

## MED3 NEAR COASTAL – YOUR STUDY CHECKLIST

View the full [Skills & Knowledge](#) required for National Standard for Commercial Vessels Part D from which oral examinations sample a candidate's proficiency.

Competent			More study		
Outcome	Content			Standards for evaluating (extracts)	
<b>Table 2</b>	<b>Safety and Emergencies</b>				<ul style="list-style-type: none"> <li>• Practice survival techniques</li> <li>• Operate lifesaving and survival equipment</li> <li>• Undertake/understand risk management including SMS operational practices</li> <li>• Follow safety procedures and take action</li> <li>• Understand/ follow fire minimisation procs</li> <li>• Respond to and fight fires with portable and other fire-fighting appliances including correct use of vessel closure and shutdown systems</li> <li>• Identify/respond to risks with confined space</li> </ul>
<b>Outcome Elements of Shipboard Safety</b> Safety and Emergencies including survival craft			Apply basic survival skills		
			Survive at sea using survival craft		
			Fire minimization/fire-fighting		
			Risk management & SMS		
		Meet WHS requirements (confined spaces)			
<b>Competent</b>			<b>More study</b>		
<b>Outcome 11.8</b> - Demonstrate the actions to be taken in the event of fire or explosion- Describe actions for the operation and maintenance of firefighting equipment in the engine space	<b>Firefighting</b>				<ul style="list-style-type: none"> <li>• Fire control is implemented in accord with maritime safety and vessel op procs whilst maintaining crew safety, vessel stability &amp; operational capability</li> <li>• Actions taken to control fires are based on full/accurate assessment using all info</li> <li>• Priority, timing and actions sequence appropriate to the overall requirements of the incident &amp; minimise damage/potential damage to vessel, injuries to personnel &amp; impairment of the op effectiveness</li> <li>• Maintenance of fire-fighting appliances is in accordance with manufacturer's specs</li> <li>• Alarms are actioned, recorded and reported according to vessel procedures and marine safety requirements</li> </ul>
			Fire triangle, explosion, corrosion		
			Minimisation of hazards		
			Fire-f systems identification & maintenance		
			Alarm systems/panels, heat/smoke detectors		
			Fixed f-fighting installations, valves closures		
			Equipment use, management/control of fires		
			Personnel safety		
			Control- passenger/crew/comms/instructions		
<b>Competent</b>			<b>More study</b>		
<b>Outcome 11.9</b> Demonstrate know/principles of stowage & management	<b>Stowage of Flammables</b>				<ul style="list-style-type: none"> <li>• Stowage of flammable/explosive materials and management, accords with established rules and procs including liquids, gases, solids and other materials normally carried (spare fuel, lubricants, LPG, flares)</li> </ul>
			Stowage/management		
			Dangers inherent with the above materials		
<b>Competent</b>			<b>More study</b>		
<b>Table 3</b>	<b>Writing reports</b>				<ul style="list-style-type: none"> <li>• Identify safe and environmentally acceptable practices for refuelling cleaning up fuel or oil spills. Understanding garbage, sewage, noise, anchoring or marine life and other environmental maritime responsibilities</li> <li>• Antipollution procedures and equipment</li> </ul>
<b>Outcome Environment</b> Follow environmental work practices			Environmental workplace practices		
			Maintain environmental records		
			Precautions to prevent pollution & oil spill		
<b>Competent</b>			<b>More study</b>		
<b>Outcome 11.10</b> Maintain running logs written reports, fuel calculations	<b>Environmental Responsibilities</b>				<ul style="list-style-type: none"> <li>• Running and maintenance logs are completed according to vessel and maritime procedures including regular reports</li> <li>• Calculations for fuel capacity, consumption and voyage duration</li> </ul>
			Writing of simple reports		
			Keep running and maintenance logs		
			Calculate capacity/consumption/duration		
<b>Competent</b>			<b>More study</b>		
<b>Outcome 11.11</b> Work effectively with others	<b>Work in a group environment</b>				<ul style="list-style-type: none"> <li>• Work effectively as part of a crew</li> </ul>
			Promoting team commitment & cooperation, supporting members & dealing effectively with issues, problems and conflict		

