Commercial RADIO OPERATOR'S

QUESTION and ANSWER LICENSE GUIDE

FOR ELEMENTS 1, 2 & 9

INCLUDES

SAMPLE FCC TYPE PRACTICE EXAMS

Using MULTIPLE-CHOICE QUESTIONS

PREPARATION FOR RADIOTELEPHONE AND RADIOTELEGRAPH LICENSE EXAMINATIONS

AMECO

90¢

AMECO PUBLISHING CORP.

CAT. #8-01

COMMERCIAL RADIO OPERATOR'S LICENSE GUIDE – ELEMENTS 1, 2 & 9

by

MARTIN SCHWARTZ

Formerly Instructor at American Radio Institute

Published by
AMECO PUBLISHING CORP.
314 Hillside Avenue
Williston Park, New York 11596

COMMERCIAL RADIO OPERATOR LICENSE GUIDE

ELEMENTS 1, 2 and 9

PRINTED 1974

ALL MATERIAL IN THIS BOOK UP TO DATE

Library of Congress Catalog No. 72-79978

Printed in the United States of America

PREFACE

The AMECO COMMERCIAL RADIO OPERATOR'S LICENSE GUIDE - ELEMENTS 1, 2 and 9 has been prepared to meet the growing demand for a concise, yet complete study guide for the first, second and ninth elements of the Federal Communications Commission's Commercial Radio Operator's Examination. It has been compiled in full accordance with the latest FCC Study Guide Revisions, and is therefore the most complete, thoroughly up to date guide available.

An additional feature of this guide is the inclusion of a separate section devoted to sample FCC type examinations covering Commercial Elements 1, 2 and 9. These sample tests consist of multiple choice questions, because this type of question is currently used by the Federal Communications Commission on all of the Commercial Radio Operator's examinations. Aside from providing valuable study practice, these sample examinations may be used as an accurate gauge of preparedness; when the student is capable of answering the various questions correctly, he is then prepared to take the actual examination.

The satisfactory completion of an examination covering Elements 1 and 2 fulfills the governmental requirements for obtaining a Radiotelephone 3rd Class Permit. In addition to Elements 1 and 2, Element 9 is required for a Radiotelephone 3rd Class Permit with endorsement for broadcast use. For other licenses and permits, there are further requirements; however, Elements 1 and 2 must be completed in all cases. The following are the requirements for the various classes of commercial radio operator's licenses and permits issued by the Federal Communications Commission:

Radiotelephone 1st Class Operator's License - Elements 1, 2, 3, 4.

Radiotelephone 2nd Class Operator's License - Elements 1, 2, 3.

Radiotelephone 3rd Class Operator's Permit - Elements 1, 2.

Radiotelephone 3rd Class Operator's Permit endorsed for broadcast operation - Elements 1, 2 and 9.

Radiotelegraph 1st Class Operator's License - Elements 1, 2, 5, 6.

Radiotelegraph 2nd Class Operator's License - Elements 1, 2, 5, 6.

Radiotelegraph 3rd Class Operator's Permit - Elements 1, 2, 5.

Aircraft Radiotelegraph Endorsement on 1st or 2nd Class License - Element 7.

Ship Radar Endorsement on Radiotelegraph or Radiotelephone 1st or 2nd Class License - Element 8.

The FCC examinations for Elements 1, 2 and 9 each consist of 20 multiple-choice questions, similar to the examinations starting on Page 36. 5% credit is allowed for each question answered correctly. 75% is the passing mark for each examination element.

Element 2 is subdivided so that the prospective operator may elect to answer either 20 questions in the maritime field (series M) or 20 questions of a general nature (Series O). Elements 1 and 9 each have only one group of questions.

The Element 9 examination has recently been revised. The format is the same, but the questions are difficult. IT IS THEREFORE IMPORTANT TO STUDY ALL THE MATERIAL IN THE ANSWERS QUITE THOROUGHLY!

You will note that there are abbreviations after most of the questions. These abbreviations refer to the rule on law that the question pertains to. The meanings of the abbreviations are as follows:

Sec. Refers to a section of the Communications Act of 1934.

Art. Refers to an article of the International Radio Regulations (Atlantic City 1947).

R&R Refers to a provision of the Rules and Regulations of the FCC.

When a change occurs in the FCC rules, there may be some confusion concerning those FCC test questions that are based on the old regulations. If this should occur, the questions should be answered in accordance with the rules in effect at the time that the test is taken.

It is important to emphasize that the questions in this, or any other study guide, are not the exact questions that will appear on the FCC examinations. They indicate the subject matter covered on the examinations. The applicant should understand completely the questions, their answers and their full meanings.

It would be helpful for the prospective operator to visit a broadcast station before taking the examination. In this way, he will obtain valuable practical information.

Examinations are conducted at FCC field offices only on specified dates and at times according to a published schedule. At certain offices and field examination points, tests are given by appointment only. In some cases, applications must be submitted prior to the examination date. Therefore, it is advisable for the applicant to obtain an examination schedule from the FCC well in advance of the time he expects to take the exams.

Although this guide covers only Elements 1, 2 and 9 of the commercial radio operator examinations, the Ameco Publishing Corp. publishes other guides covering some of the other elements of the commercial examinations. License guides covering the requirements for the Amateur Radio Operator examinations have also been published. These guides are all listed on the back cover.

TABLE OF CONTENTS

ELEMENT 1
SERIES "O" AND "M"

Question 1. Where and how are FCC licenses and permits obtained? (R&R 13.11(a))

Answer 1. An operator's license or permit may be obtained by applying for a specific license at a regional office of the Federal Communications Commission. An examination must then be taken by the applicant, and if the examination is completed satisfactorily, a license is then issued to the applicant. An applicant for a restricted radiotelephone permit must fill out an application, but he is not required to take an examination.

