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Naval Knowledge, Leadership,
and Nautical Skills
for the NJROTC Student

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UNIT 1 Sea Power and National Security

Chapter 1. The Importance of Sea Power

1. **What two major political developments since World War II have increased the importance of the oceans?**

   The first major political development has been the rapid increase in the number of new nations, from 51 immediately after the war to over 190 today. The second development is the steady increase in the interdependence of all nations of the world since World War II.

2. **What does "inland reach" mean as related to sea power?**

   The inland reach of sea power includes ballistic and cruise missiles launched from nuclear-powered submarines, cruise missiles and attack aircraft launched from surface ships.

3. **What two aspects of nuclear technology have affected sea power?**

   On the constructive side are fission reactors used in ship and submarine propulsion and for power generation ashore. On the destructive side is the thermonuclear warhead.

4. **What four ocean areas are of prime strategic importance to the United States?**

   There are four main ocean areas that are of prime importance to the Unites States: the Atlantic, including the Mediterranean Sea, the North Atlantic, and the western approaches to Europe; the Pacific; the Arctic; and the Afro-Asian ocean, including the broad reaches of the South Atlantic and Indian Oceans, as well as oil transportation routes through the Red Sea, Suez Canal, and Persian Gulf.

5. **What is unique about naval operations in the Arctic Ocean?**

   In the mid-1960s it became routine for our submarines and those of the former Soviet Union and other NATO nations to cruise under the polar icecap.

6. **What three benefits do our fleets gain because of their ability to move freely on the high seas?**

   Naval forces can move much more quickly than land forces wherever they wish, and disperse whenever and however necessary. They can establish a line of defense far from national shores. They can easily replenish fuel, stores, and ammunition at sea whenever required.

7. **Why is it important for the United States to maintain a strong merchant marine?**

   The merchant fleet must be kept competitive if it is to meet the growing needs of industry and provide logistic support to our forces overseas.

8. **What is the importance of oceanographic research?**

   Oceanography is the science that will find ways to properly tap the resources of the sea for the benefit of the world. The sea is the last great storehouse of food and minerals on Earth.

Chapter 2. The U.S. Merchant Marine

1. **Why is the U.S. merchant marine an important part of U.S. sea power?**

   Merchant marine ships are important because they convey American products to markets around the world, and bring foreign products and raw materials essential to our economy back to U.S. ports.

2. **Why did our merchant marine decline during and after the Civil War?**

   The American merchant marine declined rapidly during and after the Civil War because of the effect of Southern commerce raiders during the war, and afterward our concentration on westward expansion, European competition, noncompetitive American wage scales, high insurance costs, and increasing shipbuilding costs.

3. **What did the Merchant Marine Act of 1936 authorize in order to help American shipping companies compete against foreign companies?**

   The Merchant Marine Act of 1936 provided for the payment of construction and operating subsidies so American ship owners would consider expansion.

4. **What is the basic means for moving vast quantities of raw materials and manufactured goods throughout the world?**

   The basic means of moving vast quantities of primary products and manufactured trade goods is by water, because this is the fastest and most efficient and economical way.

5. **What are the key factors that have caused American cargo in American ships to drop to less than 3 percent of total?**

   The key factors that have caused the percentage of American cargo in American ships to drop are: rebates by foreign manufacturers to shipping companies to carry their products at premium rates; American labor instability in maritime unions; rising taxes and insurance costs; higher shipbuilding costs; and rising labor costs.

6. a. **What are the five leading ports in the United States?**

   The five leading ports in the United States are: Los Angles, California; New York/New Jersey; Long Beach, California; Houston, Texas; and Charleston, South Carolina.

   b. **What are the five largest U.S. shipyards, and where are they located?**

   The five largest U.S. shipyards are Northrup Grumman/Newport News, Newport News, Virginia; Northrup Grumman/Ingalls, Pascagoula, Mississippi; General Dynamics/ Electric Boat, Groton, Connecticut; General Dynamics/Bath Iron Works, Bath, Maine; and Northrup Grumman/Avondale, in New Orleans and Tallulah, Louisiana, and Gulfport, Mississippi.

7. **What is the most numerous type of ship in the U.S. merchant marine and the most commonly seen on the high seas?**

   Most ships in the U.S. merchant marine and on the high seas are tankers.

8. **a. How does the containership work?**

   Containerships can carry in excess of 8,000 prepackaged TEU containers. These containers can be offloaded and reloaded using semiautomatic equipment, and placed aboard semitruck trailers or railroad flatcars for overland transportation.

   b. What are its most significant advantages?

   Loading and offloading of a big containership can be accomplished in less than 24 hours by only about ten longshoremen. Containership crew sizes have decreased to around twenty from forty or more over the last decade.

9. **What are the major advantages of RoRo ships?**

   RoRo ships have ramps and large hold openings designed to accommodate either containerized or unitized cargoes, or wheeled and tracked vehicles. This type of ship requires few facilities ashore, in contrast to the containership—merely a strong ramp from pier to ship, compatible with the mobile cargo.

10. **What are five ways in which the U.S. merchant marine contributes to national defense?**

    Five ways in which the merchant marine can contribute to the national defense are military sealift, transport of strategic material, direct support of military operations, use as auxiliary combatants, and support of foreign policy.

11. **What is the mission of the Military Sealift Command?**

    The mission of the Military Sealift Command is to provide ocean transportation of equipment, fuel, supplies, and ammunition to sustain U.S. forces worldwide both in peace and wartime for as long as operational needs require.

12. **a. How can MSC ships be identified?**

    Except for hospital ships, which are painted white with large red crosses on their sides, MSC naval auxiliary ships are painted gray like U.S. Navy ships, but can be identified by blue and gold stripes on their stacks.

    b. What designator is used to identify them?

    They are designated U.S. Naval Ships (USNS) rather than USS.

13. **a. Why are increasingly larger ships being constructed for the world's merchant marine?**

    Larger more efficient ships are needed because of the growing commercial and industrial demands for bulk strategic materials, particularly crude oil and metallic ores.

    b. How could this be a military disadvantage in the event of war?

    In wartime the United States and its allies could ill afford to lose many big commercial ships because of the serious impact this could have on imports of strategic materials.

14. **How may merchant ships be used in direct support of military operations?**

    Tankers can be fitted with underway refueling rigs. Freighters can be fitted for transfer of cargo at sea.

Chapter 3. Grand Strategy

1. **What name is used to designate the employment of national power and influence to attain national security objectives?**

   This is the definition of grand strategy.

2. a. **Who was the first great Western strategist?**

   The first great Western strategist was Alexander the Great of Macedonia, who had conquered much of the known Western world by about 325 B.C.

   b. **What did he postulate about the conduct of war?**

   Alexander determined that war is always conducted on both physical and psychological levels.

3. **What was Machiavelli's contribution to strategic thinking?**

   Machiavelli of Florence broadened strategic thinking when he wrote on the sources, applications, and limitations of power. His unscrupulous concepts of diplomatic and military conduct later served to inspire the dictators of the twentieth century.

4. **What did Karl von Clausewitz emphasize concerning strategy?**

   Clausewitz showed that war has both social and political aspects. Probably his most famous statement is that "War is not merely a political act, but also a real political instrument, a continuation of policy carried out by other means." He continually asserted that military and political strategy must go hand in hand.

5. **What are the three classic schools of global strategy?**

   The three classic schools of strategy are the maritime, laid out by Mahan, the continental, put forth by Mackinder, and the aerospace, put forth originally by Douhet, and later by de Seversky.

6. **What is meant by Clausewitz's statement concerning military preparedness ("Woe to the Cabinet")?**

   Clausewitz's statement points out that a government cannot deter an adversary from waging war with half measures and inadequate military strength. Every sign of deficiency will be used to advantage by the opponent. If we hope to avoid war, then the best strategy is to be fully prepared to fight one should our national survival require it.

7. **What are the three principal phases through which U.S. grand strategy has evolved?**

   The three principal phases through which U.S. grand strategy has evolved are: (1) Western hemispheric defense (1783-1898), (2) limited interventionism (1898-1948), and (3) containment of communism (1948-1991). Principles developed in the latter stages of the Cold War continue to be our fundamental strategy today.

8. **What are the seven key principles of modern U.S. strategy developed from the Nixon Doctrine?**

   There are seven major features of modern U.S. strategy, descendent from the Nixon Doctrine of the early 1970s. They are: (1) strategic nuclear sufficiency rather than superiority; (2) strong conventional capability assisted by increased allied military contributions; (3) adequate peacetime general-purpose forces for meeting a major attack on allies in either Europe or Asia and for helping allies with local contingencies as required; (4) smaller U.S. active forces with greater emphasis on readiness; (5) reemphasis on a strong R&D program to maintain U.S. technological superiority; (6) security assistance to friendly nations; and (7) meeting U.S. military manpower needs with an all-volunteer active force in all services, plus reserves.

9. **What are the three principal elements of U.S. national military strategy?**

   The national military strategy of the United Stated today includes three principal elements: deterrence, flexible response, and forward strategy.

10. **What two elements were added to the U.S. maritime strategy for the 21st century in 2007?**

    The two elements added in 2007 were a maritime security element emphasizing the importance of international cooperation to maintain freedom of the seas, and a humanitarian assistance/disaster response element that stresses the importance of participation in international and domestic relief efforts when natural disasters occur.

11. **According to current strategic thought, what direction should our national grand strategy take in future years?**

    In future years the focus of our national strategy should be the threat posed by international extremist violence and terrorism. Against this enemy our national strategy must be to defeat them by a kind of moral warfare, emphasizing our national principles while challenging at every opportunity the extremist assertions terrorists use to justify their causes.

12. **What differentiates "World War IV" against violent extremism from the world wars that preceded it?**

    In contrast to conflicts of the past, the war against violent extremism and terrorism is being waged against adversaries having no firm allegiance to any country, about whom little is known, including what tactics they might use and when.

Chapter 4. U.S. Strategy and the Navy

1. **What is the mission of the Navy?**

   The mission of the Navy is to be prepared to conduct prompt and sustained combat operations at sea in support of U.S. national interests.

2. **What are the Navy's two basic functions?**

   The Navy's two basic functions are sea control and power projection.

3. **What is the advantage of having naval forces deployed in peacetime overseas?**

   These forces are deployed where they can support forward-positioned U.S. and allied forces in peacetime and engage enemy forces should hostilities break out.

4. **What is the tactical key to survival in atomic warfare?**

   The key to survival in atomic warfare is dispersal.

5. **What are the essential tactical capabilities of our general purpose forces?**

   The essential tactical capabilities of our general purpose naval forces are offensive power, defensive strength, logistical independence, effective command and control, and tactical nuclear weapons capability.

6. **What are the three naval warfare areas?**

   The three naval warfare areas are surface, subsurface, and aerospace.

7. **What are the fundamental tactical warfare tasks of the Navy?**

   The fundamental naval tactical warfare tasks are air warfare (AW), undersea warfare (USW), surface warfare (SUW), strike warfare, amphibious warfare, mine warfare, and information warfare.

8. **What are the supporting tactical warfare tasks of the Navy?**

   The supporting tactical warfare tasks are special warfare, ocean surveillance, intelligence, electronic warfare, and logistics.

9. **How do Navy planners and tacticians attempt to structure Navy tactical forces?**

   Navy planners and tacticians attempt to structure our naval forces in such a way that there is always a proper balance of ship types to accomplish the expected warfare tasks.

Chapter 5. National Security and Modern Conflict

1. **What main factors affect a nation's national strategy?**

   National strategy combines all the capabilities of a nation to attain its national interests and objectives. All aspects of a nation's power must be considered in the total strategy.

2. a. **What are the three basic considerations in evaluating an external threat?**

   The three basic considerations affecting external threat evaluation are: (1) capabilities—what can a potential adversary do? (2) intentions—what will the adversary do? (3) vulnerabilities—what are the adversary's weaknesses?

   b. **Which is most difficult to assess?**

   Intentions are the most difficult to assess, for they are subjective and often easily concealed. The best indication of intentions is not what people say, but what they do.

3. a. **What are intelligence estimates intended to do?**

   The purpose of intelligence estimates is to forecast intentions.

   b. **Why are they so important?**

   Threat evaluation is a process on which every government and nation is dependent for survival.

4. **What are the nine principles of war?**

   The nine principles of war are define the objective, mass forces, maneuver, take the offensive, economize force, achieve unity of command, maintain simplicity, achieve surprise, and maintain security.

5. **What is general war?**

   General war, as defined by the U.S. Joint Chiefs of Staff, is "armed conflict between major powers in which the total resources of the belligerents are employed, and the national survival of a major belligerent is in jeopardy."

6. **What are the six potential actions that might cause a general war to occur?**

   The six potential actions are deliberate initiation, accidental initiation, miscalculation, misunderstanding, entanglement, and irrational acts.

7. **What circumstances might cause entanglement of the major powers in a war that could escalate to general war?**

   Wars can be started intentionally by smaller countries for a variety of motives. Collective security systems, pledges, and other involvements with nations in conflict with neighbors in areas vital to the major powers pose such dangers.

8. **How are understandings concerning limitations in a limited war conveyed to the nations affected?**

   Understandings by which opposing sides in a limited war convey their intentions to use limited means may be made known through a speech of the chief of state, official releases to the media, or exchanges of notes through diplomatic channels in third countries.

9. **What are the two schools of thought concerning the introduction of tactical nuclear weapons to the battlefield?**

   One argument against use of any size nuclear weapons is that once introduced, both the size and extent of their use could rapidly escalate. An opposite contention is that tactical weapons should be used in limited war situations in the best interests of humanity and civilization; this school contends that if they are used once or twice on the right targets at the right time, further aggression can be stopped, and future limited wars can be deterred from ever starting.

10. **How may selective use of force be used to limit wars or reduce danger of major power confrontations?**

    Limitations in type, number, roles, and origins of military forces can limit a war. Defensive, support, and advisory troops are less provocative than major combat elements. Proxy forces avoid direct major power confrontations.

11. **Why are naval and air operations less risky than ground force invasion?**

    Use of naval and air power in selective attacks of retaliation is less risky than an invasion by ground forces because the latter implies more than a temporary presence.

12. **What is the major difference between traditional revolutionary wars, as fought in the eighteenth and nineteenth centuries, and modern wars of national liberation?**

    Earlier revolutions, such as in America and South America in the eighteenth and nineteenth centuries, were essentially colonial wars for independence with opposing armed forces engaged in traditional warfare. They ended with formal treaties of peace and recognition of sovereignty. The French and Russian Revolutions were explosive upheavals of the masses; after turning out the old royalty, the elements fought among themselves until one dominant group emerged. Modern wars of national liberation are carried on by military insurrections or insurgency. Such revolutionary wars are primarily political and social processes rather than military operations.

13. **What was Mao Tse-tung's concept of modern revolutionary war?**

    Mao considered revolution total war, with no scruples for benevolence, righteousness, and morality.

14. **What are the three prerequisites for revolution?**

    The three prerequisites for revolution are dissatisfaction with the status quo, a cause, and a carefully directed organization.

15. **What new form of warfare has emerged in recent years?**

    In recent years another more sinister form of warfare has burst onto the world stage—terrorism. In this form of warfare, a small group of individuals outside the established government attempts to bring about political change by the creation and exploitation of fear.

UNIT 2 Naval Operations and Support Functions

Chapter 1. Naval Operations

1. **As set forth in *Sea Power 21*, what are the three concepts that will underlay all naval operations in the twenty-first century?**

   In his blueprint for the U.S. Navy of the twenty-first century, *Sea Power 21*, CNO Admiral Vernon Clark stated that henceforth there will be three basic concepts underlying all future naval operations: sea strike, sea shield, and sea basing. *Sea strike* is the ability to project offensive power from the sea worldwide, whenever and wherever required. *Sea shield* concerns naval operations related to homeland defense, and defense of U.S. and allied sea and land forces and territory abroad. *Sea basing* concerns the maintenance of deployed fast response forces sufficient to carry out the Navy's mission worldwide, and their sustainment from the sea.

2. a. **What is the striking force centered around an aircraft carrier called?**

   Such a force is called a carrier strike group.

   b. **What is its purpose?**

   While many of its missions are in support of amphibious assault forces, the primary purpose of the carrier strike groups is to win command of the seas.

3. a. **What is the CAP?**

   The CAP is the combat air patrol.

   b. **What is its purpose?**

   Its purpose is to protect the carrier strike group from surprise air attack.

4. **What are the three main classifications of air warfare?**

   All air warfare may be roughly broken down into three main classifications: air-to-surface, air-to-air, and surface-to-air.

5. **What are the phases of AW operations for a ship formation?**

   The phases of AW operations for a ship formation are: (1) searching for, finding, evaluating, and reporting the enemy attack force; (2) initial AW defense measures, distant from the force, including electronic deception, aircraft intercepts, and long-range surface-to-air guided-missile fire; and (3) close-range defense by gunfire, short-range missiles, and evasive maneuvering.

6. **What is Aegis designed to do?**

   Aegis is a coordinated, electronic, tactical defense system in which an AW coordinator directs air defense for the entire formation. Using computerized tactical data links, the coordinator guides the weapons systems of all ships involved with air defense.

7. **a. Historically, what has always been the mission of the submarine?**

   Historically, the mission of a submarine has been to seek out and destroy enemy surface ships, both naval and merchant.

   b. With the coming of the nuclear-powered attack submarine (SSN), what became its primary attack mission?

   Modern nuclear-powered attack submarines now have enemy submarines as their primary objective, with surface shipping a secondary target.

8. **What were the three major developments that established undersea warfare during World War I?**

   Three major developments that established undersea warfare (USW) during World War I were the convoy system, the directional hydrophone and triangulation, and the depth charge.

9. **a. What is the primary electronic detection device used in USW operations?**

   The primary electronic detector used in USW operations is sonar.

   b. What are some variations of it that can be used by to locate and attack submarines?

   Variations of sonar that can be used to locate and attack submarines are radio sonobuoys, dipping sonar, and towed arrays.

10. **What are the four possible objectives of amphibious operations?**

    The four possible objectives of amphibious operations are: (1) to capture territory from which a land campaign can be launched and supported; (2) to capture a land area from which air operations can be launched and supported; (3) to prevent enemy use of selected territory or facilities; and (4) to destroy enemy facilities, interrupt their communications, and cause them to spread their forces to try to respond to amphibious raids.