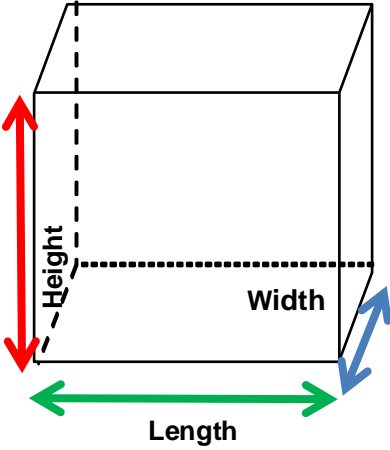
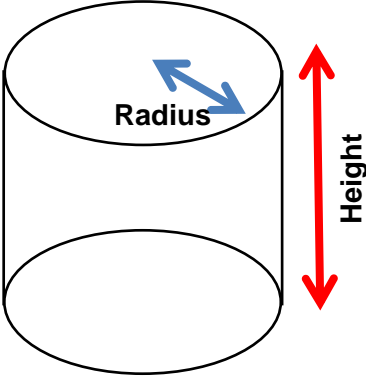
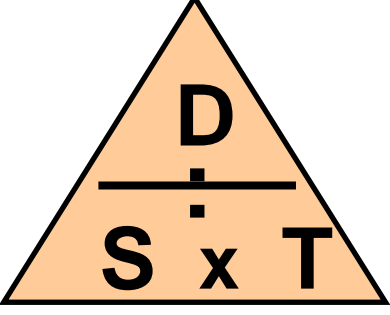
Competent	More study		
<b>Outcome 11.1</b> Demonstrate knowledge of the construction, operation and service of marine internal combustion engines	<b>Engineering - Basic Operation</b>		<ul style="list-style-type: none"> <li>• Major parts of marine internal comb eng identified</li> <li>• Main differences between 2 and 4 stroke cycles of operation are identified</li> <li>• Fuel systems managed safely in accordance with regs, manufacturer's instructions and vessel procs to prevent pollution</li> <li>• Marine i.c. engines operated to tech specs</li> <li>• Ops/surveillance of main prop plant and aux systems is sufficient to maintain safe operating conditions</li> <li>• Basic operational faults are recognised/repaired or maintenance assistance is organised</li> </ul>
		Marine 2 – and 4 – stroke petrol/ diesel engines	
		Basic combustion process	
		Basic timing diagrams	
		Petrol/diesel fuel storage and management	
		Carburettors/fuel injectors	
		Injection pumps	
		Basic governor operation	
		Fuel system maintenance, fault finding & emergency ops	
	Air filters		
	Turbo/Supercharging		
<b>Cooling systems</b>		<ul style="list-style-type: none"> <li>• Cooling systems are operated in accordance with established procedures and prevent pollution of the marine environment</li> </ul>	
	Keel cooling/heat exchangers		
	Circulating pumps		
	Coolant circulation and thermostats		
	Ship's side valves		
	Maintenance		
	Corrosion		
	Instrumentation		
	Emergency procedures		
<b>Lubricating systems</b>		<ul style="list-style-type: none"> <li>• Lubricating systems are operated in accordance with established procedures and prevent pollution of the marine environment</li> </ul>	
	Lube oil circulating systems		
	Lube oil system components		
	General lubrication and cooling effects		
	Lubrication system problems		
	Lube oil contamination		
	Lube oil system management and maintenance		
	Lube oil system instrumentation		
	Refuelling operations (environment, safety and regulations)		