Q. 2. When a licensee qualifies for a higher grade of FCC license or permit, what happens to the lesser grade license? (R&R 13.26)

A. 2. If the holder of a license qualifies for a higher class in the same group, the license held will be cancelled upon the issuance of the new license. Similarly, if the holder of a restricted operator permit qualifies for a first- or second-class operator license of the corresponding type, the permit held will be cancelled upon issuance of the new license.

Q. 3. Who may apply for an FCC license? (R&R 13.5(a))

A. 3. Normally, commercial licenses are issued only to citizens and other nationals of the United States. As an exception, in the case of an alien who holds an Aircraft Pilot Certificate issued by the Civil Aeronautics Administration or the Federal Aviation Agency and is lawfully in the United States, the Commission, if it finds that the public interest will be served thereby, may waive the requirement of the U. S. nationality.

Q. 4. If a license or permit is lost what action must be taken by the operator? (R & R 13.71, 13.72)

A. 4. He must immediately notify the FCC, and may then apply for a duplicate license. He must inform the Federal Communications Commission of the circumstances surrounding the loss of the original license, or how said license was destroyed. He must state that a reasonable search has been made for the original license, and that if it is found subsequent to the issuance of a duplicate, he will return either the original or the duplicate to the FCC for cancellation. He also must submit documentary evidence of the service performed under the original license.

Pending receipt of the duplicate license, the operator may operate the station, but he must exhibit a signed copy of the application for the duplicate license.

Q. 5. What is the usual license term for radio operators? (R & R 13.4(a))

A. 5. Commercial operator licenses will normally be issued for a term of five years from the date of issuance.

Q. 6. What government agency inspects radio stations in the U.S.? (Sec. 303(n))

A. 6. The Federal Communications Commission.

Q. 7. When may a license be renewed? (R&R 13.11)

A. 7. At any time during the final year of the license term or during a one-year period of grace after the date of expiration of the license sought to be renewed. During this one-year period of grace, an expired license is not valid.

Q. 8. Who keeps the station logs? (R&R 73.111)

A. 8. Each log shall be kept by the person or persons competent to do so, having actual knowledge of the facts required.

Q. 9. Who corrects errors in the station logs? (R&R 73.111)

A. 9. Any necessary correction may be made only by the person originating the entry.

Q. 10. How may errors in the station logs be corrected? (R & R 3.111)

A. 10. Any necessary correction may be made only by the person originating the entry who shall strike out the erroneous portion, initial the correction made, and indicate the date of correction.

Q. 11. Under what conditions may messages be rebroadcast? (Sec. 325(a))

A. 11. Messages may be rebroadcast only with the express authority of the originating station.

Q. 12. What messages and signals may not be transmitted? (R & R 13.66, 13.67, 13.68)

A. 12. No licensed radio operator shall transmit unnecessary, unidentified, or superfluous radio communications or signals. Neither shall he transmit communications containing obscene, indecent or profane words, language, or meaning. A licensed radio operator is prohibited from transmitting false or deceptive signals or communications by radio, or any call letter or signal which has not been assigned by proper authority to the radio station he is operating.

Q. 13. May an operator deliberately interfere with any radio communication or signal? (R & R 13.69)

A. 13. No.

Q. 14. What type of communication has top priority in the mobile service? (ART.)

A. 14. Distress calls, distress messages and distress traffic have top priority in the mobile service. Urgent signals are next in the order of priority, followed by safety signals.

Q. 15. What are the grounds for suspension of operator licenses? (Sec. 303(m)(1))

A. 15. The FCC may suspend an operator license upon proof sufficient to satisfy the Commission that the licensee:

(a) Has violated any provision of any Act, treaty or convention binding on the United States, which the Commission is authorized to administer, or any regulation made by the Commission under any such Act, treaty, or convention; or

(b) Has failed to carry out a lawful order of the master or person lawfully in charge of the ship or aircraft on which he is employed; or

(c) Has willfully damaged or permitted radio apparatus or installations to be damaged; or

(d) Has transmitted superfluous radio communications or signals or communications containing profane or obscene words, language, or meaning, or has knowingly transmitted ---

(1) False or deceptive signals or communications, or

(2) A call signal or letter which has not been assigned by proper authority to the station he is operating; or

(e) Has willfully or maliciously interfered with any other radio communications or signals; or

(f) Has obtained or attempted to obtain, or has assisted another to obtain or attempt to obtain, an operator's license by fraudulent means.

Q. 16. When may an operator divulge the contents of an intercepted message? (Sec. 605)

A. 16. An operator may divulge the contents of an intercepted message if the message is for the use of the general public or relating to ships in distress.

Q. 17. If a licensee is notified that he has violated an FCC rule or provision of the Communications Act of 1934, what must he do? (R & R 1.76)

A. 17. Within 10 days from receipt of notice, or such other period as may be specified, the licensee shall send a written answer, in duplicate, direct to the office of the Commission originating the official notice. If an answer cannot be sent or ack-

nowledgment made within such 10-day period by reason of illness or other unavoidable circumstances, acknowledgment and answer shall be made at the earliest practicable date with a satisfactory explanation of the delay. The answer to each notice shall be complete in itself and shall not be abbreviated by reference to other communications or answers to other notices. In every instance, the answer shall contain a statement of action taken to correct the condition or omission complained of and to preclude its recurrence. In addition: (1) If the notice relates to violations that may be due to the physical or electrical characteristics of transmitting apparatus and any new apparatus is to be installed, the answer shall state the date such apparatus was ordered, the name of the manufacturer, and the promised date of delivery.

Q. 18. If a licensee receives a notice of suspension of his license, what must he do? (R & R 1.72)

A. 18. If a licensee receives a notice of suspension of his license, he must make a written application to the Commission within 15 days of receipt of the notice for a hearing on the suspension order.