11. **What is information warfare?**

    Information warfare is any action taken to negatively affect the information or information processing capabilities of an enemy, safeguard our own information, or exploit that information militarily. It includes such things as electronic warfare, psychological warfare operations, military deception, computer network defense, and operations security.

12. **What are the warfare capabilities of today's space satellite systems?**

    Today's space satellite systems play a key role in linking widely dispersed forward deployed naval forces with each other, the supporting shore establishment, forces of other services and other nations, and government and nongovernment agencies. They are used for most ship-to-shore communications, precision navigation, combat information and intelligence, and weather forecasting.

Chapter 2. Naval Communications

1. **a. What is "communications"?**

   Communications means transmitting a message so the receiver understands the message accurately. The tools of communication are written and spoken words.

   b. What is "naval communications"?

   Naval communications is the transmission and reception of military instructions and information by sound, electronics, or visual means.

2. **Why are effective communications in the Navy so important?**

   Effective communications are essential so a commander can evaluate a situation and determine appropriate courses of action for his or her units from a central command post. Good communications enable coordinated actions between ships, aircraft, and ground forces.

3. **What three qualities must naval communications have?**

   Naval communications must be reliable, secure, and rapid.

4. **What are main and secondary functions of naval telecommunications?**

   The main and secondary functions of naval telecommunications are to meet the communication needs of the operating forces, and to allow the administration of the naval establishment.

5. **What are the largest of the Navy's communications facilities called?**

   The largest of the Navy's communications facilities are called naval communications stations (NAVCOMSTA).

6. **Which officer is in charge of a ship's communications organization?**

   The communications organization aboard ship is under the direct control of the commanding officer. A large ship, such as an aircraft carrier or amphibious command ship, has a separate communications department. In other ships, such as destroyers or auxiliaries, the communications division is part of the operations department.

7. **a. What is a radiotelephone?**

   A radiotelephone is a basic voice radio device. It is easy, direct, and convenient, with very little delay in transmission. It is used extensively for tactical communications among surface ships, ground forces, and aircraft.

   b. What alphabet is used for voice communications by radio?

   The phonetic alphabet.

8. **What are communications satellites?**

   The communications satellite system is an application of long-distance radio relay, in which ships, ground stations, or aircraft can communicate with each other via satellite relay stations in orbit high above the Earth.

9. **How is tactical data sent between ships and aircraft in today's Navy?**

   The Navy and other armed services transmit tactical data among surveillance and weapons control system computers on ships, ground stations, and aircraft via transmission of digital data over radio networks called tactical digital information links (TADILs).

10. **How would your full name be sent in Morse code?**

    Individual cadet answers.

11. **What are the main Navy visual communications methods?**

    Visual signals include flaghoist, semaphore, and flashing light.

12. **What is the principal use of flaghoist?**

    Flaghoist is a rapid and accurate system of sending tactical signals or international code during daylight.

13. a. **What are three ways of communicating by flashing light?**

    The three kinds of flashing light signals are directional signal light, omnidirectional yardarm blinkers, and Nancy (infrared signaling).

    b. **What is the advantage of the Nancy system?**

    Nancy is especially secure because it can only be seen through special optical receivers.

14. a. **What is semaphore?**

    Semaphore uses hand flags for short-distance communications between ships.

    b. **How can it be used at night?**

    At night, lighted wands may be used.

15. a. **What sound communications are used by ships, and under what conditions are they used?**

    Sound communications include whistles, sirens, bells, and underwater acoustics. The first three are used by ships for sending a variety of emergency warning signals, including navigational signals such as fog and maneuvering whistles, air raid warning, ship breakdown, collision warnings, and convoy signals in wartime.

    b. **What is the Gertrude system?**

    The Gertrude system uses an underwater telephone system associated with the sonar equipment of destroyers or submarines. It can communicate by either CW or voice.

Chapter 3. Naval Intelligence

1. **What is the definition of military and political intelligence?**

   The definition of military and political intelligence is "that information acquired on a national scale, usually about a rival, but sometimes about an ally or a neutral country."

2. **What is the difference between information and intelligence?**

   Information is the raw material collected from all sources about a given subject or country. This information becomes intelligence after it is compiled and analyzed and used by a political or military leader in making decisions.

3. **What are the five steps in the intelligence process?**

   The five steps in the intelligence process or cycle are planning and direction, collection, processing, analysis and production, and dissemination.

4. **What kind of intelligence is naval intelligence primarily interested in collecting?**

   Naval intelligence is concerned mainly with collecting information of interest to the Navy. It includes information about foreign ships, weapon systems, naval strategies and tactics, harbor and port facilities, and other data that might help the Navy carry out its mission.

5. a. **What is air intelligence?**

   Air intelligence is information about the offensive and defensive capabilities of actual or potential enemies and their vulnerability to air attack.

   b. **How is it gathered?**

   Air intelligence officers work with specially trained photo interpreters. They study photographs made by satellites and aircraft to try to learn as much as possible about an area of interest.

6. **What is the U.S. intelligence community?**

   The U.S. intelligence community consists of all the agencies and individuals who produce intelligence in the United States.

7. **What is the CIA?**

   The CIA is the Central Intelligence Agency. Its mission is to provide the president, National Security Council, and other policy-making government and military officials with comprehensive foreign intelligence on matters related to national security.

8. **What new department was created in 2002 to coordinate national strategy against domestic terrorism?**

   The Department of Homeland Security (DHS) was established in 2002 to better coordinate all civilian activities related to both defense of the American homeland against terrorist attacks, and emergency disaster response, following the September 2001 terrorist attacks on the Pentagon and World Trade Centers.

9. **What is the mission of the Defense Intelligence Agency?**

   The primary mission of the DIA is to provide all-source intelligence to the U.S. armed services, and coordinate all military intelligence resources.

10. **What is the mission of U.S. naval and military attachés?**

    The mission of a military attaché in a foreign country is to collect military and political information and report it to the DIA and the parent service of the attaché.

11. **What is the organization responsible for carrying out the intelligence mission of the Navy?**

    The organization responsible for carrying out the intelligence mission of the Navy is the Office of Naval Intelligence (ONI).

12. **If persons in a diplomatic status are caught violating their trust, what is likely to happen?**

    If persons in a diplomatic status are caught violating their trust with the host government, that government may demand that they be recalled.

13. **What is the loss of classified material or information called?**

    The loss of classified information is called compromise of that information.

14. **What are some of the ways in which classified material may be compromised?**

    Classified material may be compromised by one of the following means: capture or salvage; theft, espionage, observation, or photography; interception of communications traffic; electronic tracking devices; communications traffic analysis; cryptanalysis (breaking of codes); carelessness of personnel.

15. a. **What are the three levels of security classification given to official material?**

    The three levels of classification given to official material, in descending order of importance, are Top Secret, Secret, and Confidential.

    b. **To what degree would national security be damaged by the compromise of each?**

    Compromise of Top Secret material could result in exceptionally grave damage to the nation; of Secret material, serious damage to national security; of Confidential, some harm to national security.

Chapter 4. Naval Logistics

1. **When did modern logistics begin?**

   Modern logistics may be said to have begun in World War I, when the United States was required to support a large American expeditionary force in Europe.

2. **What is the relationship between strategy, tactics, and logistics?**

   Strategy is concerned with the general plan for the employment of the nation's fighting forces. Tactics involves the specific maneuvers and techniques of fighting. Logistics refers to the total process by which the resources of a nation, both material and human, are mobilized and directed toward the accomplishment of military goals. Thus, while strategy provides the scheme for the conduct of military operations, logistics provides the means.

3. **What will probably have to be done from the logistics standpoint if the United States becomes involved in total war?**

   If the United States becomes involved in total war, the whole national economy would have to mobilized efficiently.

4. **What are the seven principles of logistics that must be reflected in logistics planning at all levels?**

   The seven principles of logistics that must be reflected in logistics planning at all level are: (1) responsiveness—providing the right support at the right time, at the right place; (2) simplicity—avoiding unnecessary complexity in preparing, planning, and conducting logistic operations; (3) flexibility—adapting logistic support to changing conditions; (4) economy—employing logistic support assets effectively; (5) attainability—acquiring the minimum essential logistics support to begin combat operations; (6) sustainability—providing logistics support for the duration of the operation; and (7) survivability—ensuring that the logistic infrastructure survives in spite of degradation and battle damage.

5. **What are the six functional areas of logistics?**

   The six functional areas of logistics plans are: (1) supply—includes design, procurement, contracting, receipt, storage, inventory control, and issuance of end items, spare parts, and consumables; (2) maintenance—actions necessary to preserve, repair, and ensure continued operation and effectiveness of equipment, both afloat and ashore; (3) transportation—the movement of units, personnel, equipment, and supplies from the point of origin to the final destination; (4) engineering—the construction, damage repair, combat engineering, and maintenance of facilities; (5) health services—the provision of medical and dental supplies, blood and blood products, and facilities and services in both combat and non-combat environments; and (6) other services—the provision of administrative and personnel support to operational forces, including record-keeping, disbursing, food services, and legal services.

6. **What are the four elements of logistics that come into play in each functional area?**

   The four elements of logistics that come into play in each functional area are acquisition, distribution, sustainment, and disposition.

7. **What are prepositioned stocks of war matériel intended to do?**

   Such prepositioned stocks would, it is hoped, be sufficient to sustain military operations until further resupply could be accomplished, most likely by seaborne transport from the United States.

Chapter 5. Naval Research and Development

1. **Who manages the Navy's R&D program?**

   Under the secretary of defense, the secretary of the Navy has policy control over the Navy R&D organization. Under the Navy secretary is the assistant secretary of the Navy for research, engineering, and systems. The top adviser to these two leaders is the chief of naval research. The chief of naval research is in charge of the basic research program of the Navy, coordinating all Navy efforts with the systems commands.

2. **What is the mission of the Office of Naval Research?**

   The ONR is charged with planning and conducting coordinated research in every field of basic science, in conjunction with the applied research and engineering development programs of the Navy.

4. a. **What is DARPA?**

   DARPA is an acronym for the Defense Advanced Research Projects Agency. The purpose of this agency is to prevent technological surprise from harming U.S. security by sponsoring research in areas of high risk in terms of commercial applicability and profit potential, which private enterprises would be reluctant to take on.

   b. **What are the three main DARPA program areas?**

   DARPA's program is structured in three major areas: national-level problems involving threats to U.S. national security; operational dominance, wherein advanced systems and technologies are developed that will give U.S. military forces a decisive edge over prospective enemies; and high-risk high-payoff technologies that will enable quantum leaps in U.S. military capabilities.

UNIT 3 Military Law

Chapter 1. Introduction to Military Law

1. **Why have societies developed codes of laws?**

   In any organization of people, whether a business, school, community, athletic team, or military unit, there has to be an understanding of what can and cannot be done. There must be a code of law, rules, and established regulations by which all group members conduct themselves.

2. **How do laws come into force?**

   The force of government behind customs and codes of law transforms them into practical laws regulating the daily lives of people. These laws are further defined by court decisions and rulings by judges.

3. **What is the basic difference between the European Civil Code and English common law?**

   Under the European Civil Code (Napoleonic Code), the accused must prove himself or herself innocent of charges filed by the state. Under English common law, upon which American criminal law is based, the accused is presumed innocent until the evidence brought before the jury proves guilt beyond any reasonable doubt.

4. **What is the basis of all U.S. law?**

   The U.S. Constitution is the basis of all U.S. law.

5. **What is meant by a trial by a jury of peers?**

   Trial by a jury of peers means that a person accused of a crime has his or her case heard by a jury of citizens of equal status under the law.

6. **Why is there a separate body of military law?**

   Military law not only restrains individuals for protection of the whole military community, but also establishes the prescribed conduct that all members must observe to preserve order and discipline. Military law is therefore different in some degree from the civil law code.

7. **What is the relationship between discipline and military law?**

   Under the Constitution, military law regulates the military establishment, including the military justice system. It is designed to preserve good order and discipline in the military services the same way that state and federal laws preserve good order in the civilian community.

8. **What is the basic requirement of both military and civil law pertaining to individual rights?**

   Both military and civil law, under the Constitution, require that the rights of each individual be protected. Every person in uniform is assured equal justice under military and civil law.

9. What is the purpose of *Navy Regulations*?

Navy Regulations is the set of basic laws governing the Navy today. These regulations provide the broad guidelines for the organization and administration of the Navy and specify particular actions that can and cannot be done and how the chain of command should handle these actions.

10. Under *Navy Regulations*, what is the rule concerning the following subjects?

a. Communications with the commanding officer

The right of any person in the naval service to communicate with the commanding officer in a proper manner, and at a proper time and place, shall not be denied or restricted.

b. Examinations

Persons in the Department of the Navy, without proper authority, shall not have in their possession, obtain, sell, publish, give, purchase, receive, or reproduce any examination paper, or any copy thereof, or answer sheet thereto, for any examination whatsoever that has been, is, or is to be administered within the Department of the Navy.

c. Equal opportunity

Equal opportunity shall be afforded to all on the basis of individual effort, performance, conduct, diligence, potential, capabilities, and talents without discrimination as to race, color, religion, creed, sex, or national origin.

d. Alcoholic beverages

Except as may be authorized by the secretary of the Navy, the introduction, possession, or use of alcoholic beverages on board any ship, craft, aircraft, or in any vehicle of the Department of the Navy is prohibited.

11. Which three publications explain all matters concerning U.S. military law?

The three publications dealing with U.S. military law are the *Uniform Code of Military Justice* (UCMJ), the *Manual for Courts-Martial, United States,* and the *Manual of the Judge Advocate General.*

12. Why must naval personnel be familiar with the UCMJ?

All military leaders must know the fundamentals of military law. Officers must know the basics of court procedures, for they may be called upon at any time to participate in the conduct of a military court, or to investigate matters that have some bearing in such a court. Since Navy personnel agree to abide by the Navy's law and regulations in their oath of enlistment, it stands to reason that each Navy person must learn what these laws are.

13. What kinds of cruel and unusual punishments are prohibited by Article 55 of the UCMJ?

Under Article 55 of the UCMJ, cruel and unusual punishments are prohibited. In the days of sail, punishments by flogging, branding, or tattooing on the body were not uncommon. Today they are strictly forbidden. Public punishments that might tend to ridicule, such as shaving the head, placing offenders in the stocks, tying them up by the thumbs, and forcing them to carry about placards or heavy loads, are also prohibited by the Code. Placing a prisoner "in irons," except for handcuffs when traveling in custody, is likewise not allowed.

Chapter 2. Discipline and Punishment

1. **Why must discipline be handled in a consistent manner?**

   A breach of discipline cannot be disregarded one day and rebuked the next. Under such conditions, personnel do not know where they stand and cannot establish a pattern of conduct that is consistent.

2. **What is the basic difference between arrest and restriction?**

   Arrest is the restraint of a person by an order directing that person to remain within certain specified limits. Arrest is not punishment, but a binding restraint imposed on the arrested person to obey the arrest order. A person under arrest cannot be required to perform full military duty. Instead of arrest, an accused person may be restricted to specified areas. He or she may be required to perform all usual military duties while under such restriction. This is the usual form of restraint while awaiting mast or court-martial.

3. **Who may place offenders on report, and under what circumstances?**

   Any commissioned officer or petty officer who sees a breach of discipline afloat or ashore may place naval personnel on report.

4. **What is the purpose of the executive officer's screening mast?**

   The XO's screening mast is a preliminary mast held prior to the captain's mast. The purpose is to determine the seriousness of the case and to ascertain the facts so the XO may recommend action to the CO. The XO may not assign punishment, but he or she may dismiss the charges if conditions justify so doing.

5. **What five judgment possibilities exist for the commanding officer after hearing a mast case?**

   The five possibilities open to the CO after hearing a mast case are: (1) dismiss the case, (2) officially warn the accused, (3) administer an oral or written admonition or reprimand, (4) administer punishment, or (5) order the accused to be tried by court-martial.

6. **What are the three types of courts-martial, in ascending order of seriousness?**

   Types of courts-martial in ascending order of seriousness are summary court-martial, special court-martial, and general court-martial.

7. **What is unique about the tasks of a summary court officer?**

   The summary court officer is unique in that he or she represents both the government and the accused; in other words, he or she is both prosecuting attorney and defense counsel. He or she investigates both sides of the matter and ensures that the interests of both the government and the accused are safeguarded.

8. **What are the duties of the convening authority concerning a court-martial?**

   The convening authority of a summary or special court is the commanding officer. He or she draws up a convening order that specifies the time and place of meeting of the court and assigns the members to it; he or she may have a military judge appointed to the court if one is available. If the accused requests enlisted persons on a special court, the convening

authority may grant this if they are available. In a special court, the convening authority appoints an officer as trial counsel to conduct the case for the government, and another officer to act as defense counsel for the accused.

9. What are the tasks of a military judge if assigned to a four-person special court?

If a military judge is detailed to a four-person special court, he or she will be the president of the court. As president, he or she rules on legal procedures during the trial and instructs the court on the elements of each offense charged prior to closure of the court for vote, as well as what constitutes the presumption of innocence, reasonable doubt, and burden of proof. The military judge advises as to the maximum authorized punishment for each offense.

10. What are the court duties of the trial and defense counsels?

The trial counsel acts as the prosecuting attorney on behalf of the government. The defense counsel acts on behalf of the accused.

11. What is a peremptory challenge?

A peremptory challenge may be exercised by the accused on advice of his or her defense counsel. This means that the challenged member of the court is dismissed from court duties by the president. No reason for the peremptory challenge need be given, but if this reduces the court membership below three, the convening authority must appoint another member.

12. When may a general court-martial try civilians?

A general court-martial may try civilians in situations in which martial law has been officially declared because of a breakdown of normal civilian authority.

13. What punishments may be awarded by a general court-martial?

A GCM can decree the most severe punishments, including death (for desertion in time of war, mutiny, sedition, or spying), confinement for life, dishonorable discharge, bad conduct discharge, dismissal of an officer, and total forfeiture of pay during the remaining period of a person's obligated service.

