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Principles and Practice of Engineering Examination
NAVAL ARCHITECTURE AND MARINE ENGINEERING CBT Exam Specifications

Effective Beginning October 2025

- The PE Naval Architecture and Marine Engineering exam is computer-based. It is closed book with an electronic reference.
- Examinees have 9.5 hours to complete the exam, which contains 85 questions. The 9.5-hour time includes a tutorial and an optional scheduled break. Examinee works all questions.
- The exam uses both the International System of units (SI) and the U.S. Customary System (USCS).
- The exam is developed with questions that will require a variety of approaches and methodologies, including design, analysis, and application.
- The knowledge areas specified as examples of kinds of knowledge are not exclusive or exhaustive categories.

		Number of Questions
1.	**Naval Architecture: Hydrostatics and Stability**	**10–15**
	A. Tools, methods, and procedures (e.g., curves of form, integration methods, inclining, sallying)	
	B. Intact stability (e.g., center of gravity, righting arm, free-surface, docking, grounding)	
	C. Damage stability (e.g., floodable length, probabilistic stability, righting arm, downflooding, effect of list, free communication)	
	D. Dynamic stability and transitional stability (e.g., equilibrium polygon, porpoising, chine walking, parametric roll)	
	E. Weights (e.g., weight estimate, weight distribution, weight control)	
2.	**Naval Architecture: Hydrodynamics**	**6–9**
	A. Resistance and propulsion (e.g., different hull forms, shallow water effects, channel effects)	
	B. Propulsor, foil, and appendage design (including cavitation)	
	C. Maneuvering and directional stability (e.g., steering, rudders, control surfaces)	
	D. Seakeeping (e.g., forces and motions, added mass, wave damping, response amplitude operators, motion stabilization)	
	E. Model testing (e.g., scaling laws, data expansion, CFD validation)	
3.	**Naval Architecture: Ocean Engineering**	**4–6**
	A. Wind, waves, and currents (e.g., wave theories, wave spectra, tides, wind scale, sea state)	
	B. Mooring systems (e.g., floating structure to seabed, berthing, anchoring)	

4. Naval Architecture: Structural Design **7–11**

A. Internal loads (e.g., sloshing, tank loading, hydrostatic loads)
B. External loads (e.g., slamming, impact, berthing, collision, drydocking, grounding, mooring, launching, ice, wind, waves)
C. Primary structures (e.g., hull girder, midship section)
D. Secondary structures (e.g., frames, beams, girders, trusses, plates, columns, pillars, foundation)
E. Tertiary structures (e.g., clips, brackets, knees, gussets)
F. Structural considerations (e.g., stress concentration, fatigue, corrosion, thermal variations)
G. Finite element analysis
H. Hull responses and reactions (e.g., vibration, impulse, whipping, springing, slamming)
I. Material selection (e.g., ferrous materials, nonferrous materials, plastics, composites, wood, concrete)

5. Naval Architecture: General Arrangements **5–8**

A. Arrangements and details (e.g. compartment arrangements, workflow, access and egress, maintenance and removal routes, hazardous zone plan)
B. Crew accommodations and habitability (e.g., staterooms, galleys, mess, lounges, storerooms)
C. Boundaries (e.g., watertight, fire)

6. Marine Engineering: Propulsion and Power Generation **6–9**

A. Internal combustion plants (e.g., diesel)
B. Fuels and lubrication (e.g., properties, handling systems, effects on equipment, choices of fuels and lubricants)
C. Drive train (e.g., propellers, propulsors, gearing, shafting, bearings)
D. Drive train vibration (e.g., flow-induced, machinery-induced, shafting)
E. Propulsion architecture (e.g., selection, efficiencies, propulsion alternatives)

7. Marine Engineering: Piping System Design **5–8**

A. Component selection (e.g., pumps, valves and control devices, strainers, filters)
B. Design considerations and limitations (e.g., viscosity, limiting flow speeds, flow effects, noise, cavitation, pipe hammer, pressure relief)
C. Layout (e.g., piping arrangement, support, maintenance)
D. Calculations (e.g., pipe flow, pipe resistance, pressure drop, stress analysis)

8. Marine Engineering: Auxiliary Equipment Selection **5–8**

A. Heat exchangers
B. HVAC/refrigeration
C. Fire protection (e.g., personnel, fire detection, fire zone definitions, egress, firefighting equipment)
D. Hydraulic systems

9. Marine Engineering: Electrical Systems **5–8**

A. Component selection (e.g., generators, transformers, motors, batteries, fuel cells, switch gear, cables)
B. Design considerations (e.g., power load, overload, redundancy, power factor, emergency generator requirements, bonding, safety, automation and control systems)
C. Calculations (e.g., electrical load analysis, cable sizing, voltage drop, power conversion)
D. Electric propulsion considerations (e.g., fuel cell, hybrid, batteries, charging infrastructure, propulsion motor sizing)

10. Marine Engineering: Environmental Considerations **4–6**

A. Combustion emissions standards compliance and corresponding equipment (e.g., exhaust scrubbers, incinerators)
B. Environmental protection (e.g., oily water separation, sewage treatment, solid waste, ballast water treatment)

11. Common: Hull Outfitting **4–6**

A. Deck machinery and cargo handling (e.g., winches, anchoring and mooring equipment, gangways, lifting appliances)
B. Securing systems and fittings (e.g., bollards, bitts, chocks, rigging)

12. Common: Materials, Corrosion, Welds, and Connections **4–6**

A. Connectors and fasteners (e.g., bolts, adhesives) and bimetallic joints (e.g., explosion bonding)
B. Welding design and procedures (e.g., stresses, symbols, filler materials, methods, inspection, testing)
C. Elements of corrosion (e.g., galvanic series, general wastage, pitting, crevice and stress corrosion, fretting, stray currents)
D. Corrosion-control applications (e.g., impressed current systems, sacrificial anodes, bonding and grounding)

13. Common: Rules and Regulations **5–8**

A. Statutory requirements, international regulations, and third-party standards (e.g., U.S. Coast Guard, IMO, OSHA, EPA)