Q. 19. What are the penalties provided for violating a provision of the Communications Act of 1934 or a Rule of the FCC? (Sec. 501, 502)

A. 19. Any person who willfully and knowingly violates the Communications Act of 1934 shall, upon conviction thereof, be punished for such offense, for which no penalty (other than a forfeiture) is provided in this Act, by a fine of not more than $10,000 or by imprisonment for a term not exceeding one year, or both; except that any person, having been once convicted of an offense punishable under this section, who is subsequently convicted of violating any provision of this Act punishable under this section, shall be punished by a fine of not more than $10,000 or by imprisonment for a term not exceeding two years; or both.

Any person who willfully and knowingly violates any rule, regulation or restriction made by the Commission under authority of this Act, or any rule, regulation or restriction made by any international communications treaty to which the United States is or may hereafter become a party, shall, in addition to any other penalties provided by law, be punished, upon conviction thereof, by a fine of not more than $500 for each and every day during which such offense occurs.

Q. 20. Define "harmful interference". (ART.)

A. 20. Harmful interference is any emission, radiation or induction which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service.

ELEMENT 2 — SERIES "O"

Ques. 1. What should an operator do when he leaves a transmitter unattended?

Ans. 1. Precautions should be taken so that the equipment will not be subjected to use by unauthorized personnel.

Q. 2. What are the meanings of: clear, out, over, roger, words twice, repeat, and break?

A. 2(a). "Clear" indicates that the transmission is completed, and that no response is expected.

(b) "Out" is similar in meaning to "clear". It indicates that the conversation is ended and no response is expected.

(c) "Over" indicates that the transmission has ended and a response is expected.

(d) "Roger" indicates that the immediately preceding message has been received, and is completely understood.

(e) "Words twice" is used to indicate that a series of words will be sent two times due to poor reception conditions or general communications difficulty.

(f) "Repeat" means to say again.

(g) The term "break" is used as a separation between parts of a single message.

Q. 3. How should a microphone be treated when used in noisy locations?

A. 3. It is good practice for the operator to shield the microphone with his hands when speaking into a microphone in a noisy location. This tends to cut down the microphone's picking up of background noise.

Q. 4. What may happen to the received signal when an operator has shouted into a microphone?

A. 4. Shouting into the microphone generally causes overmodulation. This results in speech distortion, as well as interference with stations on adjacent frequencies.

Q. 5. Why should radio transmitters be "off" when signals are not being transmitted?

A. 5. The transmitter should be off to prevent causing interference to other stations on the frequency.

Q. 6. Why should an operator use well-known words and phrases?

A. 6. Simple phrases and plain language are easier to understand. This reduces the number of errors that are made, and minimizes the amount of repetition necessary.

Q. 7. Why is the station's call sign transmitted?

A. 7. A station's call sign is transmitted so as to enable one to identify the station and thus avoid possible confusion. A proper station identification consists of the call letters and location of the station.

Q. 8. Where does an operator find specifications for obstruction marking and lighting (where required) for the antenna towers of a particular radio station?

A. 8. If an operator wishes to determine the specifications for obstruction marking and lighting of antenna towers, he should look in Part 17 of the Rules and Regulations of the FCC. If he wishes to determine the specifications for a particular station, he should examine the station authorization issued by the Commission.

Q. 9. What should an operator do if he hears profanity being used at his station?

A. 9. The licensed operator on duty should endeavor to end the transmission and should enter the relevant details in the log of the station. A report of the incident should be submitted to the FCC.

Q. 10. What should an operator do if the station he is calling does not answer within a reasonable length of time?

A. 10. He should stop calling and wait a reasonable length of time before attempting to call again. Continuous calling without results only causes interference and takes up valuable airways space that could be used by others.

Q. 11. When may an operator use his station without regard to certain provisions of his station license? (R & R 2.405)

A. 11. The licensee of any station, except amateur, may, during a period of emergency in which normal communication facilities are disrupted as a result of hurricane, flood, earthquake or similar disaster, utilize such station for emergency communication service in communicating in a manner other than that specified in the instrument of authorization: Provided: (a) That as soon as possible after the beginning of such emergency use, notice be sent to the Commission at Washington, D. C., and to the Engineer in Charge of the district in which the station is located, stating the nature of the emergency and the use to which the station is being put, and (b) That the emergency use of the station shall be discontinued as soon as substantially normal communication facilities are again available, and (c) That the Commission at Washington, D. C., and the Engineer in Charge shall be notified immediately

when such special use of the station is terminated.

Q. 12. Who bears the responsibility if an operator permits an unlicensed person to speak over his station?

A. 12. When a licensed operator in charge of a radiotelephone station permits another person to use the microphone and talk over the facilities of the station, he should remember that he continues to bear the responsibility for the proper operation of the station.

Q. 13. What is meant by a "phonetic alphabet" in radiotelephone communications?

A. 13. A phonetic alphabet is one in which a specific word is used to represent a letter of the alphabet; each letter has its corresponding word. For instance, the letter "A" may be made more easily recognizable by means of the word "Able", the word "Baker" is used to signify the letter "B", and the letter "C" is distinguished by use of the word "Charlie". By using one of the established phonetic symbols, the transmitting station makes clear to the receiving station exactly what letter is meant. This cuts down greatly on the amount of confusion and error, since many letters of the alphabet are similar in sound and may easily be confused.

Q. 14. How does the licensed operator of a station normally exhibit his authority to operate the station?

A. 14. An operator normally exhibits his authority to operate a station by posting a valid operator license or permit at the transmitter control point.

Q. 15. What precautions should be observed in testing a station on the air?

A. 15. In testing a radiotelephone transmitter, the operator should clearly indicate that he is testing, and the station call sign or name of the station, as required by the rules, should be clearly given. Tests should be as brief as possible. Caution should be observed by persons testing a station to make certain their test message will not interfere with other communications in progress on the same channel. Testing is important since it tells the operator whether the equipment is functioning properly. One of the primary duties of the operator is to maintain the equipment in proper operating condition.