14. What is the purpose of a court-martial review?

Review by higher authority of the findings and sentence of any court-martial is automatic. The court records are gone over to see that the trial court acted correctly, the accused person was not denied any rights to which he or she was entitled, and the sentence was not illegal or too severe. After this review the convening authority may approve or disapprove the findings and sentence, and change either or both of them. He or she may reduce or suspend the sentence, or change it to a different one providing the severity of the punishment is not increased.

15. How does the military review of a court-martial compare with a civilian appeal?

The military review is similar to the appeal of a civil court conviction, except that in the military the review is done by higher authority in the chain of command, and is automatic. An appeal of a civilian court conviction is made to a higher court in the system, and will only be granted if reasonable grounds for one can be shown.

16. What are the functions of the Court of Military Review and the Court of Military Appeals?

A finding of any court-martial that awards a bad conduct discharge must be sent beyond the officer exercising general court-martial jurisdiction to the Office of the Judge Advocate General (JAG) of the Navy. There, a Court of Military Review consisting of a three-judge appellate review panel carefully reviews every case in which an approved sentence affects a flag officer, or in which a sentence imposing the death penalty, dismissal of an officer, a dishonorable or bad-conduct discharge, or confinement for one year or more has been imposed.

The Court of Military Appeals is the supreme court of military justice. It is composed of three civilian judges appointed by the president and confirmed by the U.S. Senate. An offender whose conviction has been upheld by the Court of Military Review has the right to petition the Court of Military Appeals to review the case. Such appeals are not automatic. If the petition is granted, the convicted person is entitled to a lawyer who will prepare a brief and argue the case before the court.

17. When are service personnel subject to civil law?

Military personnel are subject to civil courts and law when they are within civil jurisdiction. In general, offenses committed by service personnel off base in civilian clothes against a civilian or against some element of the civil government lack the necessary service connection to be punishable under the UCMJ.

18. What two kinds of adverse discharges may be awarded by courts-martial?

A bad conduct discharge may be awarded by either a special or general court-martial. A dishonorable discharge may be awarded only by a general court-martial.

UNIT 4 International Law and the Sea

Chapter 1. Fundamentals of International Law

1. **What are the official representatives of our government in foreign capitals called?**

   Ambassadors are accredited officials who represent our government in the capitals of foreign countries.

2. **What is the body of rules that has evolved to regulate many of the relations between nations called?**

   The body of rules under which civilized nations deal with each other is called international law. Some of this law is formal as prescribed in treaties and agreements, and some is informal, unwritten but legally functional because of tradition and custom.

3. **What aspect of international law pertains to relations between independent nations?**

   That aspect of international law that deals with relations between sovereign states is called public international law.

4. **How does the U.S. Constitution regard international treaties?**

   The Constitution directs that treaties form a part of the supreme law of the land.

5. **What is diplomacy?**

   Diplomacy is the management of international relations by negotiation, and the method by which these relations are adjusted and managed by ambassadors and envoys. It is a substitution for force, and the means of obtaining the maximum national advantage without resort to force.

6. **Where did the principles of early international law originate?**

   The pharaohs of Egypt and other early rulers had agreements with rulers of other states concerning sovereignty, military assistance, refugees, and immigrants. The Greek city states of Athens and Sparta built on this experience, and by 400 B.C. they had developed and defined treaty law and methods of negotiation, principles of international arbitration, the rights and duties of aliens, the immunity of ambassadors, and the right of asylum.

7. **Which official world body rules in cases involving application of international law?**

   Cases involving rulings on the basis of internationally accepted law are heard at the International Court of Justice in The Hague, Netherlands.

8. **Under international law, what three characteristics are necessary for a state to be regarded as sovereign?**

   A sovereign state has these three characteristics: (1) it is a permanently organized legal society or government; (2) it is a fixed territory free from control of any other state; and (3) it has the ability to enter into international associations with other states.

9. **What unique relationship still applies between Britain and its former colonies?**

Britain is the leader of a group of associated states called the Commonwealth of Nations. It is composed mainly of nations that were at one time under British colonial rule. Great Britain and its Dominions of Australia, Canada, New Zealand, and some fifty other countries enjoy complete sovereignty and independence in their internal and external affairs, but acknowledge an ideological allegiance to the British Crown based on common tradition and economic interest.

10. **What are the fundamental rights of a sovereign nation?**

The fundamental rights of a sovereign nation are the right of freedom from interference or intervention, the right of continued existence, and the right of self-defense.

11. **What are the legal rights of a nation if it obtains evidence of imminent attack by another country?**

If a state obtains evidence of imminent attack by another country, it has the right to wage war in self-defense. No state is expected to wait passively until attacked, for the right of self-defense includes the right to prevent attack.

12. **What legal term is applied to countries engaged in a lawful war?**

A nation engaged in a lawful war is called a belligerent.

13. **What is the step short of formal withdrawal of diplomatic recognition that countries may take when cooperation between them becomes very difficult?**

The step short of formal withdrawal of recognition that nations more often exercise when some disagreement exists is called a breach in diplomatic relations. In this situation, ambassadors are recalled, consular stations are closed or drastically reduced in size and number, and treaties either remain in force or are suspended for the duration of the breach.

14. a. **What is meant by diplomatic immunity for ambassadors, attachés, and others of the embassy staff and their families?**

Diplomatic immunity includes freedom to communicate with the home government; safety and security of self, staff, and family; inviolability of home and embassy; and certain jurisdictional immunities such as freedom from criminal and civil laws.

b. **What may a host country do if an embassy staff member violates established standards of behavior?**

If a diplomat repeatedly breaks laws, the host government may declare him or her *persona non grata* (not acceptable) and demand his or her removal.

15. a. **What is the title of the senior U.S. service attaché assigned to an embassy?**

The senior U.S. service attaché assigned to an embassy, regardless of service, is called the defense attaché.

b. **What does the acronym ALUSNA mean?**

ALUSNA stands for American Legation U.S. Naval Attaché.

16. What recent technical innovation is international law beginning to address today?

Interactive computer networks like the Internet have ushered in an information revolution of instantaneous worldwide electronic communication. International law is only beginning to grapple with some of the legal questions regarding its use for illicit purposes.

17. What is the basic purpose of the United Nations?

The basic purpose of the United Nations is to maintain international peace and security, to take effective collective action to prevent and remove threats to world peace, and to cooperate in solving international economic, social, cultural, and humanitarian problems.

18. Who are the five permanent members of the United Nations Security Council?

The five permanent members of the United Nations Security Council are the United States, Great Britain, Russia, France, and the People's Republic of China.

19. What actions can the Security Council take to maintain or restore peace and security in a given world situation?

The Security Council can make recommendations and pass measures to maintain or restore international peace and security whenever it determines the existence of any threat to the peace, breach of the peace, or act of aggression. These measures may be actions not involving the use of armed forces, such as interruption of economic relations or severance of diplomatic relations. Or the action may be military operations by air, sea, or land forces to maintain or restore peace. The charter obligates member nations to place armed forces under United Nations command to carry out whatever actions are decided upon by the council.

20. What are the two main collective defense arrangements in which the United States is an active participant?

The United States is a participant in the following two main collective defense arrangements: the Organization of American States (OAS) and the North Atlantic Treaty Organization (NATO).

21. What is the keystone provision of each of the various collective defense treaties?

The key provision of our collective defense treaties is that if one member state is attacked, it will be considered an attack on all.

22. Which countries currently belong to NATO?

The membership of the North Atlantic Treaty Organization consists of the United States, Canada, Iceland, most of the nations of northern and western Europe, Greece and Turkey, and, more recently, many of the former satellite states of the old Soviet Union. Additional countries, including some of the member states of the Russian Federation, may be invited to join in the future.

Chapter 2. International Law of the Sea

1. **What is the basis of modern sea law as accepted by all maritime nations?**

   The basis of modern sea law is the principle stated by Hugo Grotius, a Dutch publicist, in 1604: "no part of the sea may be regarded as pertaining to the domain of any given nation." This precept grew to become the basis of the "freedom of the seas" advocated by Britain and the United States and is now widely accepted by all maritime nations in the world.

2. a. **What is meant by the term *territorial sea*?**

   The territorial sea is that band of sea adjacent to the seacoast of a coastal state over which the right of sovereignty exists for national security reasons.

   b. **What territorial sea width does the United States recognize?**

   The United States joined other maritime powers in accepting the principle of a twelve-mile territorial sea in 1978.

3. **What are the three main precepts of the international law of the sea?**

   The three main precepts are (1) the freedom of the high seas; (2) the territorial sea; (3) special contiguous zones wherein limited jurisdiction prevails, such as in straits and channels, where neither the rules of the high seas nor territorial seas pertain.

4. **What has been the purpose of the United Nations Law of the Sea Conferences?**

   The purpose of the United Nations Law of the Sea Conferences has been "to develop rules for peaceful use of the seabed beyond the continental shelf to the entire spectrum of ocean uses."

5. **What is meant by the term *innocent passage*?**

   Innocent passage is the right of vessels of one nation to navigate peacefully through the territorial waters of another nation.

6. **How are submarines affected by rules applying to innocent passage?**

   Submarines must transit a territorial sea surfaced, unless a specific bilateral treaty provides otherwise.

7. a. **What is an archipelagic nation?**

   An archipelagic nation is one composed of many islands.

   b. **What are some problems that might arise regarding them from the standpoint of ship transits?**

   Problems that might arise regarding archipelagic nations include restrictions on passage through them and constraints on aircraft flying over them.

8. **What has been the basic controversy concerning gulfs and bays as regards the territorial sea of a littoral nation?**

   The basic controversy is over the question of where internal waters of bays and gulfs end, and where territorial seas begin.

9. **a. What are rivers that lie entirely within one country called?**

   Rivers entirely within a single country are called national rivers.

   b. If they form a boundary between two or more countries, what are they called?

   If they form a boundary, they are called international rivers.

10. **What factor determines the boundary line between nations on an international river?**

    If an international river is not navigable, the territorial boundary lies in the geographic center of the river. If it is navigable, the center of the deepest channel marks the boundary; it is called a thalweg.

11. **What rules govern the use of major canals by belligerent nations?**

    Passage through canals is controlled by agreement of concerned nations. In peacetime, ships of all nations may use them, subject to paying tolls for transit service. In wartime canals are closed to belligerents at war with the controlling state.

12. **What does *freedom of the high seas* include within the meaning of the phrase?**

    Freedom of the high seas includes freedom to conduct maritime commerce, to navigate, to fish, to lay submarine cables and pipelines, and to undertake scientific research. In exercising these freedoms, reasonable regard must be given to the rights of others to use the high seas.

13. **What is meant by the term *residuum of authority* in the economic zone?**

    Residuum of authority refers to the question of with whom jurisdiction in the 12-to-200-mile economic zone rests—the coastal state, or the international community as a whole.

14. **What is the key legal difference between the territorial sea and the economic zone beyond the 12-mile limit?**

    The key legal difference is the exercise of sovereignty, that is, exclusive jurisdiction in the territorial sea, whereas in the economic zone, a coastal state has only limited preventive or protective jurisdiction such as exploration and exploitation rights on the continental shelf and seabed, fisheries, or self-defense measures.

15. **What self-defense measures may a nation take in the economic zone?**

    A sovereign state can take all defensive measures required to guarantee its existence.

16. **What particular resources are now becoming available from the seabed of the continental shelf?**

    At the present time, oil and some minerals are being taken from the seabed of the continental shelf.

17. **How does the Geneva Convention on the Continental Shelf define the term *continental shelf?***

    The Geneva Convention defines the term continental shelf as the seabed and subsoil of the submarine areas adjacent to the coast beyond the territorial sea to a depth of 200 meters (656 feet), or beyond that limit to where the depth of the superjacent waters allows exploitation of the natural resources.

18. **Where is there now special activity in continental shelf oil exploration and exploitation?**

Presently, most activity in continental shelf oil exploration and exploitation is off the California and Gulf Coasts of the United States, the North Sea off Scotland and Norway, and the Gulf coast off Mexico.

19. **What are the nautical rules of the road designed to do?**

The nautical rules of the road were devised for the purpose of standardizing ship movements on the seas in various situations in such a manner as to avoid collisions at sea.

20. **What type of court hears cases involving ship collisions on the high seas?**

The cases are heard in the admiralty court of the maritime nation having jurisdiction.

Chapter 3. The Law of War at Sea

1. **Why does the preservation of law and order on the high seas fall within the scope of international law?**

   The preservation of law and order on the high seas falls within the scope of international law because the high seas are not under the sovereignty of any state.

2. **What specific requirements must be met in order for a ship to be termed a warship?**

   To be termed a warship, a ship must be commissioned as a part of the naval forces of a state, and authorized to display an appropriate flag or pennant that identifies it as such. Second, the ship must be commanded by a member of the military forces of the state and must be manned by a crew subject to military discipline.

3. **Who has exclusive jurisdiction over a warship?**

   Warships represent the sovereignty and independence of their state, and consequently, jurisdiction of their own state over them is exclusive under all circumstances.

4. **How does the diplomatic status of embassy officials and their staffs compare with the status of warship commanding officers and crews visiting a foreign port?**

   In representing their country, commanding officers of warships head their officers and crew in the same manner as ambassadors head legations. Both are expected to uphold the dignity and honor of the sovereign in whose services they perform their duties.

5. a. **Why do warships have the right to approach other ships at sea?**

   Because warships of all nations have a duty to suppress piracy on the high seas, international law recognizes that warships have the right to approach other vessels on the high seas in peace and in war.

   b. **How is this usually accomplished?**

   Warships, as a matter of practice, request the name and nationality of all merchant ships met at sea, usually by flashing light.

6. **What is the status of the officers and crew on leave or liberty in a foreign port?**

   When ashore on leave or liberty, officers and crew members are subject to local law and jurisdiction, in conformance with any Status of Forces Agreement which may exist between the United States and the host country.

7. **What is the fundamental jurisdictional difference between naval vessels and merchant ships when visiting foreign ports?**

   Merchant ships visiting in a foreign port are completely subject to the jurisdiction of the nation being visited. Local police may come aboard, arrest, and remove accused offenders or political refugees since the doctrine of asylum does not apply to merchant ships.

8. **Why are the legal details as to a state of war important?**

   They are important because of war clauses in insurance policies, certain provisions of the UCMJ, and certain presidential powers.

9. **When do the rules of war apply to military and naval actions between states?**

The international rules of war apply whenever there is armed conflict between states.

10. **What is the basic purpose of rules of warfare?**

The basic purpose of the rules of warfare is to restrain the belligerents from the excessive use of force so they do not escalate a conflict to total war with all its devastating implications.

11. **What are the three basic principles underlying the rules of warfare?**

The three basic principles underlying the rules of warfare are humanity, chivalry, and military necessity.

12. **What is a significant difference between land and sea warfare as regards private and neutral property?**

On land, private property is generally required to be left undisturbed by the opposing forces. At sea, private enemy property, and in some instances neutral property, is subject to confiscation by belligerent warships.

13. **What are the Hague Convention rules concerning mines?**

The Hague Convention forbids the laying of unanchored, automatic contact mines, unless they will become harmless within one hour after the person laying them ceases to control them. Automatic mine fields are not supposed to be laid solely for the purpose of intercepting commercial shipping, and precautions are supposed to be taken for the security of peaceful neutral shipping.

14. **What is the U.S. policy concerning CBR warfare?**

Chemical, biological, and nuclear (CBR) warfare may be used by United States forces only if and when authorized by the president. In general, the United States has condemned the use of such weapons, and President Nixon halted the production of chemical and biological agents in 1969.

15. **Under the rules of warfare, what institutions and ships are supposed to be exempt from attack?**

Medical establishments, hospital zones, churches, museums, buildings housing religious organizations, and hospital ships and aircraft, when marked and operating as required by the Geneva Convention, may not legally be made the object of attack in naval warfare.

16. **Why was unrestricted submarine warfare generally practiced by both sides in World Wars I and II?**

Unrestricted submarine warfare was practiced by both sides in retaliation for illegal acts by the other side, and because merchant ships were armed, convoyed by warships, and ordered to fire upon, or ram, submarines on sight.

17. a. **What are the legal requirements of a blockade?**

To make a blockade legal, it must be effective, that is, if a ship attempts to enter or leave a blockaded port, its capture must be attempted.

b. How does a quarantine differ from a blockade?

A quarantine is a limited and selective form of naval blockade directed against specific prohibited cargo or contraband.

18. What action may belligerent warships take toward merchant ships on the high seas suspected of transporting contraband?

Belligerent warships may cause a merchant ship to pause on the high seas and submit to a visit and search for contraband.

19. What is the most effective way to enforce laws of war?

The most effective way of enforcing the laws of war is the official publication of the facts by the wronged nation, with intent to influence world opinion against the offending belligerent.

Chapter 1. The Challenge of Leadership

1. **What is the challenge of leadership?**

   Although each leadership position may be different, the challenge of leadership remains the same: to get people to do the job.

2. **Upon what is effective leadership based?**

   Effective leadership is based on personal example, good organization and administration, and personal moral responsibility.

3. **What are the two extremes in philosophy of leadership?**

   One extreme view holds that leaders are born, not made. The opposite extreme contends that anyone who can master various leadership principles can lead effectively.

4. **What is the first lesson that military personnel must learn?**

   Obedience is necessarily the first lesson that must be learned by any military person.

5. **Why must military personnel have a more idealistic outlook on the importance of obedience?**

   Since the military mission is defense of our country and our way of life, military personnel must be more idealistic than the average civilian, since they are serving, protecting, and defending the United States and its allies—even to the extent of giving up their lives in peace or war.

6. a. **What are the two forms of military obedience?**

   Obedience has two forms in the military, each with its own time and place. *Blind obedience* is automatic response to orders such as commands issued during close order drill, or steering commands to a helmsman. *Reasoned obedience*, on the other hand, allows for some personal initiative in carrying out an order.

   b. **Why is there a need for each?**

   In the case of blind obedience, there is no time for questioning or determining the reason for this type of order or command. Reasoned obedience allows people to use their own ideas, and therefore to work and learn best.

7. **What is the difference between a senior's request or order and a command?**

   A command is a specific type of order that calls for immediate blind obedience. Courteous terms normally are not used in commands, and there is usually no time for questions or hesitation.

