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| **MSQ Unit 87** | **QCF Ref: J/504/1135** |
| Title: | **Electrical circuits for marine engineers** |
| Level: | **2** |
| Credit value: | **5** |
| Learning outcomes - *The learner will:* | Assessment criteria - *The learner can:* |
| 1. Understand the nature of electricity
 | * 1. Describe the theory of current flow in terms of electrical conductors
	2. Describe circuit parameters in a dc resistive network.
	3. Explain the difference between an insulator and a conductor
	4. Describe the effect known as electrical resistance and its relationship to electrical conductors and temperature
	5. Describe the use of secondary cells and generators as an electrical source
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| 1. Identify different batteries as electrical power sources
 | * 1. Explain the difference between primary and secondary cells
	2. Describe the chemical changes that take place during charging and discharging an cell
	3. Measure the e.m.f. of a battery when connected, singly, in series and in parallel using a voltmeter
	4. Explain the effect that the load current has on the p.d. of the battery and how the internal resistance can be calculated
	5. Describe the names of the internal and external components that make up the Lead Acid and Alkaline cells
	6. Describe the measurement of a battery’s capacity
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| 1. Complete calculations involving the resistance of an electrical circuit
 | * 1. Define resistivity
	2. Explain the effect of temperature on the resistance of a material
	3. Define the temperature co-efficient of resistance
	4. State the full term p.d. and define internal resistance of an electrical battery and generator
	5. Solve calculations involving the definitions in 3.1, 3.3 and 3.4
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| 1. Be able to use electrical drawings
 | * 1. Explain the different symbols used in electrical drawings
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| 1. Be able to explain electrical current effects
 | * 1. Explain the effect of the following on electrical current
* Magnetism
* Chemicals
* Heat
	1. Describe practical applications of the effects on electric currents by:
* Magnetism
* Chemicals
* Heat
	1. Calculate the power dissipated in simple electrical circuits
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| **Additional information about the unit** |  |
| Unit aim(s) | To develop the knowledge and understanding of basic electrical concepts, magnetic and electromagnetic theory |
| Unit expiry date |  |
| Details of the relationship between the unit and relevant national occupational standards (if appropriate) | MNTB NOS (Jan 2006) – C01 Monitor and Operate Engine Room MachineryC11 Prepare and operate vessel propulsion machinery and ancillary systemsC13 Operate and adjust vessel electrical equipmentC33 Carry out maintenance of vessel electrical machinery and systems |
| Details of the relationship between the unit and other standards or curricula (if appropriate) | Maritime and Coastguard Agency Marine Guidance Notice regarding Certificates of Competency – Engine Department,  |
| Assessment requirements specified by a sector or regulatory body (if appropriate) | Maritime Skills Alliance Assessment StrategyMCA Certification requirements |
| Endorsement of the unit by a sector or other appropriate body (if required) | MCA…. |
| Location of the unit within the subject/sector classification system | Transportation  |
| Name of the organisation submitting the unit | Scottish Qualifications Authority |
| Availability for use |  |
| Availability for delivery |  |
| Guided Learning Hours | 44 |