

Study Guide - MediSend International BMT Entrance Exam



All candidates applying for acceptance to the MediSend Biomedical Repair Training Program must first pass the Entrance Exam. The Entrance Exam is a multiple choice test covering several scientific disciplines including: general sciences, physics, mathematics, and basic and advanced electronics. The candidate should be acquainted with the following subject areas in order to successfully pass the exam.

PHYSICS: Electricity and Magnetism

The ELECTRIC FIELD

- Properties of electric charges
- Static electricity (Electrostatics)
- Insulators and Conductors
- Transfer of charge by friction, induction and conduction
- Definition of Electric Field
- Definition of Electric Potential

CAPACITANCE and DIELECTRICS

- Definition of Capacitance
- Calculating Capacitance
- Electric Field in a plan-parallel Capacitor
- Capacitors in Series and Parallel
- Capacitors with Dielectrics
- Types of Capacitors

ELECTRIC CURRENT and RESISTANCE

- Electric Current in Metallic Conductors
- Definition of Resistance
- OHM's Law
- Electrical Energy and Power in electric circuits

DIRECT CURRENT (DC) CIRCUITS

- Electromotive Force
- Internal Resistance of a Battery
- Current in Series and Parallel Circuits
- Voltage in Series and Parallel Circuits
- Resistors in Series and Parallel Circuits
- Kirchhoff's Rules
- Voltage Dividers
- Wheatstone Bridge
- Variable Resistors
- RC Circuits. Charging and Discharging a Capacitor

DC MEASURING DEVICES

- Current, voltage and resistance measuring devices and methods
- Voltmeter impact on measured circuit
- Ammeter impact on measured circuit
- Multimeters
- Bridge circuits

BATTERIES

- Battery Construction
- Types of Batteries
- Batteries in serial/parallel

The MAGNETIC FIELD

- Permanent magnets
- Magnetic Field produced by current-carrying conductors
- Magnetic Force between a magnet and a current-carrying wire
- Magnetic Force between a current-carrying wires
- Solenoids, Relays and Electromagnets

- Definition of Ampere
- The Lorentz Force
- Cathodic Tube. Oscilloscope
- Definition of Magnetic Flux

The ELECTROMAGNETIC INDUCTION

- Faraday's Law of Induction
- Lenz's Law
- The Electromotive Force
- Definitions of Self-Inductance and Inductive Reactance
- RL Circuits. Applications
- DC Motors and Generators

ALTERNATING CURRENT (AC) CIRCUITS

- AC Generators and Motors
- Resistors in an AC Circuit
- The Effective Value (RMS) of an AC Current
- AC waveform, Vector and Phasor representations
- Capacitors in an AC Circuit
- Inductors in an AC Circuit
- RL, RC, and RL in series AC Circuits
- The RLC Series Circuit
- Resonance in a Series RLC Circuit
- Transformer and Power Transmission
- Matching Impedance and Tuning Circuits

ELECTRONIC DEVICES and CIRCUITS

SEMICONDUCTOR DIODES

- Semiconductor n and p Types Material Characteristics
- Diode Operation
- Rectifier Circuits
- Zener Diodes
- Schottky, Tunnel, and LED Diodes
- Bridge Rectifiers
- Regulated Power Supplies

BIPOLAR TRANSISTORS

- Transistor Operation
- The Common-Emitter Amplifier
- The Common-Collector Amplifier
- The Common-Base Amplifier
- Darlington Pair

LOGIC CIRCUITS

- Fundamentals of Logic Circuits

OPERATIONAL AMPLIFIERS

- Fundamentals of Operational Amplifiers

GENERAL SCIENCE

- Fundamentals of Physics, Chemistry and Biology
- Fundamentals of Human Anatomy and Physiology

ALGEBRA and MATH

BASIC ARITHMETIC

- Arithmetic order of operations
- Working with fractions
- Decimal separator

ALGEBRA

- Real, Integer, Rational, and Complex Number Systems
- Calculating Equations with Variables & Constants
- Common Mathematical Expressions and Equations
- Plotting Linear Equation
- Solve a System of Equations
- Logarithmic Equations

EXPONENTS

- Using Powers to Simplify Very Large/Small Numbers
- Solving Exponential Equations

NOTATIONS AND PREFIXES

- Scientific Notation and Prefixes
- Engineering notation and Prefixes
- Converting Between Prefixes
- Hand calculator use

GEOMETRY

- Length, area, volume and Circumference calculations
- Applying Constants (Pi)
- Angular Velocity and Rotation
- Angles, Degrees and Radians
- Geometric Planes (x, y, z)