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CHAPTER 51 - BARGE SUPERVISOR, MODU/SURFACE

PART I - GENERAL REQUIREMENTS OF APPLICANTS

- 51.1 (1) Every applicant for a certificate as Barge Supervisor, MODU/Surface, shall:
- (a) subject to subsection (2), complete 12 months as follows:
 - (i) a minimum of six months sea service as a watchkeeping mate on a MODU/surface, while holding a certificate as Watchkeeping Mate, MODU/Surface, or a First Mate, Intermediate Voyage, Certificate and a MODU Certificate; and
 - (ii) the remaining time made up of any combination of service as a driller, watchkeeping mate, engineer, maintenance supervisor, tourpusher, toolpusher or ballast control operator; and
 - (iii) the service referred to in paragraph (a) shall include:
 - (A) at least 10 cargo-transfer operations at sea between a surface unit and a supply vessel of which not less than two or more than five shall have been observed from the supply vessel;
 - (B) at least two complete anchor-handling operations of a surface unit of which not less than one shall have been observed from the anchor-handling vessel; and
 - (C) at least 10 helicopter landings and departures;
 - (b) obtain a medical certificate prescribed in the Crewing Regulations;
 - (c) obtain a certificate of completion for each of the following courses from a school set out in TP 10655:
 - (i) Marine Emergency Duties Courses, set out in TP 4957, for:
 - (A) Survival Craft (B1);
 - (B) Marine Fire Fighting (B2);
 - (C) Officer Certification (C); and
 - (D) Senior Officer (D);
 - (ii) Marine First Aid Advanced Course, set out in TP 13008;
 - (iii) Simulated Electronic Navigation Level I, set out in TP 4958; and

- (iv) Mobile Offshore Drilling Unit Courses, set out in TP 10937, for:
 - (A) Basic Drilling;
 - (B) Second-Line Supervisor Functions, Offshore Well Control; and
 - (C) Basic Offshore Survival;
- (d) pass an examination in each of the following:
 - (i) Meteorology;
 - (ii) Rig Construction; and
 - (iii) Stability and Ballast Control;
- (e) pass an examination in Simulated Electronic Navigation; and
- (f) pass an oral examination in General Seamanship.

51.1 (2) Not in use.


PART II - EXAMINATIONS

51.2 The following table indicates the examinations for the Barge Supervisor, MODU, Certificate, the qualifying sea service required before each may be attempted, and other requirements.

Examination	Qualifying Service While Holding WKM MODU	Other Requirements
073 Meteorology	NIL	
114 M MODU Stability and Ballast Control	NIL	
125 M Rig Construction	NIL	
165 B General Seamanship	12 months	All other exams must have been passed.

PART III - VALIDITY OF CERTIFICATE

51.3 The Barge Supervisor, MODU/Surface, Certificate has validity as barge supervisor of any MODU/Surface while the unit is secured or positioned on location for the purpose of conducting a drilling operation or is in transit under the charge of a towing vessel, provided such certificate, granted without geographical restriction, is also valid as the person in charge of a navigational watch when the unit is in transit.


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PART IV - SYLLABUSES OF EXAMINATIONS