Competent	More study		
<p><b>Outcome 11.2</b> Demonstrate knowledge of the workings of marine propulsion systems</p> <p>Recognise and takes steps to rectify basic operational faults</p>	<b>Power Transmission</b>		<ul style="list-style-type: none"> <li>• Marine propulsion systems components are identified and functions explained in simple terms</li> <li>• Describe the operation and servicing of propulsion system within the technical specifications</li> <li>• Basic operational faults are recognised and repair or maintenance assistance is organised</li> </ul>
		<ul style="list-style-type: none"> <li>Gearbox-reverse/reduction &amp; gear train</li> <li>Gearbox-lube/cooling/filters/strainers</li> <li>Propeller and intermediate shafting alignment</li> <li>Bearing types, materials, installation, lube</li> <li>Shaft seals and glands, packing</li> <li>Couplings types, fitting, keys and keyways</li> <li>Prop types-fitting/keys/locking/cont.pitch</li> <li>Stern drive and water jet drive units</li> <li>Maintenance/inspection/vibration/wear</li> <li>Fault identification &amp; emergency operation</li> </ul>	
Competent	More study		
<p><b>Outcome 11.4</b> Identify and operate components of auxiliary systems</p> <p><b>WARNING:</b> <i>Relevant Commonwealth, local and State / Territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and / or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.</i></p>	<b>Steering Systems</b>		<ul style="list-style-type: none"> <li>• Steering arrangements are operated in accordance with manufacturer's instructions, operational procedures and regulations</li> <li>• Maintenance is arranged in accordance with the technical specifications</li> </ul>
		<ul style="list-style-type: none"> <li>Rudder construction and rudder types</li> <li>Rudder &amp; stock bearings/glands, packing, seal</li> <li>Tiller arm attachment</li> <li>Steering operation- hydraulic/cable/rod &amp; gear</li> <li>Testing of steering, hydraulic systems</li> <li>Emergency steering checks</li> </ul>	
	<b>Pumping Systems</b>		<ul style="list-style-type: none"> <li>• Pumping systems are operated in accordance with manufacturer's instructions, operational procedures and regulations to ensure safety of operation and prevention of pollution of the marine environment</li> <li>• Maintenance is arranged in accordance with the technical specifications</li> </ul>
		<ul style="list-style-type: none"> <li>Fire/bilge/tank circulating systems</li> <li>Fault id, maintenance, prevent corrosion</li> <li>Valves-construction, servicing, back-flooding</li> <li>Strainers, mud boxes, foot valves</li> <li>Dual duty systems/cross connection.</li> <li>Use of flexible materials, hoses, etc.</li> <li>Drive systems, belts, clutches, motors</li> <li>Environmental regs &amp; responsibilities</li> </ul>	
	<b>Refrigeration systems</b>		<ul style="list-style-type: none"> <li>• Refrigeration system is operated and maintained in accordance with manufacturer's recommendations, regulations and vessel operating procedures to ensure safety of operation and prevention of pollution of the environment</li> </ul>
		<ul style="list-style-type: none"> <li>Hazards of refrigerant gases</li> <li>Identification of components</li> <li>Environmental responsibilities</li> </ul>	

<b>Competent</b>		<b>More study</b>	
<b>Outcome 11.5</b> Operate electrical Systems  <b>WARNING</b> <i>Relevant State/Territory electrical licensing requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of electrical circuits or systems that are 50 v A.C. or above, OR 120 v DC or above, on a vessel.</i>	<b>Direct Current Systems</b> not exceeding 32 V DC		
		Electrical systems – Basic care/fault recognition Batteries – types/care/maintenance/hazards/connecting Charging systems – regulators/alarms/indicators Fuses/circuit breakers –select correct capacity Op/maint – Starters/alternators/associated equipment.	<ul style="list-style-type: none"> <li>• DC systems are operated and operator preventative maintenance in accordance with manufacturer's recommendations, regulations and vessel operating procedures to ensure safe operation.</li> </ul>
	<b>Electric Systems</b> above 32 V DC and up to 415 V AC		
		Protective devices on switchboards  Personal safety  Shore power connection  Fault identification, location, and safety implications	<ul style="list-style-type: none"> <li>• Electrical systems are operated in accordance with manufacturer's recommendations, regulations and vessel operating procedures to ensure safe operation</li> <li>• Electrical system faults are recognised and where necessary steps are taken to make them immediately safe</li> </ul>
<b>Competent</b>		<b>More study</b>	
<b>Outcome 11.6</b> Use deck machinery	<b>Use of deck machinery</b>		
		Lifting equipment	<ul style="list-style-type: none"> <li>• Lifting equipment and deck machinery is operated and user-maintenance is carried out in accordance with manufacturer's recommendations, regulations and vessel operating procedures</li> </ul>
		Winches, capstans	
		Safe working procedures	
		Basic hydraulic systems, operation/user-maint	
	Legislation affecting lifting equipment		
<b>Outcome 11.7</b> Demonstrate knowledge of the basic techniques of hull maint	<b>Hull maintenance</b>		
		Basic hull inspection and maintenance	<ul style="list-style-type: none"> <li>• Maintenance procedures and techniques for hulls are in accordance with regulations and vessel operating procedures</li> </ul>
		Use of sacrificial anodes	
<b>Competent</b>		<b>More study</b>	
<b>Outcome 11.3</b> Prepare vessel machinery for sea	<b>Engine watchkeeping</b>		
		Inspection/checks main/aux mach. & spaces	<ul style="list-style-type: none"> <li>• Prep for start-up inc. fuel, lube, cooling &amp; air comply with vessel op procs. and manufacturer recom.</li> <li>• Checks of pressures, temp &amp; revs during start/warm-up accord with the tech specs</li> <li>• Prep for shut-down &amp; supervise the cool down of the engine are in accord with op procs. &amp; manufacturer recommendations.</li> </ul>
		Start-up procedures	
		Instrumentation	
		Running checks	
		Keeping of running and maintenance logs	
		Shut down procedures	