ELEMENT 2 — SERIES "M"

Ques. 1. What is the importance of the frequency 2182 Kc? (R & R 83.352, 83.353(a))

Ans. 1. The frequency 2182 Kc. is the international distress frequency for radiotelephony. It shall be used for this purpose by ship, aircraft, and survival craft stations using frequencies in the authorized bands between 1605 and 4000 kc. when requesting assistance from the maritime services. The frequency 2182 Kc. is also the international general radiotelephone calling frequency for the maritime mobile service. It may be used as a carrier frequency for this purpose by ship stations and aircraft stations operating in the maritime mobile service.

Q. 2. Describe completely what actions should be taken by a radio operator who hears: (a) a distress message; (b) a safety message? (R & R 83.239, 83.240, 83.241, 83.242)

A. 2(a). Stations of the maritime mobile service which receive a distress message from a mobile station which is, beyond any possible doubt, in their vicinity, shall immediately acknowledge receipt. However, in areas where reliable communication with one or more coast stations are practicable, ship stations may defer this acknowledgement for a short interval so that a coast station may acknowledge receipt.

Stations of the maritime mobile service which receive a distress message from a mobile station which, beyond any possible doubt, is not in their vicinity, shall allow a short interval of time to elapse before acknowledging receipt of the message, in order to permit stations nearer to the mobile station in distress to acknowledge receipt without interference.

The acknowledgment of receipt of a distress message is transmitted, when radiotelegraphy is used, in the following form:

(a) The call sign of the station sending the distress message, sent three times;

(b) The word DE;

(c) The call sign of the station acknowledging receipt, sent three times;

(d) The group RRR;

(e) The distress signal SOS.

The acknowledgment of receipt of a distress message is transmitted, when radiotelephony is used, in the following form:

(a) The call sign or other identification of the station sending the distress message, spoken three times;

(b) The words THIS IS;

(c) The call sign or other identification of the station acknowledging receipt, spoken three times;

(d) The word RECEIVED;
(e) The distress signal MAYDAY.

Every mobile station which acknowledges receipt of a distress message shall, on the order of the master or person responsible for the ship, aircraft, or other vehicle carrying such mobile station, transmit as soon as possible the following information in the order shown:

(a) Its name;
(b) Its position;
(c) The speed at which it is proceeding towards, and the approximate time it will take to reach, the mobile station in distress.

Before sending this message, the station shall ensure that it will not interfere with the emissions of other stations better situated to render immediate assistance to the station in distress.

A mobile station or a land station which learns that a mobile station is in distress shall transmit a distress message in any of the following cases:

(a) When the station in distress is not itself in a position to transmit the distress message;
(b) When the master or person responsible for the ship, aircraft, or other vehicle not in distress, or the person responsible for the land station, considers that further help is necessary;
(c) When, although not in a position to render assistance, it has heard a distress message which has not been acknowledged. When a mobile station transmits a distress message under these conditions, it shall take all necessary steps to notify the authorities who may be able to render assistance.

The transmission of a distress message under the conditions prescribed in the above paragraph shall be made on either or both of the international distress frequencies (500 kc. radiotelegraph; 2182 kc. radiotelephone) or on any other available frequency on which attention might be attracted.

The transmission of the distress message shall always be preceded by the call indicated below, which shall itself be preceded whenever possible by the radiotelegraph or radiotelephone alarm signal. This call consists of:

When radiotelegraphy is used:
(a) The signal DDD SOS SOS SOS DDD;
(b) The word DE;
(c) The call sign of the transmitting station, sent three times;

When radiotelephony is used:
(a) The signal MAYDAY RELAY, spoken three times;
(b) The words THIS IS;
(c) The call sign or other identification of the transmitting station, spoken three times.

A. 2(b) All stations hearing the safety signal shall listen to the safety message until they are satisfied that the message is of no

concern to them. They shall not make any transmission likely to interfere with the message. In the event that the message concerns them, they shall bring it to the attention of the master of the ship or whoever should receive the information.

Q. 3. What information must be contained in distress messages? What procedure should be followed by a radio operator in sending a distress message? What is a good choice of words to be used in sending a distress message? (R&R 83.234 through 83.238)

A. 3. The international radiotelegraph distress signal or call consists of the group "three dots, three dashes, three dots" (...---...), symbolized herein by SOS, transmitted as a single signal in which the dashes are slightly prolonged so as to be distinguished clearly from the dots.

The international radiotelephone distress signal consists of the word MAYDAY, pronounced as the French expression "m'aider".

These distress signals indicate that a mobile station is threatened by grave and imminent danger and requests immediate assistance.

The radiotelephone distress procedure shall consist of:

(a) The radiotelephone alarm signal (whenever possible);

(b) The distress call

(c) The distress message

The radiotelephone distress transmissions shall be made slowly and distinctly, each word being clearly pronounced to facilitate transcription.

After the transmission by radiotelephony of its distress message, the mobile station may be requested to transmit suitable signals followed by its call sign or name, to permit direction-finding stations to determine its position. This request may be repeated at frequent intervals if necessary.

The distress message, preceded by the distress call, shall be repeated at intervals until an answer is received. This repetition shall be preceded by the radiotelephone alarm signal whenever possible.

When the mobile station in distress receives no answer to a distress message transmitted on the distress frequency, the message may be repeated on any other available frequency on which attention might be attracted.