51.4 Meteorology

Examination number 073

ITEM	COLUMN
1.	Chemical Composition of the Atmosphere Water vapour, nitrogen, oxygen, argon, carbon dioxide, krypton, xenon, ozone; dust and hygroscopic particles, dust, smoke, salt particles; micro-organisms (such as bacteria used as nuclei for artificial snow).
2.	Vertical Structure of the Atmosphere Troposphere, stratosphere, mesosphere, thermosphere and ionosphere; stratospheric clouds, nacreous and noctilucent, appearance, height limits, composition; optical phenomena, reflection, refraction, aureole, bishop's ring, corona, halo, mock sun or parhelion, rainbow, mirages, Saint Elmo's fire, northern lights, magnetic storms, phosphorescence.
3.	Transfer of Heat Radiation, conduction, convection, turbulence.
4.	Temperature Related to the atmosphere and the earth; calorie, specific heat of water and earth; perpendicular and oblique radiation; selective absorption of radiation by the atmosphere; isotherm; temperature and distance of the sun.
5.	Atmospheric Moisture and Changes of State Heat of fusion, vaporization and sublimation; latent heat; relative and absolute humidity, saturation, supersaturation and supercooling, dew point; lapse rates, adiabatic cooling, dry and saturated lapse rates.
6.	Atmospheric Stability Stability, instability, conditional instability, potential instability; causes of inversions, radiative cooling, turbulence or convection, subsidence; effects of inversions, fog and low-lying cloud, smog, accumulation of smoke; causes of subsidence; effects of substances, compression heating, evaporation.
7.	Fog Definition, formation; season, locality and frequency of occurrence; major types, advection, radiation, frontal, sea smoke; anomalous propagation of sound in fog, mist, haze, smog.
8.	Clouds Formation, convection, turbulence, frontal, convergence, orographic; types, stratus, cumulus, stratocumulus, nimbostratus, cumulonimbus, altostratus, altocumulus, cirrus, cirrostratus, cirrocumulus.
9.	Precipitation Theories explaining the formation of precipitation; relative sizes of condensation nuclei, cloud droplets, drizzle drops and rain drops; types, convective, frontal, orographic; forms of precipitation, dew, frost, rain, snow, sleet, hail, snow pellets, snow grains, ice pellets, diamond dust, rime.
10.	Lightning Theory of formation; associated clouds, conditions within the clouds; times, seasons and localities of occurrence.
11.	Pressure and Pressure Systems Definition; Coriolis effect; convergence and divergence; highs and lows, standard atmosphere (1013.25 mbar); isobar, isallator, diurnal pressure variation, effect of diurnal pressure variation on detection of tropical revolving storms, isobaric patterns and pressure gradients, pressure gradient, terminology, deepening or filling low, weakening or filling high, shallow (weak) pressure gradients, steep (strong) pressure gradients; patterns, troughs, ridges, cols; types of depression, polar front low, thermal depression, vertical instability depression (e.g., tropical revolving storm); straight isobars, effect of straight isobars on wind, on weather.

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12.	<p>Winds Definition, speed (knots and Beaufort scale); direction, veering and backing, calculation of pressure gradient, geostrophic wind, gradient wind, centrifugal force, Buys Ballot's law, cyclostrophic wind, effect of latitude and friction on wind speed, effect of latitude on geostrophic wind scale, absence of surface friction above 2000 feet, angle of indraught (15° at sea, 30° over the land); special wind effects, land and sea breezes, anabatic and katabatic winds, Fohn effect (chinook), gusts and squalls; monsoons, theory of monsoon formation, land and sea breezes compared to monsoons, associated pressure and weather characteristics, monsoons in the Indian Ocean and China Sea; global systems circulation, seasonal modification and permanent pressure systems; intertropical convergence zone, trade winds, horse latitudes, westerlies, roaring forties, polar front, semi-permanent highs (Atlantic and Pacific), polar highs, Icelandic and Aleutian lows, effects of land; local winds, locality, season and prevailing direction of following winds, levanter, vendevals, mistral, bora, sirocco, gregale, etessain, khamsin, simoon, shamal, kaus, elephants, brick fielder, williwaw, harmattan, norther, tehuantepecer; upper air circulation and jet stream, thermal wind, isohypses, Rossby waves, flow patterns at 500 mbar, steering rule.</p>
13.	<p>Air Masses Definition; source regions; identification; characteristics; modification; seasonal movement (North America and offshore); types, continental arctic, continental polar, continental tropical, maritime arctic, maritime polar, maritime tropical equatorial.</p>
14.	<p>Fronts Definition; types, stationary, cold, warm, occluded; movement; sequence of weather associated with fronts, pressure, wind, temperature, cloud, weather, visibility; squall lines, definition, association with cold fronts, weather experienced with squall lines, pressure, wind, temperature, cloud, weather, visibility; areas of occurrence; local names (e.g., pampero, southerly buster).</p>
15.	<p>Families of Depressions or Extra-Tropical Cyclones Formation between two air masses, life cycle and movement, cross section, associated weather, frontogenesis, frontolysis, secondary depressions.</p>
16.	<p>Waves and Swells Difference between seas and swells, definitions of period, height, length, speed, steepness, fetch; wave groups, waves in shallow water, ground swell, breakers and surf; swells in forecasting tropical revolving storms; effects of coast, currents, tide; storm surge; effect of ice on waves, ice crystals, pack ice; tsunamis and tidal waves, epicentre, dangers, tsunami warning system, true tidal waves and tidal bores; seiche.</p>
17.	<p>Oceanic Currents and Effect on Climate Definition of set and drift, wind-drift currents, gradient currents, complex currents (including stream currents), Coriolis effect and Ekman's spiral, upwelling, permanent currents, seasonal currents; general surface circulation and offshoots in North American waters, geographical limits, seasonal variations, direction, strength; effect of currents on climate, warm, cold; knowledge of the various currents of the world.</p>
18.	<p>Tropical Revolving Storms Definition of path, track, vertex or cod, vortex or eye, trough line, angle of indraught, dangerous semi-circle, dangerous quadrant, navigable semi-circle; features distinguishing it from extra-tropical cyclone, small diameter, steeper pressure gradient, winds tangent to central isobars, eye absence of fronts; warnings, radio messages, projected track, unusual swell, appearance of the sky, unusual changes in wind strength and direction, corrected drop in barometric pressure; weather associated with tropical revolving storms; sources of energy; seasonal distribution; practical rules for avoidance; hurricane and typhoon anchorages; mandatory reporting; names and season for tropical storms in the following areas: North Atlantic, western North Pacific, eastern North Pacific, South Pacific, Bay of Bengal, Arabian Sea, western Indian Ocean, eastern Indian Ocean.</p>