8. What makes the military leader different from the civilian executive?

Civilian executives hold their positions by virtue of superior knowledge and experience and strong character or personality. The executive probably is not legally responsible for the persons employed, and any concern for the well being of subordinates is primarily a moral one. Military leaders, on the other hand, have both a legal and a moral obligation to do all in their power to lead their subordinates effectively and to be concerned about their welfare.

Chapter 2. Qualities of a Leader

1. **What are the qualities of a good leader that are discussed in this chapter?**

   The qualities of a good leader discussed in this chapter are moral responsibility, loyalty, devotion to duty, professional knowledge, self-confidence, initiative and ingenuity, courage, ability to organize and make decisions, personal example, mutual trust and confidence, conduct in uniform, discipline, self-control, knowing personnel, and friendship versus fraternization.

2. **Why must loyalty be a two-way street?**

   Subordinates are particularly sensitive about loyalty extending downward to them and are quick to notice when it is absent. The loyalty of a senior toward his or her personnel has a great effect on the morale within the organization, and this may translate into that extra effort that is so often necessary to accomplish a mission.

3. a. **What is devotion to duty?**

   Devotion to duty may be defined as loyalty to the position or job one holds. In general, devotion to duty is shown by someone who not only exerts maximum effort on the present job, but also takes initiative to learn about tasks and billets demanding increased levels of responsibility.

   b. **How does it relate to healthy personal ambition?**

   Positive recommendations, advancements, and promotions are likely to result from such performance of duty.

   c. **How does it relate to the ability to take orders?**

   The unit might fail in its mission if some individuals fail to do their part.

4. **What two main qualifications are necessary for a leader to be regarded as knowledgeable?**

   The person who knows the job thoroughly is far better qualified to lead than one who does not. Mere schoolbook knowledge is not sufficient; experience is also essential.

5. **How can courage be strengthened?**

   Courage is a quality of the mind and may be developed and strengthened with use. Each time a person overcomes an obstacle—whether it is a tough examination, or a sports opponent, or peer pressure—the courage of that individual will be strengthened.

6. a. **What is moral courage?**

   Moral courage means a show of firmness in difficult situations where the danger of death or injury is not an immediate concern.

   b. **What are the principal factors that make moral courage difficult?**

   Fear of anger from seniors, fear of ridicule by peers, and lack of confidence due to immaturity or ignorance are some of the pressures that make the exercise of moral courage difficult.

c. **How can a lack of moral courage lead to the loss of both the respect of juniors and the trust of seniors?**

The person who says nothing, or agrees with seniors and then criticizes them behind their backs, loses both the respect of juniors and the trust of the seniors.

7. **Why could it be especially dangerous to neglect reporting a disagreeable fact to a commander?**

Moral courage is necessary to ensure that seniors get the information they need to make good decisions—even if such information upsets them.

8. a. **Why is decision-making important for a leader?**

Without the ability to make good decisions, a leader is useless.

b. **How can the young leader obtain help when confronted with problems beyond his or her experience to solve?**

He or she can call upon the expertise and experience of seniors to assist.

9. **Why is the leader's personal example so important in leading subordinates?**

When leaders' conduct is outstanding, those around them are often inspired to pattern their own actions after them, to the good of the whole organization. No leader can ignore rules and regulations and still expect subordinates to follow them. Such a leader will not be trusted and will lose control of subordinates. Regaining respect and control once they are lost is exceptionally difficult.

10. **Why are mutual trust and confidence so important in dealing with people?**

Mutual respect, trust, and understanding can prompt all hands to exercise a greater degree of personal responsibility. Then morale will be higher, efficiency will be improved, and burdens will be lighter.

11. **What is Admiral Burke's definition of a well-disciplined organization?**

Admiral Arleigh Burke, USN, a former Chief of Naval Operations, stated: "A well-disciplined organization is one whose members work with enthusiasm, willingness, and zest, as individuals and as a group, to fulfill the mission of the organization with expectation of success."

12. **What is the purpose of military discipline?**

The purpose of discipline in the military services is to develop an efficient organization of personnel trained to achieve a common goal.

13. **How does a person acquire self-discipline?**

Self-discipline begins with the realization that there is a need for self-control. Development of self-discipline comes only through repeated practice of self-control.

14. **Why is consistency in disciplinary action essential?**

In the military, disobedience of regulations must be handled immediately, justly, and consistently. Wrongdoing that is dealt with severely one day cannot be treated as insignificant the next. Such an approach can only result in confusion, poor morale, and distrust of the leader.

15. **Why is it important not to make rules that are unenforceable?**

    If service people are allowed to defy a regulation openly, they will develop an indifferent attitude toward other regulations as well.

16. **What is the usual result if leaders lose their temper?**

    A person who loses control of him- or herself usually loses control of the situation.

17. **Why is an understanding of human nature important in dealing with people?**

    A good leader continually strives to apply all that he or she can learn about human nature through experience and study. This knowledge can be obtained only by working at the job of human relations. The better his or her insight into human nature, and the better he or she understands the intelligence, education, and backgrounds of personnel, the more effective the leader will be in handling people.

18. a. **Why is fraternization or familiarity between officers and enlisted personnel prohibited in the military services?**

    The relationship between leaders and their subordinates influences discipline. Subordinates who perceive themselves as "favored" may feel the leader will not require them to obey and perform well. Those who do not feel so favored may perceive unfair or unequal treatment, whether or not it actually exists.

    b. **What is the difference between friendship and familiarity?**

    The leader who talks to subordinates in a friendly manner, taking a personal interest in them and being concerned with their problems, quickly gains their confidence and respect. On the other hand, leaders who become *too* familiar with their subordinates will often have difficulty in leading them. The old adage "familiarity breeds contempt" is applicable.

19. a. **What is sexual harassment?**

    Sexual harassment is unsolicited or otherwise undesirable or inappropriate advances of one service member toward another based on sexual attraction, especially involving promises of reward or threats of punishment or other forms of intimidation.

    b. **Why can it not be tolerated in the military services?**

    Fraternization and sexual harassment can be extremely destructive to the morale of both those directly affected and their fellow crew members.

Chapter 3. Evaluation of Performance

1. **Explain why evaluation of performance of subordinates is important to officers in the Navy and the NJROTC.**

   In the Navy and in NJROTC, officers are concerned with the selection of personnel for instructors, for school nominations, for advancement in rate, for filling billets in the unit, and for carrying out specific assignments. The overall performance rating of a naval leader is greatly affected by ability to select appropriate people for various roles, and to judge their capability to take on future assignments of greater responsibility.

2. **What is the difference between a person's ability and his or her performance?**

   Performance refers to what a person does—actual behavior or actual output. Ability applies to what a person could do at a given moment, if the situation were right.

3. **Why should NJROTC cadets know about performance evaluation?**

   Properly evaluating the achievements of their subordinates is one of the most important responsibilities of a leader, and developing leadership ability is one of the main objectives of NJROTC.

4. **Why is self-evaluation important?**

   Self-evaluation is important because, like the navigator of a ship, you have to know your present location and where the ship is going, or you cannot possibly determine whether or not you are on the correct course to get there.

5. **What is a common factor in most personal success stories?**

   A common thread in almost every success story is the setting of realistic and attainable goals.

6. **How can a person assess his or her progress toward a personal goal?**

   In the school setting, such progress assessment is facilitated by the assignment of periodic progress grades by the teacher. Broader progress can be assessed by such standardized tests as the preliminary and regular Scholastic Aptitude Tests (PSAT and SAT) and various achievement tests. In the military, progress is measured by periodic formal and informal performance ratings, advancement exams, and aptitude tests such as the ASVAB. Similar methods are used to assess progress in civilian occupations. Also, successful people do not sit back and wait until they are formally evaluated to judge their progress toward the goals they have set for themselves. Rather, they go through an almost continuous process of self-evaluation to determine for themselves how they are progressing and whether corrective action is necessary to get back on track.

7. **What are the main tasks in self-evaluation?**

   The main tasks in any self-evaluation process are to set realistic criteria by which one may measure progress, and to make realistic assessments of performance against those criteria.

8. **What must a person do to advance in the Navy or in any other large organization?**

   To advance in the NJROTC, the Navy, or another armed service—and indeed in almost any organization—an individual needs to grow steadily both personally and professionally.

Chapter 4. How to Give Instruction

1. **What is the definition of learning?**

   Learning can be defined as a change in behavior as a result of experience. The behavior can be physical and apparent, or it can be intellectual or attitudinal, not easily seen.

2. **What mental characteristics does the student bring into the classroom?**

   Each student sees the classroom situation differently because he or she is a unique individual whose past experiences affect readiness to learn and understanding of the requirements involved. Most people have fairly definite ideas about what they want to do and achieve. The student brings these purposes and goals into the classroom.

3. **What are the types of learning as classified by psychologists?**

   Psychologists classify learning by types: verbal, conceptual, perceptual, motor, problem solving, and emotional.

4. **Describe the shape of the typical learning curve.**

   There is rapid improvement in the early stages. Then the curve may tend to level off thereafter for significant periods of time. Such a development is a learning plateau and may signify any of a number of conditions.

5. **When do people learn best?**

   A student with a strong purpose, a clear objective, and a well-defined reason for learning something makes more progress than one who lacks motivation.

6. **What are the factors that speed and strengthen learning?**

   Several factors in the learning situation are known to speed, strengthen, or otherwise enhance learning. Learning occurs best when it progresses from known to unknown and concrete to abstract. The new learning can be attached to areas of existing knowledge. Learning is strengthened when accompanied by a pleasant or satisfying feeling, and learning is weakened when it is associated with an unpleasant feeling.

7. a. **What is motivation?**

   Motivation is the drive or desire to do a particular thing, the force that causes a person to move toward a goal.

   b. **What is negative motivation?**

   Impressing students with the seeming impossibility of a problem or task.

8. **What are the conditions that tend to hinder learning?**

   The conditions that tend to hinder learning are destructive sarcasm, intimidation, boredom, frustration, fatigue, lack of purpose, and sense of failure.

9. What should a lesson plan include?

A lesson plan, as a minimum, should contain the following items:

- The *objective* or *outcome* of the lesson, including some specific criteria that should be achieved by the trainees.
- The *intended audience* for the lesson.
- Identification of any *training aids/equipment* needed for the lesson.
- The *technique(s) of instruction* you will use.
- An *outline of the material to be presented*, with enough detail to meet the needs of the instructor.
- The *means you will use to assess the effectiveness* of the instruction.
- A *closing* or *summary* of the lesson.

10. What are the main techniques for delivery of instruction?

There are several main methods of instruction that have been widely used by those involved in education both in the military and in civilian life, over the years. These are the lecture method, the lecture with audiovisual support, the demonstration, role-playing, case study, the discussion method, and cooperative learning.

11. What are the advantages and disadvantages of the lecture with audiovisuals?

Advantages

- It is an efficient instructional method for presenting many facts or ideas in a relatively short time. Material that has been logically organized can be presented concisely in rapid sequence.
- It is often useful to supplement, summarize, or emphasize material from other sources or to provide information difficult to obtain in other ways. This is especially true when complex material is being presented. The audiovisuals will help to focus the student's attention on the specific concept being presented.

Disadvantages

- It is not good for development of motor skills.
- Although the use of audiovisuals will help to hold the attention of the student, it still requires considerable skill in speaking on the instructor's part.
- It assumes active listening and adequate note-taking skills on the part of the student.

12. What are the steps for the demonstration type of instruction?

The steps for a demonstration are: (1) show and tell, wherein the operations are shown and explained; (2) repetition, to develop students' ability to operate equipment or acquire physical skills; (3) performance, wherein the students practice under supervision until they have attained the required proficiency.

13. When is the use of the role-playing type of instruction appropriate?

Role-playing is especially useful in helping students understand perspectives and different ethnic and cultural backgrounds, and in problem-solving situations where different roles are in opposition to each other.

14. What is the case study approach to instruction?

The case study is an instructional approach that requires the student to analyze problem situations that may be hypothetical or real. The student receives a "case"—a report containing all pertinent data. The student then must analyze the data, evaluate the nature of the problem, decide upon applicable principles, and finally recommend a solution or course of action. The case may be handled by the class as a whole, by subgroups of the class, or by an individual.

15. When is the use of the discussion method of instruction appropriate?

Discussion techniques get at attitude development. By taking part in meaningful discussion with fellow students, the participant finds his or her own values and beliefs both reinforced and challenged. Discussion provides students with the opportunity to develop questioning skills and responses. It gives them the chance to develop organizational skills and formulate answers. Discussion is motivational. Since the role of the student is not as passive as with some other strategies, the student maintains a high degree of mental alertness.

16. Under what conditions can cooperative learning strategies be employed?

A cooperative learning strategy is best used when sufficient time is available for the group to gather, discuss, digest, and disseminate information. It is an excellent strategy to use when the material to be learned is complex or important, and requires both mastery and retention in long-term memory.

UNIT 1 Ship Construction and Damage Control

Chapter 1. Ship Construction

1. **List the major factors considered in the construction of naval ships.**

   The major factors considered in the construction of naval ships are the mission, armament, protection, seaworthiness, maneuverability, speed, endurance, and habitability.

2. **Provide the nautical terms for these civilian terms:**

   a. outer walls—hull
   b. inner walls—partitions or bulkheads
   c. floors—decks
   d. ceilings—overheads
   e. hallways—passageways
   f. stairs—ladders
   g. entrance hall—quarterdeck

3. **What nautical names are given to these parts of a ship?**

   a. front part—bow
   b. back part—stern
   c. middle of ship, lengthwise—away from centerline, outboard; toward centerline, inboard
   d. lengthwise direction—fore and aft
   e. crosswise direction—athwartships
   f. midpoint area—amidships
   g. widest part of ship—beam
   h. main deck, forward—forecastle
   i. main deck, aft—fantail
   j. main deck and above—topside
   k. below the main deck—below
   l. right of centerline—starboard
   m. left of centerline—port
   n. in the rigging—aloft

4. a. **What name is given to the girders attached to the keel that support the watertight skin of the ship?**

   Girders attached to the keel are called transverse frames.

   b. **What is the watertight skin called?**

   The watertight skin is the shell plating.

c. What additional strengthening beams run fore and aft?

Additional strengthening beams called longitudinal frames run fore and aft.

5. **What is another name for the deck-edge where the main deck meets with the shell or side plating?**

The intersection of the main deck with the shell plating is called the gunwale.

6. **How are all compartments in a ship identified?**

All compartments aboard a ship are identified by standardized compartment numbers that locate them and indicate their use.

7. **a. How are decks numbered below the main deck?**

Complete decks below the main deck are numbered in sequence from the second deck down.

b. Above the main deck?

Above the main deck, the decks are usually called levels, the first level number 01, the second 02, and so on.

8. **a. What name is given to all structures above the main deck?**

The superstructure is the name given to all structures above the main deck.

b. What is the highest structure above the main deck?

The ship's mainmast is usually the highest structure above the main deck.

c. What equipment is installed on this structure?

Many of the ship's electronic devices and antennas, radar, radio aerials, and meteorological instruments are on the mast.

9. **a. What main components does a steam propulsion plant have?**

A steam propulsion plant consists of boilers, main engines (steam turbines), reduction gears, propeller shafts, and propellers.

b. What is the biggest difference between a steam- and nuclear-powered vessel?

Nuclear-powered ships have steam propulsion, too, but the steam is produced by heat from a nuclear reactor instead of oil-fired boilers.

10. **Briefly describe how a gas turbine engine works.**

The three basic parts of a gas turbine engine are compressor, combustion chamber, and turbine. The compressor draws in air, compresses it, and sends it under pressure to the combustion chamber, where it is combined with atomized fuel and burned. The combustion gases expand and flow through the turbine blades, causing the turbine to rotate and drive the shaft and propellers.

11. **What part of the propulsion system actually drives the ship through the water?**

Propellers actually drive the ship through the water.

12. **Why is there heavy shielding around the reactor compartment of a nuclear propulsion plant?**

Heavy shielding is placed around the reactor compartment in order to protect the crew from nuclear radiation.

13. **Where are ships built?**

Ships are built in drydocks. In many shipyards today large components are built in subassembly bays away from the main assembly site, and then carried to the main building site for assembly.

14. **What are the basic steps in building a ship?**

The basic steps in building a ship are: (1) laying the keel sections on building blocks; (2) extending the keel from the center outboard, and fore and aft; (3) installing the main propulsion system, auxiliary machinery, and shafting; (4) assembling the bow section separately and joining it to the rest of the hull; (5) painting the exterior hull.

15. **In what three ways can a ship be launched?**

The three ways a ship can be launched are drydock-launched, side-launched, or float-off launched.

16. **Who chooses the name of a new ship?**

The name of the ship is chosen by the secretary of the Navy upon recommendation of the CNO.

17. a. **Who places a naval ship in commission?**

When a ship is ready for commissioning, the shipyard commander or another senior officer representing the CNO is ordered to place it in commission.

b. **What is the first order of the new commanding officer after he or she reads the orders?**

The prospective commanding officer reads aloud the orders from the Navy Department to command the ship, and then the first order is "Bring the ship to life and set the watch." The officers and crew then file aboard and take their stations in the new ship.

18. **What are the purposes of the shakedown and underway training cruise?**

The ship goes on a shakedown cruise to verify seaworthiness, speed, endurance, and ability to maneuver. After discrepancies of these tests, if any, are corrected, the ship goes on a six-to-eight-week underway training cruise. Upon successful completion of this cruise, the ship is ready to join the fleet.

19. a. **What is a ship's designation composed of?**

A designation is a group of letters and numbers that identify the ship. The letters tell the ship type and general use; the hull numbers indicate the number of ships of that type built, in sequence.

b. What are the first-letter designators of major naval vessels?

The first-letter designators of major naval vessels are:

A	Auxiliary	L	Amphibious, littoral
B	Battleship	M	Mine warfare
C	Cruiser	P	Patrol
CV	Carrier	S	Submarine
D	Destroyer	T	Military Sealift Command
F	Frigate	Y	Yard and service craft

20. a. What determines a class of ships?

When a number of ships are built to the same design, they make up a class, which is named for the first ship in it.

b. What do the letters G and N indicate in a ship's designator?