Q. 4. What are the requirements for keeping watch on 2182 Kc.? If a radio operator is required to "stand watch" on an international distress frequency, when may he stop listening? (R & R 83.223)

A. 4. Each ship station on board a ship navigating the Great Lakes and licensed to transmit by telephony on one or more frequencies within the band 1600 to 3500 kcs. shall, during its hours

of service for telephony, maintain an efficient watch for the reception of class A3 emission on the radio-channel of which 2182 Kcs. is the assigned frequency, whenever the station is not being used for transmission on that channel or for communication on other radio-channels.

Except for stations on board vessels required by law to be fitted with radiotelegraph equipment, each ship station (in addition to those ship stations specified above) licensed to transmit by telephony on one or more frequencies within the band 1600 to 3500 kcs. shall, during its hours of service for telephony, maintain an efficient watch for the reception of class A3 emission on the radio-channel of which 2182 kcs. is the assigned frequency, whenever such station is not being used for transmission on that channel or for communication on other radio-channels.

Q. 5. Under what circumstances may a coast station contact a land station by radio? (R & R 81.302(a) (2))

A. 5. A coast station may contact a land station for the purpose of facilitating the transmission or reception of safety communications to or from a ship or aircraft station.

Q. 6. What do distress, safety, and urgency signals indicate? What are the international urgency, safety, and distress signals? In the case of a mobile radio station in distress, what station is responsible for the control of distress message traffic? (R & R 83.234 through 83.249)

A. 6. Distress signals indicate that a mobile station is threatened by grave and imminent danger and requests immediate assistance.

The safety signal indicates that the station is about to transmit a message concerning the safety of navigation or giving important meteorological warnings.

The urgency signal indicates that the transmitting station is about to transmit a message concerning the safety of a ship, aircraft or other vehicle, or of some person aboard, or within sight.

The international radiotelephone urgency signal consists of the word "PAN" repeated three times and transmitted before the call.

The international radiotelegraph urgency signal consists of the letters "X X X" spaced out as separate letters.

The international radiotelephone safety signal consists of the word "SECURITY" repeated three times and transmitted before the call. In radiotelegraphy, the safety signal consists of three repetitions of the group "TTT" transmitted before the call.

The international radiotelephone distress signal consists of the spoken word "MAYDAY" repeated three times and transmitted before the call. In radiotelegraphy, the international distress signal consists of the group "SOS" transmitted before the call.

The control of distress traffic is the responsibility of the mobile station in distress or of the station which, pursuant to 8.242(a), has sent the distress message. These stations may however, delegate the control of the distress traffic to another station.

Q. 7. In regions of heavy traffic why should an interval be left between radiotelephone calls? Why should a radio operator listen before transmitting on a shared channel? How long may a radio operator in the mobile service continue attempting to contact a station which does not answer? (R & R 83.366)

A. 7. In regions of heavy traffic an interval is left between radiotelephone calls in order to give other stations a chance to make their calls and also to prevent undue interference.

A radio operator should listen before transmitting on a shared channel so as not to interfere with communications already in progress.

If the called station is not heard to reply, that station shall not again be called until after an interval of two minutes. When a station called does not reply to a call sent three times at intervals of two minutes, the calling shall cease and shall not be renewed until after an interval of 15 minutes; however, if there is no reason to believe that harmful interference will be caused to other communications in progress, the call sent three times at intervals of two minutes may be repeated after a pause of not less than 3 minutes. In the event of an emergency involving safety, the provisions of this paragraph shall not apply.

Q. 8. Why are test transmissions sent? How often should they be sent? What is the proper way to send a test message? How often should the station's call sign be sent? (R & R 83.365)

A. 8. Test transmissions are made in order to make certain that the equipment is functioning properly. Regular tests may reveal defects or faults which, if corrected immediately, may prevent delays when communications are necessary.

Test signals shall have a duration not exceeding 10 seconds. Test transmissions shall not be repeated until a period of at least one minute has elapsed. A period of at least five minutes shall elapse before the test transmission is repeated on the frequency 2182 kcs. or 156.8 Mcs. in a region of heavy traffic.

The testing procedure should be as follows: The operator shall announce the word "testing" followed in the case of a voice transmission test by the count "1, 2, 3, 4 *** etc." or by test phrases or sentences not in conflict with normal operating signals. At the conclusion of the test, there shall be voice announcement of the official call sign of the testing station, the name of the ship on which the station is located, and the general location of the ship at the time the test is being made.

Q. 9. In the mobile service, why should radiotelephone messages be as brief as possible?

A. 9. Radiotelephone messages should be as brief as possible in order to prevent interference and to give others an opportunity to use the airways.

Q. 10. What are the meanings of: clear, out, over, roger, words twice, repeat and break?

A. 10. (a) "Clear" indicates that the transmission is completed and that no response is expected.

(b) "Out" is similar in meaning to "clear". It indicates that the conversation is ended and no response is expected.

(c) "Over" indicates that the transmission has ended and a response is indicated.

(d) "Roger" indicates that the immediately preceding message has been received, and is completely understood.

(e) "Words twice" is used to indicate that a series of words will be sent two times due to poor reception conditions or general communications difficulty.

(f) "Repeat" means to say again.

(g) The term "Break" is used as a separation between parts of a single message.

Q. 11. Does the Geneva, 1959 treaty give other countries the authority to inspect U.S. vessels? (Art. 21)

A. 11. If a mobile station visits a foreign country, the governments or proper administrations of the countries may examine the station license. The inspectors of the foreign countries shall have in their possession an identity card or badge issued by the competent authority which they shall show at the request of the master or persons responsible for the ship, aircraft or other vehicle carrying the mobile station.

When the station license cannot be produced or where manifest irregularities are observed, governments or administrations may inspect the radio installations in order to satisfy themselves that these conform to the conditions imposed by these regulations.

Q. 12. Why are call signs sent? Why should they be sent clearly and distinctly?

A. 12. Station identification should be made clearly and distinctly so that unnecessary repetition of call letters is avoided and to enable other stations to clearly identify all calls.