19.	<p>Ice Formation and Decay Freezing of fresh and salt water; formation of land ice; Greenland and Antarctic ice caps, glaciers; ice types and egg code; types of ice, new, frazil, grease, slush, shuga, nilas, pancake, young, grey, grey-white, first-year, second-year, multi-year, fast ice, pack ice, ice of land origin, forms of floating ice (floe sizes); ice fields and their movement, icebergs and drift, iceberg routes, limits, seasons, reasons for variation in numbers, difference between northern and southern hemisphere icebergs, presence of icebergs in North Pacific, North Atlantic lane routes, International Ice Patrol; icing of superstructures, causes, fog, freezing drizzle, freezing rain, freezing spray, serious accumulation above 04; avoidance, shelter, warmer water, alteration of course and speed; mandatory reporting, freezing temperatures, high winds.</p>
20.	<p>Ice Detection and Reporting Ice blink, absence of sea swell, problems associated with radar, limitations due to poor visibility, liaison with shore reporting stations; receipt of ice advisory broadcasts, ice advisory service, shipping support service, interpretation of ice charts; <i>Canadian Waters and Manice</i>, ice climatology and ice operations, <i>Ice Navigation in Canadian Waters</i>; instrumentation, thermometers, dry bulb, wet bulb, marine screen, psychrometer, seawater temperature bucket; barometer, units, corrections, diurnal variations; barograph; wind-measuring instruments; observations and weather reports, auxiliary ship, selected ship; climatology and forecasting, purpose, avoiding damage from storms, improving passage time, holding course in fine weather.</p>
21.	<p>Weather Messages and Codes International analysis in code, definition, interpreting messages; plot pressure systems, fronts, isobars; forecast for 12-24 hours—pressure, wind, sea state, visibility, clouds, weather changes; knowledge of services available, Radio Aids to Marine Navigation Atlantic and Great Lakes Pacific; ability to locate marine weather forecast areas, understanding weather forecasts for the Great Lakes, ability to use MAFOR code; assorted weatherfax, weather, satellite, sea state, and ice charts; synoptic charts, surface and upper air; recognition of isobaric distribution patterns; comparison with earlier charts; knowledge of information available on weatherfax in Canada and worldwide; understanding of synoptic surface analysis charts; understanding of surface progs; understanding of wave charts, analysis, forecast; understanding of ice charts.</p>
22.	<p>Optimum Weather Routing Advantages, reduce storm damage, save time, meet special requirements; methods, on board ship, through shore based firm, through government departments; climatological routing, in areas with stable weather patterns; optimum routing, geography does not dictate track, travel time is more than three days or 1500 miles; data and long range progs available.</p>
23.	<p>Requirements Application of ship's performance curves and sea data; use of surface analysis and prog charts; use of 500 mbar constant-pressure charts for estimating storm track; use of ice charts, wave charts; practical drawing of optimum tracks embracing the use of polar stereographic or gnomonic charts, ship performance curves and locus positions; factors that require a continuous updating and revision of weather-routing procedures.</p>

Note: The examination is a written test comprising multiple-choice and descriptive questions.
Duration is three and a half hours.