The designator letter "G" indicates guided missiles in the ship's main battery, and the letter "N" indicates the ship has nuclear propulsion.

c. What does a "T" before a ship's designator mean?

A "T" before a ship's designator means that the ship is a part of the Military Sealift Command and is manned by contract civilians.

Chapter 2. Damage Control and Firefighting

1. **a. What does damage control include?**

   Damage control includes firefighting, measures taken to control collision, grounding, explosion, and battle damage, and care of the injured.

   b. What are the duties of a ship's damage control organization?

   The duties include routine and emergency maintenance of damage control equipment and closures; control of damage and flooding caused by accident or hostile action; and defense against chemical, biological, and radiological attack.

2. **a. Which officer is the ship's damage control officer?**

   The engineering officer is the ship's damage control officer.

   b. Who is the principal assistant?

   The principal assistant is the damage control assistant (DCA).

3. **a. What is the name given to the control station for shipboard damage control?**

   The control station for shipboard damage control is called damage control central (DCC).

   b. What is the name given to the on-scene groups of people who are responsible for damage control in assigned sections of the ship?

   The on-scene groups responsible for damage control in assigned sectors of the ship are called repair parties.

4. **a. What is the task of a repair party scene leader?**

   A repair party scene leader supervises all on-scene activities, under the overall direction of the officer or petty officer in charge of the repair party.

   b. What are the special teams within a repair party?

   Repair party personnel are assigned to various teams within each repair party, including investigation teams; hose teams; dewatering, plugging, and patching teams; and shoring, piping repair, structural repair, casualty power, interior communications repair, and electrical repair teams. There are also CBR monitoring teams and decontamination teams. Besides the general repair parties, on some ships there are special departmental teams to handle aviation fuel repair, aviation crash and salvage, and ordnance disposal.

5. **a. What is a battle dressing station?**

   A battle dressing station is a first aid station manned by medical personnel.

   b. Who brings stretcher cases to the battle dressing station?

   Stretcher cases are brought to the battle dressing stations by repair party stretcher bearers.

6. **a. What are the three basic material conditions of readiness?**

   The three basic material conditions of readiness are X-RAY, YOKE, and ZEBRA.

b. What is the extent of protection for the ship in each?

Condition X-RAY offers the least protection, being set when the ship is in no danger of attack, such as in homeport. YOKE provides for more protection: it is set and maintained at sea, at all times during war, and at times outside working hours during peacetime. ZEBRA, providing the most protection, is set before going to sea or when entering port during war. It is set automatically when general quarters is sounded, and when a fire or flooding situation is in progress.

7. **What are the two ways to control flooding?**

The two ways to control flooding are: (1) to plug holes and (2) to establish and maintain flood boundaries using the watertight compartmentalization in the ship, so flooding will not spread.

8. **a. What are the emergency alarms used aboard ship?**

b. When are they used?

The emergency alarms used aboard ship are the *general alarm*, used to call the crew to general quarters because of impending enemy attack, fire, collision, or CBR attack; the *chemical alarm;* and the *collision alarm*. The general alarm used for attack or fire is a series of single gong tones; the chemical alarm is a steady tone signal; and the collision alarm consists of a series of three pulses, with a short pause between each series.

9. **a. What is the principal means of internal communication throughout a ship?**

The principal means of communication throughout a ship is the sound-powered telephone system.

b. What is the particular advantage of this system?

These telephones require no external source of power other than the talker's voice.

c. When internal phone and electrical systems fail, what method is used to relay messages?

When the phone and electrical systems fail, messengers are used to relay orders and information around the ship.

10. **Who should be the first person to report a fire?**

The first person to report a fire should be the first person who discovers it.

11. **a. What is the fire triangle?**

The fire triangle is a triangle whose sides represent the three requirements for any fire: fuel, heat, and oxygen.

b. How can a fire be put out?

Taking away any of the three sides of the fire triangle will cause the fire to go out.

c. What is the method most often used?

Removing the heat side of the triangle, or cooling the fire, is the method most often used to extinguish a fire.

12. List the four classes of fires, fuels for each, and best method of extinguishing each.

Fires are grouped into four classes according to the type of fuel or material burning and the methods required to extinguish them. These are:

Class A: Solid combustible materials such as wood, cloth, paper, and also explosives. Usual means of putting the fire out is with water. CO_2 may be used on small fires, but not on explosives.

Class B: Flammable liquids such as oil, gasoline, cleaning agents, and paints. CO_2 is good for smaller fires, but for larger ones, water fog or spray and light water should be used. A solid stream of water should not be used.

Class C: Electrical or electronic equipment. Main extinguishing agents are CO_2 and dry chemical extinguishers. Liquids should not be used.

Class D: Combustible metals such as magnesium, sodium, and titanium. Dry-powder extinguishing agents containing sodium chloride granules or copper powder are used on this type of fire. Water can excite these fires and make them worse.

13. Why must a stream of water never be used to put out fires in electrical or electronic equipment before it is completely deenergized?

A stream of water should never be used to put out electrical fires before the power is shut off because electricity can travel along wet decks and electrocute the firefighters.

14. a. Why must special precautions against fire be constantly observed aboard ship?

Special precautions against shipboard fires must constantly be taken because of the concentration of flammable fuels and explosives carried aboard ship.

b. What are some of the key rules for shipboard fire prevention?

The first rule is to keep things shipshape and squared away. Flammable materials must be kept away from torches, cigarettes, and sparking equipment. Firefighting equipment must be well maintained.

c. Why do these rules make sense in your own home?

These rules are good anywhere, including the home.

15. Where are shipboard sprinkler systems used?

Shipboard sprinkler systems are installed in magazines, turrets, ammunition-handling rooms, spaces where flammable materials are stored, and in hangar bays aboard ships that operate aircraft.

16. What should you do if your clothes catch on fire?

If your clothing catches on fire, lie down and roll up in a blanket, coat, or anything that will smother the flames. If nothing is available, roll over slowly, beating out the flames with your hands.

17. What is the purpose of the Navy's oxygen breathing apparatus?

The Navy's oxygen breathing apparatus is a self-contained unit designed to protect the wearer in a place lacking oxygen or containing harmful smoke, gases, vapors, or dust.

18. a. What are the first steps a firefighting party must take in fighting a fire?

The first job of the fire party is to locate the fire. Once the party has located the fire, it must determine the extent the fire has spread to nearby compartments and then set fire boundaries so it will not spread farther.

b. Why do they check bulkheads and decks for heat?

Decks and bulkheads around the fire must be carefully checked for heat to see if the fire is in an adjoining compartment.

19. What is the purpose of a fire boundary?

Fire boundaries are intended to isolate the fire and prevent it from spreading. Ventilation systems must be secured in the area of a fire in order to cut off the oxygen supply to the fire and to limit the spread of smoke and gases to other compartments.

20. What is dewatering?

Dewatering means removing the water that was used for the firefighting.

UNIT 2 Shipboard Organization and Watchstanding

Chapter 1. Shipboard Organization

1. **What are the basic departments in a naval ship?**

   The basic shipboard departments are operations, combat systems (weapons), engineering, supply, and, on ships having manned aircraft, air.

2. **Who has overall responsibility for the safety and operation of a naval ship?**

   The commanding officer has ultimate responsibility for the safety and operation of a naval ship.

3. **What are the main tasks of the executive officer?**

   The XO is responsible for all matters relating to personnel, ship's daily routine, and discipline in the ship.

4. **What is the basic responsibility of the ship's navigator?**

   The navigator is responsible to the CO for the safe navigation and piloting of the ship. The navigator keeps the CO, XO, and officer of the deck advised on the ship's location and maintains a position plot by celestial, visual, electronic, or other navigational means. He or she must study all charts and other sources of information before entering pilot waters and give careful attention to the course of the ship and the depth of water when near land or shoals.

5. **Why are the battle stations of the CO and XO separated?**

   The battle stations are separated so both the CO and XO are less likely to be incapacitated or killed at the same time.

6. **What is the basic task of a department head?**

   The department head is the representative of the CO for all matters related to his or her department. Except in staff departments, he or she is a line officer in the chain of command. Department heads report directly to the XO for administrative matters, and directly to the CO on matters in their departments affecting overall readiness of the ship, while keeping the XO informed of such reports.

7. **What is the basic responsibility of the operations officer?**

   The operations officer collects, evaluates, and disseminates combat and operational information wherever needed in the command. He or she also is responsible for operations of the ship and assigned airborne aircraft.

8. **What is the primary responsibility of the communications officer?**

   The communication officer is responsible for visual and electronic communications and all the communications equipment. He or she is also responsible for the routing of all messages in the ship.

9. **What type of ship has a combat systems department and combat systems officer?**

   Ships mainly concerned with ordnance or aircraft have a combat systems department headed by a combat systems officer.

10. **What is the basic responsibility of the first lieutenant?**

    The first lieutenant directs deck evolutions and the care of the ship's exterior.

11. **What is the basic responsibility of the engineering officer?**

    The engineering officer is responsible for the operation, care, and maintenance of all propulsion and auxiliary machinery, generators, switchboards, and wiring.

12. **In what kinds of ships would the manning document call for a reactor department and reactor officer?**

    Nuclear-powered ships have a reactor department headed by a reactor officer.

13. **What are the tasks of the air officer?**

    The air officer, on ships with an air department, directs launching and landing operations, and the handling of aircraft. He or she is responsible for crash salvage operations and aircraft firefighting. Also, he or she is in charge of aircraft-handling equipment such as elevators, catapults, and arresting gear; he or she handles the care, stowage, and issue of aviation fuels and lubricants.

14. **What are the duties of the supply officer?**

    The supply officer is the staff corps officer responsible for ordering, receiving, storing, issuing, shipping, selling, transferring, accounting for, and maintaining all stores and spare parts in the command. He or she is in charge of the equipment in the supply department such as forklift trucks, computers, ice cream machines, and vending machines. He or she is in charge of the general mess and food preparation in the command. He or she manages all the ship's services—laundry, barber shop, tailor shop, ship's store, snack bar—and the supervision of personnel who care for officers' spaces. He or she is in charge of disbursing pay and maintaining the pay records of all personnel in the command.

15. **On what matters does the medical officer advise the commanding officer?**

    The medical officer advises the CO in all matters affecting health of personnel on board.

16. a. **What organization is the basic unit of personnel on board ship?**

    The basic unit of personnel on board ship is the division.

    b. **What is the title of the senior officer of this unit?**

    The division officer heads this organizational unit.

17. **Why is the division officer's job important?**

    The division officer is the first commissioned officer in the chain of command over enlisted personnel; therefore, he or she must serve as the guide, leader, counselor, and supervisor of his or her subordinates.

18. What publication contains the administrative, operational, and emergency bills of the command?

The *Ship's Organization and Regulations Manual* contains these bills.

Chapter 2. Watches

1. **a. What is a "watch"?**

   Watch in the Navy is a word with several meanings. It sometimes refers to the location of the person on watch (for example, the bridge watch or comm watch), or to his or her *watch section* (for example, port or starboard, first or second). It may also refer to the individual on watch, such as the lookout watch. Watches take precedence over all normal duties and jobs that a person must routinely do aboard ship or a shore station.

   b. What is meant by "dogging" a watch?

   Traditional shipboard watches are dogged (divided) on the evening watch (1600–1800 and 1800–2000) into two two-hour watches in order to allow watchstanders to get their evening meal and to rotate the watch so people are not standing the same watch every day.

2. **a. How long does a traditional shipboard watch last?**

   Traditional shipboard watches are normally four hours long, except for the two 1600–1800 and 1800–2000 dogwatches in the early evening.

   b. A typical shore station watch?

   Shore station watches are normally eight or twelve hours long. They are usually less demanding and not so frequently stood.

3. **What is meant by "relieving the watch on time"?**

   To relieve the watch on time means to report about fifteen minutes early so that all pertinent information and instructions can be passed on prior to actually relieving/taking over the watch. At night this also allows oncoming topside watch relievers to adjust for night vision.

4. **What are the two basic types of enlisted watches in a topside underway section?**

   The two basic topside underway watches are the deck watches and the navigation watches.

5. **Who is the main enlisted assistant to the OOD?**

   The main enlisted assistant to the OOD is the BMOW (boatswain's mate of the watch).

6. **a. What do lookouts report during their watches?**

   Lookouts report aircraft sightings and all surface sightings of ships, craft, obstructions, and so on. They report on the condition of the ship's navigational lights every half-hour at night.

   b. When should additional lookouts be posted?

   Additional lookouts may be posted during periods of fog or low visibility.

7. **a. What is the purpose of the lifeboat watch?**

   The lifeboat watch is a ready crew mustered for each watch so the ship can launch a boat on short notice.

b. What does it mean to be "on call"?

The watch does not have to remain on the lifeboat station. But it must be up and awake, ready for fast action.

8. What are the duties of the QMOW?

The QMOW maintains the *Quartermaster's Notebook* and assists the OOD in navigational matters. The QMOW is a qualified helmsman.

9. How many duty sections is a ship's crew normally divided into

a. When visiting a foreign port while deployed?

There are normally three in-port duty sections while a ship is deployed overseas.

b. When in U.S. ports and naval bases?

There may be from four to six duty sections while in U.S. ports and naval bases.

10. What name is given to the primary shipboard watch station in port?

The primary watch station in port is the quarterdeck watch. The quarterdeck is located on the main deck of the ship, usually at the head of the gangway over which persons come aboard or leave the ship.

11. Who is the primary enlisted watch assistant of the OOD in port?

The primary enlisted watch assistant of the OOD in port is the petty officer of the watch (POOW).

12. What is the purpose of the security watch and patrols?

These watches may be posted to increase the security of the ship. Duties include being alert for evidence of sabotage, theft, or fire; checking security of weapons magazines; making soundings of tanks and spaces; inspecting damage control fittings; and making hourly reports to the OOD.

13. What is the purpose of side boys?

Side boys are stationed on either side of the quarterdeck to render honors to officials arriving or departing on official ship visits.

14. a. What is the purpose of the barracks security watch?

A barracks security watch is maintained in all barracks for protection against fire, for the safety of personnel and material, and for carrying out routines. It also keeps order and discipline.

b. Why should NJROTC cadets be aware of barracks watch requirements?

NJROTC cadets should be aware of barracks watch requirements because they need to stand such watches when at mini-boot camp and when on visits to naval bases. At such times, NJROTC units are responsible for the security, cleanliness, and discipline of the barracks they occupy.

UNIT 3 Basic Seamanship

Chapter 1. Deck Seamanship

1. **What is the first requirement for those who sail in naval ships?**

   The first requirement of everyone who sails in the ships of the U.S. Navy is seamanship.

2. a. **What is seamanship?**

   Seamanship has three main parts: the art and skill of handling a vessel, skill in the use of deck equipment, and the care and use of various kinds of line, called marlinspike seamanship.

   b. **Which shipboard department is concerned with seamanship as its primary duty?**

   The deck department has seamanship as its primary duty, but all sailors are expected to be seamen.

3. **What is meant by the statement that "one is first a seaman, and a then technician"?**

   Seamanship is the skill that ties every member of the Navy together. Whether an admiral or a seaman, a Navy person wears a uniform that says he or she is familiar with the art of seamanship. The pride with which a person performs seamanship duties will carry over into the specialty ratings.

4. **Which officer is in charge of the deck department?**

   The first lieutenant is the officer in charge of the deck department/division (depending upon the type of ship).

5. **What must a seaman apprentice accomplish in order to advance to pay grade E-3?**

   He or she must satisfy the practical factors involved with marlinspike, deck, and boat seamanship, receive the recommendation of his leading petty officers, and take/pass a written exam on deck seamanship.

6. **What are the main duties of the ship's boatswain?**

   The ship's boatswain is a highly qualified warrant officer specialist in deck evolutions, and is the right-hand assistant to the first lieutenant.

7. **What is marlinspike seamanship?**

   A marlinspike is a tapered steel tool used for separating strands of wire. It is the symbolic tool of the seamanship trade. Marlinspike seamanship concerns the use and care of fiber line and wire rope at sea, including the knotting, splicing, and fancywork done with rope, twine, and cord.

8. a. **What is rope?**

   Rope is a general term used for both fiber and wire.

b. When does the term line come into use in the Navy?

In the Navy, fiber rope is called line after it has been uncoiled and cut for use.

c. What materials is line made from?

Line is made from either natural fibers of various plants or synthetic fibers such as nylon or Kevlar.

9. **a. What is the strongest of the natural fibers?**

The strongest of the natural fibers is manila.

b. What is its principal use aboard Navy ships?

Aboard Navy ships it is mainly used for personnel transfers at sea.

10. **a. Why is nylon line the most common kind of line used in the Navy today?**

Nylon line is commonly used in the fleet today because it is much stronger and lasts longer than manila since it does not rot or age as rapidly. It is also less bulky and more flexible, practically waterproof, and resists marine fungus growths.

b. What is a disadvantage of nylon line?

Disadvantages are that it stretches more than manila, especially when wet, and will snap like a rubber band when it finally does break, making it very dangerous.

11. **What special safety precautions should be observed when handling wire rope?**

Persons handling wire rope should wear leather work gloves and take care not to rub against it, to avoid cuts.

12. **a. How is the length of a line measured?**

Length of line is measured in fathoms, feet, or meters (1 fathom = 6 feet).

b. How is the size of line denoted?

The size of a line is its circumference, measured in inches.

13. **What is the name given to line larger than 5 inches in circumference?**

Line larger than 5 inches in circumference is called a hawser; it is generally used for towing or mooring and for personnel highline rigs.

14. **What is line under 1¾ inches in circumference called?**

Line under 1¾ inches in circumference is called small stuff. It is identified by the number of threads in the line.

15. **What is marline, and what is it used for?**

Marline is two-stranded, left-laid, tarred hemp about the size of household wrapping cord. It is most often used for serving, or covering, a large line for protection from abrasion.

16. **What is seizing stuff?**

Seizing stuff is three-stranded, right-laid line used for serving like marline, though it is stronger.

17. **What is the bitter end of a line?**

The bitter end of a line is the end of the line.