Q. 13. How does the licensed operator of a ship station exhibit his authority to operate a station? (R & R 83.156)

A. 13. The original license shall be posted in a conspicuous

place at the principal location on board-ship at which the station is operated: Provided, That in the case of stations of a portable nature, including marine-utility stations, or in the case where the operator holds a restricted radiotelephone operator permit, the operator may in lieu of posting have on his person either his required operator license or a duly issued verification card (FCC form 758-F) attesting to the existence of that license.

Q. 14. When may a coast station NOT charge for messages it is requested to handle? (R & R 81.179)

A. 14. No charge shall be made for the service of any public coast station unless effective tariffs applicable to such service are on file with the Commission.

No charge shall be made by any station in the maritime mobile service of the United States for the transmission of distress messages and replies thereto in connection with situations involving the safety of life and property at sea.

No charge shall be made by any station in the maritime mobile service of the United States for the transmission, receipt, or relay of the information concerning dangers to navigation, originating on a ship of the United States or of a foreign country.

Q. 15. What is the difference between calling and working frequencies? (R & R 83.6)

A. 15. A calling frequency is one where initial calls and initial replies to such calls are made. Most stations maintain a watch on those frequencies. After establishing communications on the call frequencies, the stations change to the working frequencies for the transmission of the actual messages.

ELEMENT 9*

Question 1. What is meant by the following words or phrases?

(a) Standard broadcast station (R & R 73.1)
(b) Standard broadcast band (R & R 73.1)
(c) Standard broadcast channel (R & R 73.3)
(d) FM station (R & R 73.310)
(e) FM band (R & R 73.310)
(f) Daytime (R & R 73.6)
(g) Nighttime (R & R 73.7)
(h) Broadcast day (R & R 73.9)
(i) EBS (R & R 73.912)
(j) Attention signal (R & R 73.906)
(k) Nominal power (R & R 73.14)
(l) Operating power (R & R 73.14)
(m) Maximum rated carrier power (R & R 73.14)
(n) Plate input power (R & R 73.14)
(o) Antenna power (R & R 73.14)
(p) Antenna current (R & R 73.14)
(q) Antenna resistance (R & R 73.14)
(r) Percentage modulation (amplitude) (R & R 73.14)

Answer 1(a). The term "standard broadcast station" means a broadcasting station licensed for the transmission of radiotelephone emissions primarily intended to be received by the general public and operated on a channel in the band - 550 kiloHertz to 1605 kiloHertz.

(b) The term "standard broadcast band" means the band of frequencies between 535 kiloHertz and 1605 kiloHertz.

(c) The term "standard broadcast channel" means the band of frequencies occupied by the carrier and two side bands of a broadcast signal with the carrier frequency at the center. Channels shall be designated by their assigned carrier frequencies. The 107 carrier frequencies assigned to standard broadcast stations shall begin at 540 kiloHertz and be in successive steps of 10 kiloHertz.

(d) The term "FM station" means a station employing frequency modulation in the FM broadcast band and licensed primarily for the transmission of radiotelephone emissions intended to be received by the general public.

(e) The term "FM band" means the band of frequencies extending from 88 to 108 megaHertz, which includes those assigned to noncommercial educational broadcasting.

(f) The term "daytime" means the period of time between the local sunrise and the local sunset.

(g) The term "nighttime" means that period of time between local sunset and local sunrise.

(h) The term "broadcast day" means the period of time between local sunrise and 12 midnight, local standard time.

*See note in Preface concerning Element 9 examination.

(i) "E B S" stands for Emergency Broadcast System. The Emergency Broadcast System consists of the facilities and personnel of nongovernment broadcast stations and interconnecting facilities which have been authorized by the Federal Communications Commission to operate in a controlled manner during a war, threat of war, state of public peril or disaster, or other national emergency.

(j) The "attention signal" is the signaling arrangement whereby standard, FM and television broadcast stations can actuate mute receivers for the receipt of emergency cueing announcements and broadcasts. It consists of the following:

(1) Cut the transmitter carrier for 5 seconds. (Sound carrier only for TV stations.)

(2) Return carrier to the air for 5 seconds.

(3) Cut transmitter carrier for 5 seconds. (Sound carrier only for TV stations.)

(4) Return carrier to the air.

(5) Broadcast 1,000 hertz steady-state tone for 15 seconds.

(k) "Nominal power" is the power of a standard broadcast station, as specified in a system of classification which includes the following values: 50 kW., 25 kW., 10 kW., 5 kW., 1 kW., 0.5 kW., 0.25 kW.

(l) Depending on the context within which it is employed, the term "operating power" may be synonymous with "nominal power" or "antenna power". See below.

(m) "Maximum rated carrier power" is the maximum power at which the transmitter can be operated satisfactorily, and is determined by the design of the transmitter and the type and number of vacuum tubes used in the last radio stage.

(n) "Plate input power" means the product of the direct plate voltage applied to the tubes in the last radio stage, and the total direct current flowing to the plates of these tubes, measured without modulation.

(o) "Antenna input power" or "antenna power" means the product of the square of the antenna current and the antenna resistance at the point where the current is measured.

(p) "Antenna current" means the radio-frequency current in the antenna with no modulation.

(q) "Antenna resistance" means the total resistance of the transmitting antenna system at the operating frequency and at the point at which the antenna current is measured.

(r) "Percentage modulation" with respect to an amplitude modulated wave means the ratio of half the difference between the maximum and minimum amplitudes of the amplitude modulated wave to the average amplitude expressed in percentage.

