers on:**

**(10 x 3 = 30)**

1. Potential Difference.
2. Frequency.
3. Resistors in Parallel.
4. Transformers.
5. Doping.
6. Voltage Gain.
7. Transducers.
8. Sensors.
9. Fuse.
10. Bioelectricity.

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**Answer All questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Differentiate between single phase and three phase system.
2. What are the different types of measuring instruments used. Explain any one of recording instrument.
3. What do you understand by integrated circuit? Explain briefly about its applications and types.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Explain about OPAMP and its equivalent circuit.
2. Differentiate between Inductive reactance and capacitive reactance.
3. Four resistors 5 ohm each connected across the side of a square. Find the equivalent resistance across diagonal of square.
4. Explain about electromyography and its use.
5. PN Junction Diode and its characteristics.
6. A 400V 50Hz three phase supply is provided to a 3 phase star connected load each phase of the load absorbs a power of 2000W. The load power factor is 0.8 lagging. Calculate total power and line current.
7. What is sensor and explain about its types and application?
8. Explain the function of line neutral and earth of a single phase system.

**III. Short answers on:**

**(10 x 3 = 30)**

1. What do you understand by electromotive force?
2. What is sine wave and write its equation?
3. Explain the term Phase and phase difference.
4. What is specific resistance and its unit?
5. Define turns ratio in transformer.
6. What is the function of ammeter, voltmeter and wattmeter?
7. What is impedance? Write down its unit.
8. Define Power factor.
9. What is Voltage regulator and its function?
10. What is Oscillator and its use?

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