<b>Competent</b>		<b>More study</b>	
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**Outcome 11.10** Working out simple calculations for fuel capacity, consumption and voyage duration  
**MARC001** Converting units to multiples of base units, fractions to decimals, volume/capacity of regular shaped tanks, consumption of fuel /lube oil, hourly fuel consumption, theoretical steaming times/distances, the area of circle, RD/SG to convert quantity in litres and volume to mass

<p><b>1.</b> What is an engine's fuel consumption in kilos/kW/hour if 25 litres was used to produce 100 kW/hour? The fuel's specific gravity is 0.8.</p>	 <p>Volume of cylinder = <math>\Pi r^2 h</math>  <math>\Pi = 3.142</math></p>  	<p><math>25 / (100 \times 0.8) = 0.2</math> kilo/kW/hr</p>
<p><b>2.</b> Calculate amount of fuel in litres in a rectangular tank 1.0m x 1.0m x 1.0m with an ullage of 0.2 or 0.5 or 0.7 m from the top of the tank.</p>		<p>800 litres, 500 litres or 300 ltrs</p>
<p><b>3.</b> Calculate amount of fuel in litres in a circular tank with a radius of 0.5m, height of 1 m and a sounding of 0.25 or 0.5 or 0.75 m from the tank's bottom.</p>		<p><math>3.142 \times 0.5^2 \times 0.25 \times 1000 = 196</math> litres  <math>3.142 \times 0.5^2 \times 0.50 \times 1000 = 392</math> litres  <math>3.142 \times 0.5^2 \times 0.75 \times 1000 = 880</math> litres</p>
<p><b>4.</b> What is the time taken to travel 200 miles at 10 knots? What is the weight of fuel required if the single engine's rated specific fuel consumption at 250 kW is 0.25ltr/kW/hr? Allow 25% reserve. The fuel's specific gravity is 0.8.</p>		<p><math>200 / 10 = 20</math>hr. <math>20 + 25\% = 25</math>hr  <math>25 \text{hr} \times 250 \times 0.25 = 1562.5 \times 0.8 = 1250</math>kilo</p>
<p><b>5.</b> What is the time taken to travel 400 miles at 20 knots? What is the weight of fuel required if the single engine uses 15ltr/hr? Allow 25% reserve. The fuel's specific gravity is 0.8.</p>		<p><math>400 / 20 = 20</math>hr. <math>20 + 25\% = 25</math>hr  <math>25 \text{hr} \times 15 = 375 \times 0.8 = 300</math>kilo</p>
<p><b>6.</b> What is the time taken to travel 150 miles at 15 knots? What is the safe weight of fuel required if the twin engines use 9ltr/hr each? Allow 25% reserve. The fuel's specific gravity is 0.8.</p>		<p><math>150 / 15 = 10</math>hr. <math>10 + 25\% = 12.5</math>hr  <math>12.5 \text{hr} \times 9 = 112.5 \times 0.8 = 90</math>kilo</p>
<p><b>7.</b> A vessel routinely uses 175 litres on its daily 7 hour passage? Today the tank was sounded pre start-up (332 litres) and on return (147 litres). How much fuel was used today? Explain why?</p>		<p><math>332 - 147 = 185 - 175 = +10</math> Tide, wind, fouling, tuning</p>
<p><b>8.</b> What is the weight of 100 litres of diesel fuel? The fuel's specific gravity is 0.8.</p>		<p><math>100 \times 0.8 = 80</math> kilos</p>