18. **Where are most rope and lines stowed in a ship?**

Most ropes and lines are stowed in the boatswain's locker, a storage compartment usually in the forward part of the ship.

19. **What is the purpose of whipping a line or rope?**

The bitter end of a line should always be whipped to prevent it from unlaying, or fraying.

20. **Why should loose ends of line be whipped or tucked?**

Loose ends on lines should be whipped, cut, or tucked to maintain a smart, shipshape appearance.

21. a. **What is a fid?**

A fid is a pointed, round, tapered wooden tool.

b. **What is it used for?**

It is designed for splicing fiber lines.

22. **What is the difference between a knot, a bend, and a hitch?**

Knots are used to form eyes or to secure a cord or line around an object such as a package. They are permanent and hard to untie. Hitches are used to bend a line to or around an object such as a ring or stanchion. Bends are used to secure lines together.

23. **What is the best knot for securing small stuff around a package?**

The best knot for securing small stuff around a package is the square knot.

24. **What is the bight of a line?**

The bight of a line is a half-loop in the line.

25. **What is the best knot for bending together two lines of different sizes?**

The best knot for bending together two lines of different sizes is the becket bend.

26. **What is chafing gear?**

Chafing gear is a padded sleeve or canvas wrapping placed around lines to prevent wearing on sharp corners and rough surfaces.

27. **What is always the rule when working with lines and wires?**

Safety first is always the rule when working with lines and wires.

Chapter 2. Ground Tackle and Deck Equipment

1. **What is all of the equipment associated with anchoring called?**

   All of the equipment associated with anchoring is called ground tackle.

2. **What is the machinery used to hoist the anchor and its cable called?**

   The machinery used to hoist the anchor and its cable is called the anchor windlass.

3. **What is the large pipe through which the cable passes from the deck to the ship's side called?**

   The pipe through which the cable passes from the deck to the ship's side is called the hawsepipe.

4. **What are the four types of anchors used by the Navy?**

   The four types of anchors used by the Navy today are the patent or stockless anchor; mushroom anchor; lightweight anchor; and two-fluke, balanced-fluke anchor.

5. **Describe a Mediterranean moor.**

   In a Mediterranean moor, a ship usually has the stern moored to a pier, and an anchor out on each side of the bow.

6. **What is the most common anchor in use in the Navy today?**

   The most common anchor in use in the Navy today is the patent or stockless anchor.

7. **What are anchors carried on the ship's bow called?**

   Stockless anchors are also called bower anchors because they are always carried on and used from the bow.

8. **What are the advantages of LWT anchors?**

   The lightweight (LWT) anchor buries itself deep when under strain, so it has better holding power than the stockless. Also, a LWT anchor only half the size of a stockless has the same holding power of that stockless, so the cost of the anchor and the gear to handle it is much less expensive.

9. a. **How many fathoms and feet are in a shot of chain?**

   There are 15 fathoms (90 feet) in a shot of chain.

   b. **How are shots connected to each other?**

   Shots are connected to each other by detachable links.

10. **What is the identifying color scheme of detachable links and shots?**

    The color scheme of detachable links are, in order, red, white, and blue. The number of adjacent links painted white tells the shot number. Each link of the next-to-last shot is painted yellow, and the entire last shot is painted red.

11. **a. How is strain on the chain reported to the bridge?**

    Strain on the anchor chain is reported as light, moderate, heavy or no strain.

    b. What is the common reference used to describe the direction in which a chain tends?

    The common reference used to describe the direction in which a chain tends is by clock direction relative to the bow. (Dead ahead is 12 o'clock, 090°R is 3 o'clock, etc.)

12. **What is the common rule of thumb used to determine the proper amount of chain to be veered in an anchorage?**

    Commonly, about six times the depth of the water is the amount of anchor chain to veer.

13. **What does it mean to "heave in the anchor to short stay"?**

    To "heave in the anchor to short stay" means to haul in the anchor chain to the point where there is no more chain out than necessary to keep the anchor from breaking loose from the bottom, with the chain nearly vertical.

14. **Describe the following:**

    a. Cleat—a device welded to the deck that is used for fastening a wire or line; looks like a pair of projecting horns.

    b. Bitts—pairs of cylindrical steel objects fore and aft of each chock for use in securing mooring lines.

    c. Chock—a heavy fitting with smooth surfaces through which mooring lines are led from bitts to bollards on the pier when a ship is moored.

    d. Bollard—a strong mushroom-shaped fitting on a pier, around which the eye or bight of a ship's mooring line is placed.

15. **What are names of the lines in a standard six-line moor?**

    The standard six-line mooring lines are called, from bow to stern, the bowline, forward bow spring, after bow spring, forward quarter spring, after quarter spring, and stern line.

16. **What is the purpose of breast lines?**

    Breast lines are at a right angle to the ship and control the distance to that part of the ship from the pier. They are called bow, waist, or quarter breast lines.

17. **Why must all naval ships be prepared to tow or be towed?**

    All Navy ships must be prepared to tow or be towed in the event of an emergency.

18. **With respect to cargo handling, what does the term "rigging" include?**

    The term *rigging* is used for all wires, ropes, and chains supporting masts or kingposts (vertical poles), and operating booms and cargo hooks. *Standing rigging* includes all lines that support masts or kingposts but do not move, such as stays and shrouds. *Running rigging* includes all movable lines that run through blocks, such as lifts, whips, and vangs.

19. **What do underway replenishment operations alongside another ship involve?**

    Such operations may involve the transfer of fuel, cargo, ordnance, and sometimes personnel by highline transfer.

Chapter 3. Small Boat Seamanship

1. **With what type of boat will most NJROTC cadets come into contact while on visits to Navy ships and shore stations?**

   Powerboats are the type of boat most NJROTC cadets will encounter while on visits to Navy ships/shore stations.

2. **Identify the following boat parts:**

   a. Hull—largest part of a boat, the part that floats in the water.

   b. Transom—extreme back end of the stern.

   c. Waterline—the line the water makes with the hull.

   d. Pulpit—platform that overhangs the bow and provides room to handle the anchor and forward sail

3. **What are the two types of fuel used in powerboats?**

   Most boats are powered by either gasoline or diesel fuel.

4. **What is the difference between a personnel boat and a gig?**

   A personnel boat is usually intended for the transportation of personnel or light cargo; any boat used by the captain of a ship is his or her gig.

5. **What is the person in charge of a powerboat in the Navy called?**

   The person in charge of a powerboat is called the coxswain.

6. **What forces determine how a boat will handle in any given circumstance?**

   The forces that determine how a boat will handle are the controllable forces such as the propeller and the rudder, and the uncontrollable such as wind and current.

7. **What is the effect of propeller side force on a vessel's stern?**

   Propeller side force tends to move the boat's stern sideways in the direction of propeller rotation—usually to starboard when going ahead, and to port when backing.

8. **When is it most difficult to maneuver a single-screw boat?**

   A single-screw vessel is most difficult to maneuver at very low speeds where rudder effect is minimal and propeller side force is greatest.

9. **In what direction will a single-screw boat be easiest to turn when backing?**

   A single-screw boat will usually back easiest to port, because of the propeller side force in that direction.

10. **When a boat is proceeding ahead and the rudder is put over to one side, what happens to the stern initially?**

    Initially when the rudder is put over, the stern is thrown in the opposite direction by the side force on the rudder.

11. **What happens in respect to the rudder when a propeller starts backing?**

Initially there is not much rudder effect until a boat gathers sternway while backing, and then the suction current hits the rudder with more effect and swings the stern to the side to which the rudder is turned.

12. **When making a landing, at what angle should the boat approach the pier?**

In the absence of external forces, the optimum angle to approach a pier for both port- and starboard-side landings is about 20° with respect to the pier.

13. **On twin-screw boats, in which directions do the two screws turn when going forward?**

On twin-screw boats, the starboard screw is usually right-handed (clockwise) and the port screw is left-handed (counterclockwise).

14. **How does a twin-screw boat handle as compared to a single-screw boat?**

A twin-screw boat is usually easier to handle than a single-screw boat, because placing the screws in opposition to each other allows the coxswain to double the turning force exerted on the boat.

15. **With what is boat etiquette concerned?**

Boat etiquette is concerned with customs, honors, and ceremonies observed by the boat coxswain and crew.

16. **By whom are boat salutes rendered on board a boat?**

Boat salutes are rendered by a boat coxswain and by the senior officer embarked.

17. **What is the custom for embarking officers and enlisted personnel on a boat?**

The basic custom for boarding a boat is that juniors board first and take the most forward seats. On leaving, seniors depart first, followed by junior personnel.

18. **When should the national ensign be displayed from boats?**

The national ensign is displayed from boats of the Navy when under way during daylight in a foreign port; when ships are required to be dressed or full dressed; when going alongside a foreign vessel; when an officer or official is embarked on an official occasion; when a flag or general officer, a unit or commanding officer, or a chief of staff is embarked; and at such other times as may be prescribed by the senior officer present.

UNIT 4 Marine Navigation

Chapter 1. Introduction to Navigation

1. **What is navigation?**

   Navigation is the art and science by which mariners find their vessel's position and guide it safely from one place to another.

2. a. **What is a chart? How does it differ from a map?**

   A chart is a type of map that provides a picture of the navigable waters of the Earth; it is used by a navigator when plotting courses and finding positions of his or her vessel. A map shows the locations of places on the Earth, particularly land.

3. **What is the terrestrial sphere?**

   It is the round sphere that is the Earth.

4. **What are the imaginary lines that run through the poles around the Earth?**

   They are called meridians.

5. **What name is given to the imaginary line formed by a horizontal plane passing through the center of the Earth, cutting every meridian in half?**

   The equator.

6. **What is a great circle?**

   A great circle is any circle formed on the Earth's surface by passing a plane through its center, dividing it into two halves.

7. **What is the shortest distance between two points on a globe?**

   The shortest distance between two points on a globe is along a great circle.

8. **What are the lines going around the Earth parallel to the equator called?**

   The lines going around the Earth parallel to the equator are called parallels.

9. a. **What is the circumference of a circle?**

   The circumference of a circle is the distance around the perimeter of the circle.

   b. **How many degrees does it have?**

   It has 360°, regardless of the size of the circle.

10. **Into what units may degrees be divided?**

    Degrees may be divided into 60 minutes (′), and each minute can be divided into 60 seconds (″).

11. **a. Where is the reference place for the prime meridian?**

    The prime meridian is that meridian that goes through the Royal Observatory at Greenwich, England.

    b. What is the meridian exactly opposite the prime meridian on the other side of the globe called?

    The meridian continued opposite the prime meridian there is called the International Date Line.

    c. What two hemispheres does this great circle line create?

    These two meridians form the Eastern and Western Hemispheres.

12. **Using an atlas or other reference book, locate the following places in terms of their latitude and longitude, in degrees and minutes:**

a. Washington, D.C.	38°54'N, 77°01'W
b. Chicago, Illinois	41°53'N, 87°38'W
c. San Diego, California	32°43'N, 117°09'W
d. Honolulu, Hawaii	21°19'N, 157°52'W
e. Colon, Panama	38°54'N, 77°01'W
f. Gibraltar	36°09'N, 5°21'W
g. Baghdad, Iraq	33° 30'N, 44°23'E
h. Tokyo, Japan	35°42'N, 139°46'E
i. Sydney, Australia	34°00'S, 151°30'E

13. **How are distances measured at sea? Compare a land or statute mile with a nautical mile.**

    Distances at sea are measured in nautical miles. A nautical mile is about equal to 1 minute of arc measured on a great circle, and about $1^1/_7$ statute or land miles in length. A nautical mile is about 6,076 feet, and for most Navy problems is considered to be 2,000 yards. A land mile is 5,280 feet, or 1,760 yards.

14. **How is nautical direction or course measured?**

    Nautical direction or course is measured from either true or magnetic north on a compass card using 360° of arc.

15. **What are the true bearings of the cardinal points, N, E, S, W?**

    The true bearings of the cardinal points are: N, 000°; E, 090°; S, 180°; and W, 270°.

16. **Compare and contrast a true bearing, a magnetic bearing, and a relative bearing.**

    A true bearing is the direction of an object from the observer measured clockwise from true north. A magnetic bearing is the direction of an object from the observer measured clockwise from magnetic north. A relative bearing is the direction of an object from the observer measured clockwise from the ship's head (bow).

17. **If a ship is on course 050°T, and a lookout sights an object on the starboard beam at 090°R, what is the true bearing of the object?**

    The true bearing is 140°T (050° + 090°R = 140°T)

18. **If a lookout sights a merchant ship at 285°R, forward of the port beam, and own ship's course is 135°T, what is the true bearing of the contact?**

The true bearing is 060°T (285° + 135°T = 420°– 360° = 060°T)

19. **What does the hydrographic information on a chart consist of?**

Hydrographic information on a chart includes shading to show water areas and land outlines, as well as features such as water depth and overhead obstructions, and symbols for navigational aids.

20. a. **Which projection is used for almost all nautical charts?**

The Mercator projection is used for most map and nautical chart projections.

b. **Where is the greatest distortion on this kind of projection? Why?**

The greatest distortion on this kind of projection is at the poles. The farther from the equator, the greater the distortion because of the method of projection.

21. **What is meant by the scale of a chart?**

The scale of a chart refers to a measurement of distance. It is a comparison of the actual geographical distance or size of a landform with that shown on the chart itself.

22. **What tool is used to determine distance on a chart with a linear scale?**

Linear distances are determined by "walking" a pair of dividers between two points on it.

23. a. **What are soundings?**

Soundings are measured depths of water given in feet, fathoms, or meters.

b. **How are they shown on a nautical chart?**

They are shown by means of italicized figures on charts in water areas.

24. **What is a navigational fix?**

A fix is an accurate position determined without reference to any previous position, using visual, electronic, or celestial observations. A fix position is the intersection of two or more lines of position obtained at the same time.

25. **What are lines of position?**

Lines of position are lines along which a vessel must be located. They are obtained by taking visual bearings to objects whose position is known and printed on a chart of the area. They can also be obtained by electronic means such as radar or by observation of celestial bodies.

26. a. **What is piloting?**

Piloting determines the position and directs the movements of a ship by using landmarks, constructed navigational aids, and water depth readings made by a fathometer.

b. **When is it used?**

Piloting is used when entering or leaving port and in coastal navigation.

27. **What kind of shipboard device is used to determine depth of water?**

A fathometer or echo sounder is used to determine the depth of water in which a ship is operating.

28. a. **What are some of the advantages of radar?**

Radar's chief advantage is that it does not require external transmitting stations. It can be used at night and during periods of low visibility. A fix can be obtained from a single object. It is very accurate and rapid. It also can be used to locate and track other vessels and storms, so it is important for ship safety as well.

b. **What is radar's chief disadvantage?**

Radar's chief disadvantage is that the maximum range of most navigational radars is currently limited to a bit more than line-of-sight.

29. a. **What is the newest U.S. worldwide satellite navigation system called?**

The newest U.S. satellite navigation system to have been developed is the global positioning system (GPS), which can provide three-dimensional fixes accurate to at least ± 10 meters everywhere on Earth.

b. **How is it affecting the practice of marine navigation?**

GPS has revolutionized the practice of navigation. GPS is now the basis of operation of a wide variety of electronic plotters and high-tech marine navigation systems. It has an amazing variety of civil and commercial applications, including navigation and tracking systems for boats, cars and trucks, aircraft navigation and landing systems, surveying, and much more. Many cell phones and laptop computers now come equipped with GPS-based navigational systems for personal use. In addition to position-finding, military applications now include guidance systems for many of today's precision weapons, cruise missiles, and UAVs.

30. **What does the ship's inertial navigation system do?**

The ship's inertial navigation system (SINS) uses highly precise gyroscopes along with a computer to track motion with great accuracy, and produce extremely accurate and continuous dead reckoning positions for up to seven to ten days or more.

31. a. **What is celestial navigation?**

Celestial navigation is a system of locating position by means of sightings of heavenly bodies (the Sun, Moon, stars, and planets).

b. **What instrument is used to obtain celestial sights?**

The sextant is the navigation instrument used to obtain precise altitudes for celestial bodies.

32. **What is meant by dead reckoning?**

Dead reckoning means determining a position from the direction and distance traveled from a known starting point.

Chapter 2. Aids to Navigation

1. a. **What are the four main categories of constructed navigational aids?**

   The four main categories of constructed navigational aids are lighthouses, light towers, navigation lights, and buoys and daybeacons.

   b. **What is their purpose?**

   Aids to navigation are specially constructed to assist in the safe navigation of vessels.

2. **What are light lists?**

   Light lists are publications that contain the details of lighted and unlighted navigational aids. They are available for purchase in most nautical supply stores.

3. **What are the three principal characteristics of navigational lights? Briefly describe each.**

   The three principal characteristics of navigational lights are fixed, flashing, and occulting. *Fixed* lights burn steadily. *Flashing* lights show single flashes of light at regular intervals, with the duration of light less than the duration of darkness. *Occulting* lights are totally off at regular intervals, the duration of light always being greater than the duration of darkness.

4. **What is the visibility of a light?**

   The visibility of a light is the distance, in nautical miles, a mariner can see the light at night.

5. **What is the purpose of a lighthouse?**

   Lighthouses are placed wherever a powerful light, called a *primary light*, may be of assistance to navigators, or where very dangerous water requires a warning beacon of long-range visibility. Since the range of visibility of a light increases with its height, the main purpose of a lighthouse is to increase the height of a light above sea level.

6. **What is a light tower?**

   A light tower is a structure on stilts embedded in the ocean bottom. It is fitted with a powerful primary navigational light.

7. **What is the purpose of buoys?**

   Navigational buoys are moored, floating markers placed to guide ships and boats safely along channels and in and out of ports. They also warn vessels away from hidden dangers and lead them to anchorage areas.

8. **Why must buoys alone not be depended upon for piloting?**

   Buoys must never be depended upon alone because they may drag their moorings in heavy weather or may be set adrift if hit by a passing ship. Lights on them may go out, and whistles, bells, and gongs may fail to function.

9. What are the eight main types of buoys?

There are eight main types of buoys used in U.S. inland waters, described as follows:

Spar buoys are upright wooden poles, or tubes of steel, often used to mark obstructions.

Can buoys are shaped like a cylinder, much like an oil drum.

