

BMET Electrical - Syllabus

Overview

This Syllabus covers the general knowledge and skills required for an Electrical Technician.

It covers theory and good practice based around the BMEA Code of Practice and the ISOs that form the foundation of the Code and the Recreational Craft Directive (RCD).

Subject Area	Assessment Criteria
1. Health and Safety	<p>Candidates must have an ability to:</p> <ul style="list-style-type: none">• Work safely with AC (single phase) and DC systems• Use best practice for correct component selection for the protection of equipment, personnel and cable.
2. DC and AC Circuits	<ul style="list-style-type: none">• Understand why volt drop is an issue in marine installations and be capable of calculating the correct cable size to use to achieve acceptable voltage drop levels.• Show an understanding of acceptable voltage drops for various types of circuits.• Understand that a cables current carrying capability relates to CSA, temperature rating of its insulation, ambient temperature and bundling.• Understand the meaning of RMS and peak values in AC circuits.• Show an awareness of different AC frequencies used internationally.• Understand the implications of frequency variations on the performance of on-board equipment.
3. Circuit diagrams and conventions	<ul style="list-style-type: none">• Understand the difference between 2 wire insulated and 2 wire earthed (or bonded) DC systems and the implications for circuit switching and protection for the two variants.• Understand the difference between a 3 wire floating AC system and a 3 wire earth/neutral bonded AC system and the implications for circuit switching and protection for the two variants.• Understand the importance that all on-board AC supplies are correctly configured to suit the system on board (floating/neutral-earth bonded). This relates to isolation transformers, inverters, inverter-chargers and generators.
4. Test and measurement equipment	<ul style="list-style-type: none">• Correctly select the test and measurement equipment for the following:<ul style="list-style-type: none">• AC/DC voltage• AC/DC current• Continuity of circuits• Circuit polarity (AC and DC)• RCD testing• AC frequency• Battery condition

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5. Generators and motors	<p>Candidates must have an ability to:</p> <ul style="list-style-type: none"> • Understand the basic principles of AC generators with particular focus on AC voltage and frequency control. • Understand the basic principles of engine driven DC alternators.
6. Distribution systems	<ul style="list-style-type: none"> • Knowledge of the difference between ring and radial circuits in AC distribution systems. • Understand the purpose of transformers and the specific purpose of an isolation transformer. • Correctly specify AC shore power inlets and cable sets to ensure safe use. • Correctly specify the correct fuses or circuit breakers for individual circuits. • Specify the correct personnel protection equipment for AC circuits. • Understand IP ratings and be able to correctly specify equipment with the correct rating.
7. Batteries and charging systems	<ul style="list-style-type: none"> • Identify different battery types and know their features and capabilities. • Be aware of the safety issues relating to batteries including weight, acid, gas, electrical and mechanical security. • Understand the effects of ambient temperature on battery charging and use. • Understand the different types of battery charger and their correct applications. • Be able to calculate the appropriate battery bank size for a system. • Understand how to correctly specify, locate and label a battery isolator switch or switches. • Be aware of circuits that would normally be connected directly to the battery (not via an isolator switch) and their correct protection. • Be able to correctly interconnect batteries in series and parallel.
8: Cables and terminations	<ul style="list-style-type: none"> • Be able to recognise the various insulation materials used in cable manufacture and understand their properties. • Know the requirements for cable stranding to meet the RCD requirements. • Be aware of different cable termination types and their correct use to promote secure cable connections. • Be aware of the requirements of the RCD, and good practice, with relation to cable routeing, support, separation and mechanical protection. • Know the various international standards used for cable CSA ratings.