51.5 MODU Stability and Ballast Control
Examination number 114 M

ITEM	COLUMN
1.	<p>Definitions Definitions of general terms (e.g., displacement, draft, trim, heel, freeboard, buoyancy, reserve buoyancy, block coefficient, deadweight, stable, unstable and neutral equilibrium).</p>
2.	<p>Terms Understanding centre of gravity, centre of flotation, centre of buoyancy, reserve buoyancy, position of metacentre, righting lever and its effect on transverse and longitudinal stability; dynamic stability, synchronous rolling and angle of loll.</p>

3.	Theory Theory of moments as applied to stability, including the effects of heavy lifts and movement of liquids in tanks and free surface affect.
4.	Effect of Weights Effect of adding, removing, shifting weight and calculation of vertical, transverse and longitudinal shift of centre of gravity, danger of slack tanks, loading and unloading problems.
5.	Inclining Experiment Understanding the results of the inclining experiment report and using the results.
6.	Tables Use of hydrostatic curves, deadweight scale, hydrostatic tables and tank capacity tables; use of curves of statical stability; use of unit manuals.
7.	Stability Criteria Stability criteria for mobile offshore drilling units (e.g., allowable KG, effect of changing GM, righting area ratios and angle of downflooding).
8.	External Effects Effect of dynamic station-keeping systems on stability, force of the wind and high seas.
9.	Calculations Stability calculations utilizing concepts 1 to 8 above, theory and calculations of deck loads and effect on stability; areas, volumes of common figures, squares, rectangles, triangles, cubes, cones, wedges, cylinders and spheres.
10.	Systems Examination of liquid transfer systems and their limitations and procedures; ballast systems, fuel systems, drilling liquids; zones of reduced stability, asymmetrical ballasting/deballasting; dangers.
11.	Response to Damage Damage and damage-control procedure (use of pumping system and cross connections); effect of flooding compartments intentionally, including permeability; watertight integrity; dangers.
12.	Environmental Effect Environmental conditions and their effect on drilling operations; vessel and environmental limitations and criteria for changing to survival condition.
13.	Structural Stress Importance of load distribution with regard to structural stress; stress caused by location of load; stress in members; importance of bending moments and stress diagrams.


The examination consists of nine questions of which the applicant shall answer six. The examination may include calculations, sketches, and written description and multiple-choice questions. Questions may consist of several parts.

Duration is three and a half hours.

51.6 Rig Construction

Examination umber 125 M

ITEM	COLUMN
1.	Mobile Offshore Drilling Unit Construction Basic construction of principal MODU types; construction of columns, drilling derrick, pontoons (footings), tubulars, deck houses, main and pipe decks, helicopter deck, ballast tanks, drilling well (moon pool), watertight doors, hatches; pressure vessels; location and extent of watertight bulkheads and flats; stiffening arrangements of watertight and tank-boundary bulkheads, including those made of corrugated plating.
2.	Construction Portfolio Contents, including: general arrangement, inboard and outboard profile, arrangement showing watertight compartments, decks and load density plans (including helicopter deck), transverse section showing scantlings, longitudinal section showing scantlings, framing, shell plating, bulkheads (watertight), structural and tanks showing location of air pipes and overflows, watertight doors and hatches, and capacity plans.

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3.	Structural Strength Load to which a MODU is subjected; minimizing of concentrated structural strengthening to compensate for load in areas of anticipated failure.
4.	Welding Safety Welding safety procedures; hot work permit; security of area; protective clothing; shielding; storage and handling of welding materials and gas bottles; fire watch precautions; precautions in enclosed spaces; protection and security of electrical cabling and equipment; use of gas detectors.
5.	Corrosion Maintenance of corrosion control arrangements and their effect if provision is not made for effective implementation of such maintenance arrangements.
6.	Testing and Inspection Methods of testing of tanks, bulkheads, other watertight or oiltight work, pressure vessels of various types; inspection and repair (minor) procedure to maintain a MODU in compliance with regulatory requirements; requirements and preparation for statutory surveys and inspections; classification societies and advantages of classification; docking and inspection procedures, periodic and annual inspection programs; non-destructive testing/inspecting; underwater cleaning techniques; underwater inspection methods and programs; quality assurance and preventative maintenance system.
7.	Documentation Inspection, certificate and classification requirements; compiling damage and defect report; IMO code for the construction and equipment of MODU and Canadian standard (TP 6472); contents and use of construction portfolio; contents and use of marine operations manual; application of loadline regulations to the principal type of MODUs, surface and column stabilized.
8.	Watertight Integrity and Damage Control Ballast piping, pumping and control systems, bilge piping, pumping deck and rig floor draining systems; maintenance of fire integrity on a MODU; definition of various hazardous zones; access and ventilation conditions affecting the extent of hazardous areas.

The examination consists of nine questions of which the applicant shall answer six. The examination may include calculations, sketches, and written description and multiple-choice questions. Questions may consist of several parts.
Duration is three and a half hours.