Nun buoys have a conical shape.

Bell buoys have a framework supporting a bell.

Whistle or horn buoys are similar to a bell buoy in shape but they carry a whistle sounded by the sea's motion or horn that is sounded at regular intervals by mechanical or electrical means.

Gong buoys are similar to a bell buoy in shape but it has a series of gongs, each with a different tone, with hammers that are moved by the motion of the sea.

Lighted buoys carry batteries or gas tanks and have a framework that supports a light.

Combination buoys are buoys in which a light and sound signal are combined, such as a lighted bell, gong, or whistle buoy.

10. a. How are buoys colored in the United States?

In the inland waters of the United States, red buoys mark the right side of a channel, and green buoys the left side, coming from seaward. Green and red horizontally banded buoys, called preferred-channel buoys, mark obstructions or channel junctions. Red and white vertically striped buoys, called safe-water buoys, mark the middle of a channel or fairway. White-painted buoys mark anchorage areas. Buoys with black and white horizontal stripes are sometimes used to mark fish trap areas. A white buoy with a green top usually designates a dredging area. A yellow buoy signifies a quarantine anchorage, where ships go to await customs clearance. Cylindrical white buoys with orange markings are informational buoys.

b. What is the jingle used as a reminder for red buoys?

The jingle "red-right-returning."

11. a. How are buoys numbered?

Red buoys marking the right side of a channel bear even numbers, starting with the first buoy from seaward. Green channel buoys, to the left of the channel coming from seaward, have odd numbers.

b. How are channel buoys lighted?

Red lights are used only on red channel buoys. Green lights are only for green channel buoys. White lights are the only lights used on preferred-channel (junction) or safe-water (mid-channel) buoys.

12. What is a daybeacon?

A daybeacon is an unlighted structural aid to navigation, usually with a triangular daymark on top of it.

13. a. What is a range on a channel?

Two daybeacons, located some distance apart on a specific true bearing, make up a daybeacon range. When a ship reaches a position where the two beacons are seen exactly in line, the ship is "on the range."

b. Where are ranges used a great deal for piloting?

Much steering through the Panama Canal is done on ranges. Similarly, ranges are used often on the Columbia River in the Pacific Northwest.

14. **a. What is the name of the inland channel in which light-draft vessels can navigate from the Chesapeake Bay almost to the Mexican border without going into the ocean?**

The Intracoastal Waterway.

b. What is the significant color identifying all buoys, daybeacons, or light structures along this channel?

Every buoy, daymark, or light structure along the Intracoastal Waterway has part of its surface painted yellow. Buoys have a yellow band at the top. Daybeacons and other structures have a band or border of yellow.

Chapter 3. Time and Navigation

1. **Why do you suffer jet lag if you take a long east-west plane flight?**

   Jet lag is a term used to describe the effects of rapid time zone changes on the body because of a long plane flight. It occurs because your body is used to reckoning time based on the relationship of the Earth and the Sun. If you are traveling in a westerly direction, your day becomes considerably longer, and shorter if you are traveling easterly. It often takes a day or two to get one's body adjusted to the new time schedule.

2. a. **What is a chronometer?**

   A chronometer is an extremely accurate timepiece used in navigation.

   b. **To what time is a ship's chronometer usually set?**

   The ship's chronometer is normally set to Greenwich Mean Time (GMT), the basic time used in fixing position by celestial navigation.

3. **What do A.M. and P.M. mean?**

   A.M. means *ante meridiem*, or before the middle of the day (noon). P.M. means *post meridiem*, or after the middle of the day.

4. **Why do the Navy and other armed services use the twenty-four hour clock?**

   The armed services use the twenty-four-hour clock to avoid confusion in message communications and to avoid error in directions or orders.

5. **What would the following times be on the twenty-four hour clock?**

   a. 8:30 A.M.—0830
   b. 5:45 P.M.—1745
   c. 11:15 P.M.—2315
   d. Midnight—0000/2400

6. a. **How did telling time by ship's bell originate?**

   Ship's bell time started as a means of keeping track of time and informing the crew of the passage of time with the use of an hourglass. The sand in the hourglass ran out every half hour, requiring another bell to be struck.

   b. **What is the maximum number of bells struck?**

   The number of bells struck increases by one every half-hour, to a total of eight bells every fourth hour. Then the sequence starts over again.

7. **What is the basic relationship between longitude (arc) and time?**

   The basic relationship between arc (longitude) and time is that 1° of longitude is equivalent to 4 minutes of time as the Sun "goes around the Earth."

8. **Why does the length of each solar day vary slightly?**

   There is a slight variation in the length of each solar day because the Earth travels around the Sun in an elliptical orbit rather than a perfect 360° circle; the Earth is inclined to the plane of its orbit; and its speed in orbit varies. The length of the solar day, therefore, reckoned by a complete rotation of the Earth with regard to the actual Sun, varies by about 30 minutes over the course of a year.

9. **What is mean solar time?**

   Mean solar time is average solar time. This is calculated on the basis of an exact 360° trip of the Sun around the Earth every twenty-four hours.

10. a. **How have people made time setting and time keeping more practical?**

    Standard time zones have been established to make time-setting and time keeping more practical.

    b. **How many degrees of longitude are in each standard time zone?**

    There are 15° of longitude in each time zone. This may vary somewhat on land to make it easier for the people living there.

11. **How is each time zone identified?**

    Each time zone is identified by an alphabetical suffix letter, and by a negative or positive number from 1 to 12, east or west of the prime meridian, called the zone description (ZD).

12. **How do the dates on each side of the International Date Line differ?**

    The International Date Line separates one day from the next on the 180th meridian. On both sides of the line, the time of day is the same, but west of the line the date is one day later than it is to the east of the line.

13. **What is daylight savings time?**

    Daylight savings time is zone time set ahead one hour to extend the time of daylight in the evening in summer. This is done for convenience ashore in some localities; it is not used in navigation.

14. **What are the four standard time zones in the continental United States? Identify each with its alphabetical suffix and numerical ZD.**

    Eastern Standard Time (EST), Romeo, +5
    Central Standard Time (CST), Sierra, +6
    Mountain Standard Time (MST), Tango, +7
    Pacific Standard Time (PST), Uniform, +8

15. **Convert the following zone times to Greenwich mean times:**

    a. 1200 at San Francisco (ZD = +8)—2000Z
    b. 1700 at Norfolk (ZD = +5)—2200Z
    c. 0600 at Rome, Italy (ZD = –1)—0700Z

16. **Convert the following Greenwich Mean Times to zone times at the locations in the previous question:**

a.	GMT 0800:	San Francisco	0000U
		Norfolk	0300R
		Rome, Italy	0700A
b.	GMT 1600:	San Francisco	0800U
		Norfolk	1100R
		Rome, Italy	1700A

17. **What are the date/time groups for the following:**

a. 0835 local time in Norfolk, Virginia, on 23 March 2010? 231335Z MAR 10

b. 7:30 P.M. in San Diego, California, on 17 May 2010? 180330Z MAY 10

UNIT 5 Rules of the Road and Maneuvering Board

Chapter 1. Nautical Rules of the Road

1. **a. What are the two sets of rules governing the nautical rules of the road?**

   The two sets of rules governing the nautical rules of the road are the international rules and the U.S. inland rules.

   b. Where is each in effect?

   The international rules must be obeyed by all vessels of all nations that travel on the high seas. The U.S. inland rules must be obeyed by all vessels of all nations that navigate the bays, harbors, and rivers of the United States.

2. **What is the purpose of the rules of the road?**

   The purpose of the rules of the road is to prevent ship collisions.

3. **What designation is given to any vessel propelled by machinery?**

   Any vessel propelled by machinery is designated as a power-driven vessel, even if it may also have sails up.

4. **a. When is a vessel "under way"?**

   A vessel is "under way" when not at anchor, moored, or aground.

   b. If a ship is stopped in the water, but not anchored, what is its status?

   If a ship is stopped in the water, but not anchored, it is "under way but with no way on."

5. **a. What running lights must a vessel show at night?**

   When under way at night, all power-driven vessels must have running lights on. A white light in the fore part of the ship is called the *masthead light*. A white light on an after mast is called the *range light* (required on ships 50 meters or more in length), and it must be at least 5 meters higher than the masthead light. The port side light is red and the starboard side light is green; a white stern light must also be shown.

   b. What is the purpose of these lights?

   The purpose of these lights is to warn vessels of the presence or approach of other vessels and to show in which direction they are going.

6. **Why is a pilot required for large ships in most harbors?**

   A pilot is required in most harbors because he or she is thoroughly familiar with the harbor, berthing instructions, and the handling of local tugboats.

7. **a. What anchor lights must be shown according to the rules?**

   Vessels less than 50 meters in length at anchor must show an all-around white light forward. If more than 50 meters long, the ship must also display a similar light aft.

b. What day shape is used to show that a vessel is at anchor?

In daytime, vessels over 7 meters long at anchor must display a black ball day shape. It is displayed in the forward part of the vessel, usually from a crosstree of the mast, where it is clearly visible from all directions.

8. **a. What is meant by the term "not under command"?**

The term "not under command" refers to ships and craft that are disabled and cannot operate in accordance with the rules.

b. What are the lights and day shapes that indicate this condition?

At night, such a vessel must show two red lights, one over the other. If a power-driven vessel with headway, it must show the not-under-command lights instead of the masthead light, as well as it sidelights and stern light. During daylight, a merchant ship hoists two black balls, and a naval vessel hoists the "5" flag in addition to the black balls in international waters.

9. **Why can some U.S. naval vessels not comply exactly with the rules of the road? Give some examples.**

Some naval vessels cannot comply exactly with the rules regarding lights because of their special construction. Such variations are provided for by U.S. law. Examples include: Horizontal separation of the masthead and range lights on destroyers and smaller ships is often less than prescribed; the white lights on aircraft carriers are usually on the superstructure and off center; special lights such as speed lights, carrier landing lights, and colored recognition lights are shown on naval vessels in certain operations; naval vessels may run without lights during darkened ship exercises (but the OTC will normally order lights turned on if a merchant ship approaches the naval formation in peacetime); special lights and day shapes are required for minesweepers when they are engaged in sweeping operations; U.S. submarines are authorized to display an amber-colored rotating light when running surfaced, in addition to other required lights.

10. **What is the basic difference between whistle signals in inland and international rules?**

The basic difference is that under inland rules a whistle signal is a signal of intent, while in international waters, whistle signals are signals of execution.

11. **If a ship does not understand a whistle signal, or considers a proposed maneuver dangerous, what signal must that ship sound?**

When a ship does not understand a whistle signal, or considers a proposed maneuver dangerous, it must sound the danger signal of five or more short, rapid blasts.

12. **What are the three basic possible situations when there may be risk of collision when two ships are in sight of each other?**

The three basic situations are meeting, overtaking, and crossing. The situation depends upon the relative position of the two ships when they first sight each other.

13. **Under the rules, what are two vessels in an approach situation called, depending on their relative position?**

Under the rules, the vessel that must keep out of the way of the other is called the give-way vessel, and the other vessel, which is required to maintain course and speed, is called the stand-on vessel.

14. **When a bearing of an approaching vessel remains constant (does not change significantly), what situation is developing?**

When the bearing of an approaching vessel remains constant or nearly so as the range decreases, the two vessels are on a collision course.

15. a. **In a meeting situation, what is the responsibility of both vessels?**

In a meeting situation, both vessels are give-way. In all waters, power vessels meeting head-to-head or nearly so are required to pass port to port.

b. **What are the preferred maneuvers?**

If maneuvering is required, both vessels must alter course to starboard so as to pass port to port.

16. **What is the rule in a crossing situation?**

In a crossing situation, the power vessel having the other to starboard is the give-way vessel. The give-way vessel is required to maneuver if necessary to avoid crossing ahead of the stand-on vessel. This maneuver may mean reducing speed, stopping, altering course to starboard, or backing down.

17. **What is the rule in an overtaking situation?**

In an overtaking situation, the overtaking vessel is the give-way vessel and the overtaken vessel is the stand-on. The overtaking vessel must keep clear of the overtaken vessel.

18. a. **What is the inland rules signal for approaching a blind bend in a channel?**

In approaching a blind bend in a channel, a vessel must keep to the starboard side, and must sound a prolonged blast on the whistle if it is unable to see at least a half-mile ahead.

b. **What is the inland rules signal for leaving a berth (or changing status)?**

A vessel leaving its dock or berth (change of status) sounds a prolonged blast, whether or not vision is obscured beyond the slip or berth.

19. **What term defines a situation in which collision is imminent?**

The term defining a situation in which collision is imminent is "in extremis."

20. **Under what conditions must fog signals be sounded?**

Fog signals must be sounded in any condition that reduces visibility to under the range of a sidelight in any direction, including fog, falling snow, mist, or heavy rain, in both day and night and under way or anchored.

21. What kinds of signals may be sounded or shown to call attention to a vessel in special need of assistance?

Under the inland rules, the daytime or night distress signals may be a continuous sounding of any fog signal apparatus, or the firing of a gun; flames from a burning tar or oil barrel may also be shown. Under international rules, the following signals may be used:

- A gun or other explosive signal fired each minute
- Continuous sounding of any fog signal
- Red rockets or red star shells fired at short intervals
- Sending SOS by Morse code
- Sending Mayday by voice radio
- Flaghoist flying November Charlie (NC)
- Flaghoist flying a square flag with a ball or anything resembling a ball either above or below it
- Flames from a burning tar or oil barrel
- Rocket parachute flare or hand flare showing a red light
- Smoke signal giving off orange-colored smoke
- Slowly and repeatedly raising and lowering arms outstretched to each side

Chapter 2. The Maneuvering Board

1. **What the maneuvering board used for?**

   The maneuvering board is used to construct a relative motion plot, whereby the motion of other vessels and the wind relative to your own vessel can be plotted as an aid to avoid collisions and determine the true wind. It can also be used to solve many other more advanced types of problems.

2. **At sea, what is the reference for what other vessels and the wind are doing relative to your vessel?**

   At sea, the reference for what other vessels and the wind are doing relative to your vessel is your boat or ship.

3. a. **What is normally placed at the center of a maneuvering board to serve as the reference, and how is it labeled?**

   Normally your own vessel is plotted as a point at the center or pole of the maneuvering board, to serve as the reference for the plot. It is labeled "R."

   b. **What does vector *er* represent on a maneuvering board?**

   Vector *er* represents the reference vessel's course and speed. When your own vessel is at the center of the maneuvering board, the vector *er* represents your boat's or ship's course and speed.

4. **What does the relative motion line (RML) in a CPA-type problem indicate?**

   The relative motion line on a maneuvering board plot represents the track the maneuvering vessel or object will follow relative to your vessel.

5. a. **What is ship *M*'s speed of relative movement?**

   20 knots

   b. **What are the bearing and range of the CPA?**

   217°(±2°), 5,100 yards (±100 yards)

6. a. **What is the CPA of ship *M*?**

   327° (±2°), 6,000 yards (±100 yards)

   b. **What is the course and speed of ship *M*?**

   089° (±2°), 28.5 knots (±.5 knots)

7. **Your own ship is on course 090°, speed 10 knots. You sight a ship *M* on course 270°, speed 15 knots. What are the magnitudes and directions of the following vectors:**

   a. The *er* vector 090°, 10 knots
   b. The *em* vector 270°, 15 knots
   c. The *rm* vector 270°, 25 knots

8. **Your own ship is on course 025°, speed 12 knots. You sight a ship *M* on course 000°, speed 15 knots. What are the magnitudes and directions of the following vectors?**

   a. The *er* vector 025°, 12 knots
   b. The *em* vector 000°, 15 knots
   c. The *rm* vector 310° (±2°), 6.6 knots (±.5 knots)

9. **Your own ship is on course 122°, speed 15 knots. At 0400 a target ship, *Skunk M*, bears 144°, 27,000 yards. *Skunk M*'s course is 020°, 30 knots. What will be the bearing and range of *Skunk M* at CPA?**

   086° (±3°), 14,500 yards (±300 yards)

10. **Your own ship is on course 285°, speed 18 knots. At 0800 a target ship *M* bears 310°, 9,000 yards. The ship's course is 215°, speed 15 knots. What will be the bearing and range of *M* at CPA?**

    242° (±2°), 2,400 yards (±100 yards)

11. **You are aboard a boat heading 060°, speed 25 knots. Your anemometer indicates the relative wind to be from 330°R at 35 knots. What are the direction and speed of the true wind?**

    From 347° (±2°), 18.5 knots (±.5 knots)

12. **You are on a boat heading 350°, speed 15 knots. The true wind is 10 knots from 240°. What are the direction and speed of the relative wind?**

    From 321° (±2°), 15 knots (±.5 knots)

UNIT 6 Naval Weapons and Aircraft

Chapter 1. Introduction to Naval Weapons

1. **Why is naval weaponry an important part of both strategic and tactical planning at the highest levels of government?**

   The ability to project naval power far inland makes naval weaponry an important aspect of both the strategic and tactical planning done by national political and military leadership. Naval weapons have played and will continue to play an important role in achieving victory in battle, both on land and sea.

2. **What capability did naval gunfire provide in naval warfare when it was introduced?**

   Naval gunfire enabled destruction of an enemy ship at a distance, without necessarily resorting to grappling hooks and a hand-to-hand, board-and-capture operation.

3. **What factors increased naval gun range to 9 miles by the time of World War I?**

   By the time of World War I, rifled barrels and detailed studies of trajectory and ballistics increased gun ranges to 9 miles.

4. **What major missions remained for the battleship after the emergence of the carrier as the principal fleet unit in World War II?**

   After Pearl Harbor the principal tasks remaining for the battleship were naval gunfire support during an amphibious assault, and to serve as defensive gunnery platforms fitted with extensive antiaircraft armaments to protect the carriers.

5. **What types of naval weapons have received the greatest attention since World War II?**

   Since World War II, naval weapons development has concentrated on improved lightweight, rapid-fire guns; a whole arsenal of surface and air-launched missiles; and sophisticated electronic fire-control radars, weapons control systems, sonars, and guidance systems.