Q. 2. Make the following transformations: (a) Kilocycles to cycles. (b) Kilovolts to volts. (c) Milliamperes to amperes.

A. 2(a) In order to change kilocycles to cycles, we multiply by one thousand. In order to change cycles to kilocycles, we divide by one thousand. Examples: 3 kilocycles equals 3,000 cycles. 1.4

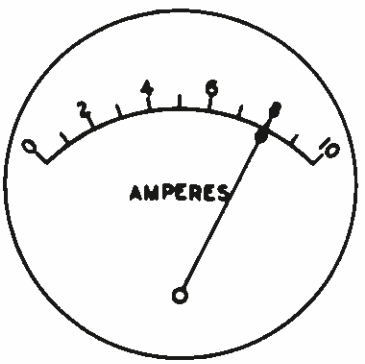
kilocycles equals 1,400 cycles. 500 cycles equals .5 kilocycle.

In recent years, the electronics industry has adopted the term "Hertz", abbreviated "Hz", to replace the term "cycles". Kilocycles has been replaced by "kiloHertz", abbreviated "kHz"; megacycles (meaning one million cycles) has been replaced by "MegaHertz", abbreviated "MHz".

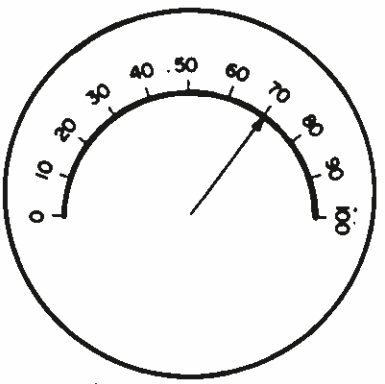
(b) In order to change kilovolts to volts, we multiply by one thousand. In order to change volts to kilovolts, we divide by one thousand. Examples: 2.6 kilovolts equals 2,600 volts. 1 kilovolt equals 1,000 volts. 50 volts equals .050 kilovolt.

(c) In order to change milliamperes to amperes, we divide by one thousand. In order to change amperes to milliamperes, we multiply by one thousand. Examples: 50 milliamperes equals .050 ampere. 200 milliamperes equals .2 ampere. .003 ampere equals 3 milliamperes.

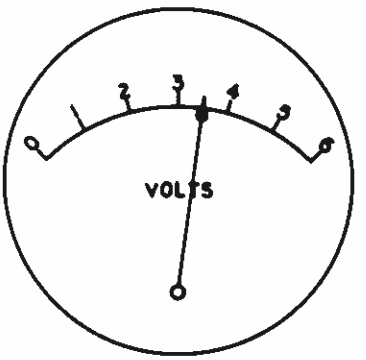
Q. 3. Draw the "face" of the following meters and know how to read each: (a) Ammeter (b) Voltmeter (c) Arbitrary scale meter (d) Frequency monitor meter (e) VU meter (for % modulation).



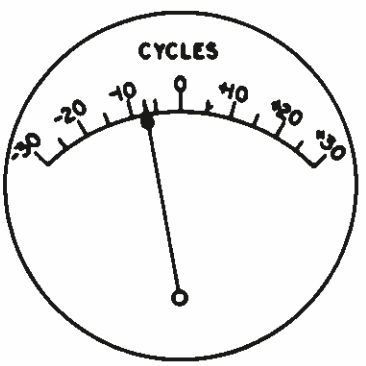
(a) Ammeter. Reading shown is 8 amperes.



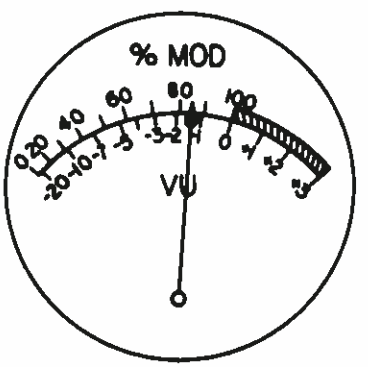
(c) Arbitrary scale meter.



(b) Voltmeter. Reading shown is 3.5 volts.



(d) Frequency Monitor Meter indicates deviation in cycles. (KC for FM stations) Reading shown is -7 cycles.



(e) VU Meter. For % modulation, scale is made larger than VU scale. Reading shown is 85% mod.

Q. 4. What should an operator do if the remote antenna am-

meter becomes defective? (R & R 73.58)

A. If the remote antenna ammeter becomes defective, the antenna base currents may be read and logged once daily for each mode of operation, pending the return to service of the regular remote meter.

Additional information: (a) Each standard broadcast station shall be equipped with indicating instruments (which conform with the specifications set forth in Sec. 73.39) for measuring the DC plate circuit current and voltage of the last radio frequency amplified stage; the radio frequency base current of each antenna element; and, for stations employing directional antenna systems, the radio frequency current at the point of common input to the directional antenna.

(b) In the event that any one of these indicating instruments becomes defective when no substitute which conforms with the required specifications is available, the station may be operated without the defective instrument, pending its repair or replacement, for a period not in excess of 60 days without further authority of the Commission: Provided, That: (1) Appropriate entries shall be made in the maintenance log of the station, showing the date and time the meter was removed from and actually restored to service. (3) If the defective instrument is the antenna current meter of a nondirectional station which does not employ a remote antenna ammeter, or if the defective instrument is the common point meter of a station which employs a directional antenna, and does not employ a remote common point meter, the operating power shall be determined by the indirect method (in accordance with Sec. 73.52) during the entire time the station is operated without the antenna current meter or common point meter. However, if a remote antenna ammeter or a remote common point meter is employed and the antenna current meter or common point meter becomes defective, the remote meter may be used in determining operating power by the direct method, pending the return to service of the regular meter, provided other meters are maintained at same value previously employed.

(c) If conditions beyond the control of the licensee prevent the restoration of the meter to service within the above allowed period, informal request (in accordance with Sec. 1.549) may be filed with the Engineer-in-Charge of the radio district in which the station is located, for such additional time as may be required to complete repairs of the defective instrument.