51.7 General Seamanship

EXAMINATION NUMBER 165 B

ITEM	COLUMN
1.	Machinery Use and care of electric and hydraulic winches, ordinary and self-tensioning; windlasses and capstans associated with MODUs; electric, hydraulic and air deck cranes; elevators for personnel, stores and equipment.
2.	Voyage Preparation Manoeuvring a MODU under power; light and shapes of Collision Regulation required for move; planning for a towed voyage; preparing and inspecting towing equipment; securing towing vessels; the use, handling and securing of towing units; getting underway under tow; communicating with tug masters; authority of OIM when MODU is under tow.
3.	Anchoring Manoeuvres and cable handling, including equipment involved in the resetting or retrieving of anchors, use of anchor buoys; planning an anchor pattern; deployment of anchors with and without anchor-handling vessels; communication with anchor-handling vessels; clearing a foul anchor; hanging off an anchor; securing anchor gear in preparation for sea passage; use of anchors in emergency to take off motion; anchor and cable stowage, fittings and cable markings; maintenance of types of fairlead, their construction, naming and use.

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4.	<p>Mooring Lines Use, care and stowage of mooring lines, comprising: types of line used for mooring and their characteristics; the names of the various mooring lines; making fast supply vessels; emergency cast-off procedures; the use of mooring wire-rope reels; types of fairlead, cleats and bollard.</p>
5.	<p>Stowage and Handling Working of stores and equipment, comprising: responsibilities in transfer of cargo, stores and personnel to and from supply vessel; inspections of holds, decks and spaces to receive goods; preparation and operation of cranes; arrangements and working of heavy lifts by ship equipment, and lifts that cannot be handled by a single runner; the overhaul and regular inspections of lifting gear; use and maintenance of fork-lift trucks.</p>
6.	<p>Organization MODU routine and organization, comprising: barge supervisor's functions and organizational duties; crew tours of shifts; direction of work; knowledge of drawing up emergency muster lists with appropriate duties for crew members; the organizational duties for fuelling, storing or ballasting in all conditions; barge supervisor's duties concerning the official logbook, entries in the deck log and owner's or charter's records; barge supervisor's duties when repair, alteration or maintenance work is being carried out; barge supervisor's duties when preparing MODU for sea; barge supervisor's duties and responsibilities on joining a MODU; the necessary paperwork or documentation to encompass the foregoing items, where applicable; control room and deck discipline, organization and routine under marine circumstances; maintenance of a proper lookout; duties and responsibilities of the person in charge of the shift, ballast control and other bridge personnel (jointly and separately); the purposes, necessity and general content of standing orders, instructions, night orders, MODU logbook and similar material; anchor watch duties and responsibilities; means of assessing a tendency to drag anchors; arrangement and responsibility of departments aboard ship.</p>
7.	<p>Pollution Prevention Management Duties related to loading, transfer and storage of pollution; responsibilities under oil pollution prevention regulations and MARPOL; response to a pollution incident; identification of pollutants; obligation to prevent pollution; reporting of incidents; waste management.</p>
8.	<p>Emergency Response Emergency duties and responsibilities for equipment, comprising: organization, frequency and routing of fire patrols under routine and exceptional conditions; recognition and assessment of fire hazards; importance of cleanliness and good housekeeping; organization of realistic fire drills, training of crew for emergencies; taking charge of marine emergencies; inspections, testing and maintenance of portable and fixed firefighting equipment; organizations of realistic boat and lifesaving appliance drills, training of crew in use of lifesaving appliances and man-overboard drills; stowage, inspections, testing and maintenance of lifeboats, capsules, rafts and their equipment, lifejackets, immersion suits, lifebuoys, self-igniting lights and distress signals; taking charge of the launching of boats, rafts and capsules; assessing damage and flooding in cases of collision or stranding; search and rescue procedures, including AMVER, MERSAR and TC publications.</p>
9.	<p>Personnel Documentation Rights and privileges of certificates of competency limited to MODUs; certificated personnel required; general manning required to meet safety requirements.</p>
10.	<p>Collision Avoidance Collision Regulations and their intent, ship routing, MODU safety zone; <i>Notices to Mariners</i> concerning MODU locations.</p>
11.	<p>MODU Underway MODU handling in a seaway; use of thrusters and their effect; wind effects on a MODU; how to heave to anchoring in a tide, current, or wind; manoeuvring characteristics of other types of vessels; handling characteristics of tugs and problems of towing vessels; turning and manoeuvring in a channel; close-quarters situations at anchor and underway.</p>

The examination is taken from the syllabus for the examinations for Watchkeeping Mate, MODU, and First Mate, MODU.

The applicant is expected to have a deeper understanding of the intent and interpretation of the Collision Regulations as demonstrated by examination 062, which is supplemented here by oral questions and demonstrations.