6. **What are the three most significant results of the increased ranges of seaborne weapons?**

   The three most significant results of the increased range of seaborne weapons have been an increase in the importance of naval firepower in land warfare, an increase in the effectiveness of naval as compared to land-based firepower, and an increase in the importance of amphibious warfare.

7. **What tactical requirement has resulted from the increased destructive range of nuclear weapons?**

   The increased lethal range of nuclear weapons has required the introduction of dispersion tactics to minimize combat damage.

8. **What is the main consideration that governs the selection of weapons for a ship?**

   The main consideration governing selection of a ship's weapons is its combat missions.

9. **What kinds of weapons are used to provide protection for an entire formation of ships?**

   Weapons used to provide protection for an entire formation are called area defense weapons.

10. **What kinds of weapons provide self-protection for a single ship?**

    Point-defense weapons provide protection for single ships.

11. **Briefly, what must a weapon system include?**

    A weapon system must include elements that detect, locate, and identify the target; elements that deliver or initiate delivery of the destructive payload of the weapon to the target; elements of fire control that guide a weapon and set the fuse of its warhead; and a destructive payload capable of destroying the target, either on contact or when in close proximity.

12. **What is the advantage of having a combat system like Aegis within a force of ships?**

    This system integrates all ship's batteries and can operate them in coordination with those of other ships in company. This way, each ship's weapons become part of the total weapons array available to the task force commander. He or she can designate the ship or ships best equipped and positioned to engage the target.

Chapter 2. Naval Guns

1. **What is the purpose of rifling in a gun barrel?**

   Rifling causes the projectile to spin in flight, keeping the projectile from tumbling after it leaves the barrel and ensuring greater accuracy and range.

2. a. **How is the caliber of a gun measured?**

   The caliber of a gun is its inside or bore diameter measured from the tops of the rifling lands (high edge of the rifling grooves). Caliber is expressed in inches or millimeters.

   b. **How is the caliber of guns with 3-inch barrels and larger expressed?**

   The length of the barrel of 3-inch guns and larger is usually expressed in calibers that are equal to the length of the gun in inches divided by the diameter of the gun in inches.

3. a. **On what does the effective range of a gun depend?**

   The effective range of a gun is dependent on the initial velocity imparted to the projectile by the propellant, the weight of the projectile, the caliber of the gun, and the ability of the sensors and fire-control systems to detect and track the target.

   b. **What is the purpose of the RAP innovation in naval gun projectiles?**

   The rocket assisted projectile (RAP) has a solid propellant rocket motor, which is intended to extend the ranges of larger naval gun projectiles.

4. a. **What gun is carried by most post–World War II destroyers and cruisers?**

   Most post–World War II destroyers and cruisers have 5"/54 and 62-caliber automatic, dual-purpose, single-mount guns.

   b. **What is the range of this gun in miles?**

   This gun has a maximum range of about 13 nautical miles with a 72-pound shell.

5. a. **What is the close-in shipboard weapon in wide use today?**

   The Phalanx close-in weapon system is a 20-mm gun system designed to be a ship's last-ditch weapon against an antiship cruise missile. The system is a complete unit containing search and tracking radar, a fire-control system, and a magazine. It fires three thousand rounds per minute to a range of about 1 mile from a six-barrel Vulcan Gatling gun. Later modifications use a magazine of missiles vice the gun.

   b. **How does it operate?**

   The Phalanx search radar input is fed directly into a computer that will identify the target, lock the gun or missiles on, and fire until the target is destroyed; it will then automatically cease firing and begin searching for another target.

6. **What are the two principal components of a round of gun ammunition?**

   The principal components of a full round of gun ammunition are a propelling charge (propellant) and a projectile. The propelling charge develops the thrust that ejects the projectile at the desired velocity from the gun muzzle. The projectile is the payload, which includes the detonating fuse, the booster, and the burster charge.

7. **From the standpoint of the propellant, what kind of gun ammunition is used most in the active fleet today?**

   Today, most naval guns on active ships use either semifixed or fixed-case ammunition. Semifixed ammunition consists of a projectile and separate case charge loaded one after the other. Fixed ammunition refers to a round in which the projectile and powder case are attached together, as with a rifle cartridge.

8. **What is the sequence of the propellant train, and what does each stage do?**

   The initiating stage in a propellant train is called a primer or detonator; it produces a hot flame that sets off the next stage, called the igniter or booster. The igniter, in turn, sets off the main burster charge.

9. a. **What is the projectile in naval ammunition?**

   The projectile is the part of a round of ammunition that is expelled at high velocity from the gun bore by the burning propelling charge.

   b. **What are the three main projectile parts?**

   The three main projectile parts are its metallic body, the fuse that sets off the main charge, and the explosive burster charge.

10. **List five kinds of special purpose projectiles.**

    Five kinds of special purpose projectiles are illuminating (star shells), incendiary, chaff (radar interference), nonfragmenting (colored smoke for gunnery practice), and target projectiles for surface gunnery practice.

11. **What is the proximity-fused shell designed to do?**

    The proximity-fused (VT) shell is designed to detonate at a position that will cause the greatest damage to that target. A VT fuse contains a radio transceiver that emits pulses of radio energy and receives a portion of these pulses reflected back from the target. When the returning pulse is strong enough, it will set off the fuse.

12. **What are some important tasks that may be assigned to naval surface support?**

    Naval surface fire support can mean the difference between success or failure in an opposed amphibious assault. Naval gunfire is vitally important both before an amphibious assault to neutralize beach defense and after the troops have landed, to support them before adequate field artillery can be brought ashore and put into action.

Chapter 3. Naval Aircraft and Missiles

1. **What are the following types of planes principally used for?**
   a. *Attack plane*: low-level bombing, ground support, or nuclear strikes
   b. *Fighter plane*: high-performance aircraft used used to gain air superiority. They may be used defensively as interceptors, offensively as escorts for bombers, or on ground support missions. They are
   c. *Patrol plane*: land-based, long-range, multiengine planes used mainly for antisubmarine patrol. They also can escort surface convoys, conduct photographic missions, and lay aerial mines.
   d. *Reconnaissance plane*: an attack or fighter aircraft used to gather intelligence.

2. **What type of weapon has become the main armament on most of today's naval fighter and attack aircraft?**
   The guided missile has become the main armament on most of today's jet aircraft.

3. **What are the four basic parts of a guided missile?**
   The four basic parts of a guided missile are the airframe, the propulsion system, the guidance system, and the warhead.

4. a. **What is the high-explosive part of a missile called?**
   The high-explosive part of a missile is called the warhead.

   b. **What kind of high explosive may it be?**
   It may be either conventional or nuclear; in the case of a practice missile, it may contain telemetry equipment.

5. **What are the five types of guidance systems used by most Navy guided missiles?**
   The five types of guidance systems used by guided missiles are preset gyro, inertial, homing, command, or beam rider. GPS-based guidance systems are coming into use on some newer models of Tomahawk cruise missiles and precision ordnance.

6. **What Navy missile is a part of the nation's strategic defense system?**
   The Trident missile (with a range over 4,000 nautical miles) is our present day Navy strategic missile.

7. **What is the purpose of an antiballistic missile?**
   Antiballistic missiles (ABMs) are missiles designed to intercept incoming enemy ballistic missiles and destroy them before they can reach their targets.

8. a. **What is the Harpoon missile?**
   Harpoon is an antiship cruise missile. It can be launched from surface ships, submarines, and aircraft.

b. What are its principal features and range?

Harpoon is the primary antiship weapon system for U.S. naval forces. It has over-the-horizon range, a low-level cruising trajectory, active guidance, counter-countermeasures, and a large payload. It is powered by a turbojet engine. It flies 100 feet above the water and has active terminal guidance radar, ensuring a high probability of penetrating enemy defenses and hitting the target. It has a maximum range of over 60 nautical miles, with a 500-pound conventional warhead.

9. a. What is the Tomahawk missile?

The Tomahawk is an all-weather, long-range, subsonic cruise missile.

b. What are its capabilities?

Tomahawk can be launched from submarines, surface ships, land, and air platforms. The Tomahawk is capable of delivering either a conventional or nuclear warhead to ranges in excess of 700–1,350 nautical miles, depending on the model. It flies at very low altitudes over land and has terrain masking and infrared features, making defense against it extremely difficult. The latest version has GPS guidance.

10. What are the three Ts that provided the surface Navy with its principal antiair defensive capability during the 1970s and 1980s?

The three "Ts" that were the Navy's second line of fleet defense for these years were the Terrier, Tartar, and Talos missiles.

11. What are the capabilities of the three Standard missile versions presently in use?

Presently the Standard-2 (SM-2) is the Navy's primary surface-to-air air defense weapon. The Standard-2 MR, 15½ feet long and weighing some 1,500 pounds, has a range in excess of 90 miles and a ceiling greater than 80,000 feet. The Standard-2 ER, 21½ feet long and weighing some 3,200 pounds, has a range exceeding 200 miles and a ceiling of 110,000 feet. The newest version, the Standard-3 ER, about the same size and weight as the Standard-2 ER, has a range of over 270 miles, a ceiling in excess of 150 miles, and was developed for use as an ABM missile.

12. a. How do homing torpedoes operate?

Homing torpedoes are guided either by the sound of the vessel being attacked, or by reflected echoes from it. They are powered by electric motors and batteries.

b. What are the two types of homing torpedoes?

The *active acoustic torpedo* generates and transmits acoustic pulses, some of which are reflected from the target. The returning echoes guide the torpedo to the target. *The passive acoustic torpedo* homes in on the noise emitted from the target.

13. What are the two basic types of missile trajectories?

The two types of missile trajectories are ballistic and aerodynamic. In a ballistic trajectory, the missile is acted upon only by gravity and aerodynamic drag after the propulsive force is terminated. An aerodynamic trajectory is one in which aerodynamic forces (thrust, drag, weight, and lift) are used to maintain the flight path.

14. **a. Describe a missile pursuit curve.**

A pursuit curve is followed by homing and beam rider missiles. At any given instant, the missile is pointed directly toward the target. If such a missile pursues a crossing target, it must follow a curved trajectory.

b. How may a pilot evade such missiles?

With a pursuit-curve missile, a proficient pilot can make radical maneuvers and escape the missile.

15. **What kind of a trajectory is followed by most long-range ballistic missiles?**

ICBMs such as Trident are launched vertically so they can get through the densest part of the atmosphere as soon as possible. At a certain computed altitude, which is controlled by preset guidance, the missile inclines to a more gradual climb. After booster burnout or shutdown of the propulsion system, the missile coasts along a ballistic trajectory to the target.

16. **What natural external forces affect a missile's trajectory?**

Natural external forces that affect a missile's trajectory include wind, gravity, magnetic forces, and the Coriolis effect.

Chapter 4. Mine Warfare

1. **What are the three principal aspects of mine warfare?**

   The three aspects of mine warfare are offensive and defensive mining, and mine countermeasures.

2. **How is defensive mining used?**

   Defensive mining is done to protect a nation's own harbors and shorelines.

3. **How is offensive mining used?**

   Offensive mining may be used to bottle up enemy harbor; render their shipping routes dangerous or impossible to use; and make the enemy divert ships, equipment, and personnel to minesweeping chores.

4. **Where was the first American attempt at mine warfare in the Revolutionary War carried out?**

   David Bushnell attempted to break the British blockade of the Delaware River at Philadelphia with floating kegs filled with gunpowder and equipped with contact-firing devices.

5. **Who conducted research in the early 1800s demonstrating that ships were vulnerable to underwater explosions?**

   Robert Fulton demonstrated in the early 1800s that a ship could be sunk by an underwater explosion.

6. a. **What was the famous Civil War sea battle in which mines played a crucial part?**

   Mines played a crucial part in the Civil War sea battle of Mobile Bay, Alabama.

   b. **Who was the Union naval commander, and what was his famous directive?**

   The successful Union naval commander at that battle was Admiral David Farragut. In referring to the Confederate mines, then called torpedoes, he ordered (in essence), "Damn the torpedoes—full speed ahead!"

7. **Following the Russo-Japanese War, why was there an attempt to place international legal restrictions on some aspects of mine warfare?**

   After the Russo-Japanese War, several ships of other nations were sunk by free-floating mines that had broken loose from their wartime moorings. The Hague Convention sought to restrict the use of floating mines unless they could self-deactivate.

8. a. **What was the most extensive Allied mining effort in World War I?**

   The most extensive Allied effort involving mines in World War I was the great North Sea mine barrage laid between northern Scotland and the Norwegian coast.

   b. **What was it designed to do?**

   It was designed to keep German U-boats confined in the North Sea and allow the Allies to use Atlantic shipping routes in comparative safety.

9. **What two new offensive minelaying methods were employed during World War II?**

In addition to defensive mining carried out by conventional types of surface minelayers, offensive mining was carried out by both submarines and aircraft in World War II.

10. **What secret German mine was captured early in World War II, enabling the British to develop countermeasures against this major German weapon?**

The Germans lost an influence mine, designed to be triggered by the magnetic field of a passing steel-hulled ship, when the mine was recovered intact in a mudbank.

11. **Where were Japanese defensive mining operations conducted in the Pacific during World War II?**

The Japanese planted extensive defensive minefields west of the Nansei Shoto, which protected their shipping in the East China Sea throughout the war. The Sea of Japan was effectively sealed off from American submarines and surface ships by Japanese minefields until the last few months of the war. Their major harbors and bases were also protected by mines.

12. **What are the major methods by which mines can be planted?**

Mines can be planted by surface craft, submarine, or by aircraft. Planting mines by submarine can be done with great secrecy and at great distances from the submarine's home port.

13. a. **How are moored mines kept at predetermined depths so they may be used against either small craft or major vessels?**

Moored mines are kept at a predetermined depth by mooring cables attached to an anchor.

b. **What is their main disadvantage?**

Their main disadvantage is that they may be cleared with comparative ease by mechanical sweeping gear.

14. a. **Why was the bottom mine developed?**

The bottom mine was developed because it is very difficult to detect and sweep.

b. **What are its major limitations?**

It cannot be planted in water depths greater than 30 fathoms unless intended as an antisubmarine weapon.

15. a. **What are the three basic types of influence mines?**

The three basic types of influence mines are magnetic, acoustic, and pressure.

b. **What is a fourth type that complicates sweeping?**

A fourth type that is harder to sweep is the combination mine, which uses two or all three of the influence features.

16. **What are the two methods of treating a ship's steel hull to decrease magnetic effects that actuate magnetic mines?**

The two methods of treating a ship's steel hull to decrease magnetic effects that actuate magnetic mines are deperming and degaussing.

17. **What new type of platform was developed for minesweeping operations in the 1970s?**

The minesweeping helicopter was developed in the 1970s.

18. **What marine mammal is used by the Navy to hunt for mines?**

For many years there has been an ongoing effort to use trained dolphins to search for mines and enemy swimmers as part of the Navy Marine Mammals Program. Dolphins from the program were used in the Persian Gulf in both Operations Desert Storm and Iraqi Freedom, and performed well. There are currently some seventy-five dolphins in the program at Navy bases on the Gulf and West Coasts.

19. **What is often the most profound impact of the mine on an enemy?**

Of all the aspects of mine warfare, none is as significant as the profound psychological effect of the mine. The danger of mines is generally judged to be much greater than the physical threat the mines may present.

20. **How can mines be used to change the geography of the ocean battlespace?**

The mine is, in effect, capable of altering geographical circumstances by making certain areas impassable to ships. An area that has been declared dangerous because of the use of mines is usually treated with great respect and avoided as though it were land.

Chapter 5. Chemical, Biological, and Nuclear Warfare

1. **What are conventional weapons?**

   Conventional weapons are those that depend for their effectiveness on the delivery of some type of high-explosive warhead or explosive device.

2. **What are some examples of the use of chemical and biological warfare in ancient times?**

   Some examples of the use of chemical and biological warfare in ancient times include the disruption of food-production capability by spreading salt on captured agricultural fields, and the contamination of water supplies by dumping dead animals or vegetation into it.

3. **What has tended to keep the use of chemical and biological agents in check in modern warfare?**

   The widespread use of chemical and biological warfare agents in World War II and in more recent conflicts since has been held in check for the most part by threats of retaliation and international accords limiting their use.

4. **What events began the age of nuclear warfare in the closing days of World War II?**

   The age of nuclear weapons began in 1945 with the allied used of the American-built atomic bomb against the Japanese cities Hiroshima and Nagasaki in the closing days of World War II, followed by the development of the hydrogen bomb shortly thereafter.

5. **Who poses the greatest threat in the use of CBR weapons today?**

   Some threat of potential use of these weapons persists, especially by countries who might use them to blackmail their neighbors into submission if allowed to do so, and by extremists and terrorists who manage to obtain weapons of this type.

6. **What is chemical warfare?**

   Chemical warfare is the military use of a chemical to harass or cause casualties among enemy forces.

7. **What are the most common types of CW agents?**

   The most common types of CW agents are nerve gases, blister gases, blood gases, choking gases, psycho gases, and vomiting and tear gases.

8. **What is biological warfare?**

   Biological warfare is the use of living organisms (bacteria, spores, or fungi) or toxins to reduce the ability of an enemy to wage war by destroying or contaminating food sources or by spreading epidemic disease.

9. **What does nuclear warfare involve?**

   Nuclear warfare involves the use of weapons armed with nuclear warheads, or improvised "dirty bombs" with radioactive materials dispersed by conventional explosives.

10. **What are the effects from the explosion of a nuclear warhead?**

    The effects from the explosion of a nuclear warhead are shock or blast and intense pulses of light, heat, and electromagnetic and nuclear radiation, followed by radioactive fallout.

11. What are the three types of nuclear bursts to which a ship may be exposed?

Ships may be exposed to three types of bursts: an air burst, in which the fireball does not touch the Earth; a surface burst, in which the fireball touches the surface; and a subsurface burst, in which the explosion is underwater.

12. What are the three phases of shipboard CBR decontamination?

Decontamination aboard ship is done in three phases. The first two, called tactical decontamination, take place immediately, at sea. Phase one is the saltwater washdown. Phase two is detailed decontamination conducted by repair-party personnel using a steam lance or hose and scrub brushes to remove contamination and wash it overboard. The final phase would normally be done at advance bases by repair ships and tenders, using flame burning, acid dips, and sandblasting.

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