(d) Remote antenna ammeters and remote common point meters are not required; therefore, authority to operate without them is not necessary. However, if a remote antenna ammeter or common point meter is employed and becomes defective, the antenna base currents (as stated above) may be read and logged once daily for each mode of operation, pending the return to service of the regular remote meter.

Q. 5. What should an operator do if the remote control devices at a station so equipped malfunction? (R & R 73.67)

A. If the remote control devices at a station malfunction, the operator should cease operating by remote control.

Q. 6. What is the permissible % of modulation for AM and FM stations? (R & R 73.55, 73.268)

A. In both AM and FM, the percentage of modulation shall be maintained as high as possible, consistent with good quality of transmission and good broadcast practice.

In a standard (AM) broadcast station, the percentage of modulation is not to exceed 100% on negative peaks of frequent recurrence, or 125% on positive peaks at any time.

In FM, the percentage of modulation is not to exceed 100% on either positive or negative peaks of frequent recurrence.

In both AM and FM, the percentage of modulation should not be less than 85% on peaks of frequent occurrence; but where necessary to avoid objectionable loudness, modulation may be reduced to whatever level is necessary, even if the resulting modulation is substantially less than 85% on peaks of frequent occurrence.

Modulation in excess of 100% is called overmodulation. It is to be avoided because it causes interference in AM and FM transmission. It causes distortion in AM transmission.

A low percentage of modulation is called undermodulation. Undermodulation is undesirable because it results in weak reception.

Q. 7. What is the permissible frequency tolerance of standard broadcast stations? (R & R 73.59) of FM stations? (R & R 73.269)

A. The operating frequency of each AM broadcast station should be maintained within 20 cycles of the assigned frequency. The center frequency of each FM broadcast station should be maintained within 2000 cycles of the assigned center frequency.

Q. 8 (a) How is the operating power of a standard broadcast station determined? (R & R 73.51) (b) What is the operating power of a normally operating standard (AM) broadcast station having a final plate voltage of 800 volts, a final plate current of 1000 ma., an antenna resistance of 52 ohms, an antenna current of 3.2 amperes and an F factor of 0.7. (c) How is the operating power of an FM station determined? (R & R 73.267) (d) Using the indirect method, what is the operating power of the above transmitter?

A. (a) (1) Except as provided in paragraph (2) of this section, the operating power shall be determined by the direct method (the square of the antenna current times the antenna resistance at the point where the current is measured and at the operating frequency).

(2) Operating power shall be determined on a temporary basis by the indirect method: (i) In the case of an emergency where the licensed antenna system has been damaged by causes beyond the control of the licensee (see Sec. 73.45), or (ii) Pending completion of authorized changes in the antenna system, or (iii) If any change is made in the antenna system or any other change is made which may affect the antenna system. (See Sec. 73.45).

In the indirect method, the operating power or antenna power

is found by the formula:

$$P = E_p \times I_p \times F.$$

where: E_p = plate voltage of last stage in volts, I_p = total plate current of last stage in amperes and F = efficiency factor. The efficiency factor is either given by the transmitter manufacturer or by a table in the Rules and Regulations (73.51).

(b) Since the direct method must be used, we used the power formula involving the antenna current (I) and the antenna resistance (R):

$$P = I^2R = (3.2)^2 \times 52 = 3.2 \times 3.2 \times 52 = 532.5 \text{ watts.}$$

(c) The operating power of an FM station is determined by using either the direct or the indirect method. Using the direct method, the power is measured by an RF transmission line meter at the output terminals of the transmitter, while operating into a dummy load of substantially zero reactance and a resistance equal to the transmission line characteristic impedance. The indirect method used for FM stations is the same as that used for AM stations.

(d) Using the indirect method formula, we can find the operating power:

$$P = E_p \times I_p \times F = 800 \times 1 \times .7 = 560 \text{ watts.}$$

Q. 9(a) What stations may be operated by a third class broadcast operator and what equipment adjustments may they perform? (b) What should be the normal operating position of a radio operator? (R & R 73.93, 73.265)

A. Except for a very limited number of standard broadcast stations, using critical directional antenna arrays, licensees of AM and FM broadcast stations may employ third class operators for the routine station operations. However, if a station licensee elects to use third class operators, he is subject to many additional requirements. In most cases, a supervisory operator holding a Radiotelephone First-Class Operator's license must be employed either on a full-time or part-time basis.

With the exceptions set forth below, adjustments of the transmitting system, inspection, maintenance, repairs, required equipment performance measurements and required field strength measurements must be performed only by a first-class radiotelephone operator.

Except at times when the operation of the station is under the immediate supervision of an operator holding a valid radiotelephone first-class operator license, adjustments of the transmitting equipment by a third class operator shall be limited to the following:

(1) Those necessary to turn the transmitter on and off.

(2) Adjustments of external controls as may be required to compensate for voltage fluctuations in the power supply.

(3) Adjustments of external controls to maintain modulation of the transmitter within the prescribed limits.

(4) Adjustments of external controls necessary to effect routine changes in operating power which are required by the station's

instrument of authorization.

(5) Adjustments of external controls necessary to effect operation in accordance with a National Defense Emergency Authorization during an Emergency Action Condition.

(6) Those necessary to change between nondirectional and directional or between differing radiation patterns, provided that such changes require only activation of switches and do not involve the manual tuning of the transmitter final amplifier or antenna phasor equipment. The switching equipment shall be so arranged that the failure of any relay in the directional antenna system to activate properly will cause the emissions of the station to terminate.

It shall be the responsibility of the licensee to insure that the person who may be required to perform these tasks, as well as to perform other duties (such as reading meters and making log entries) is properly instructed so as to be capable of performing the duties required of him at times when not under the immediate supervision of a radiotelephone first-class operator. Where necessary, printed step-by-step instructions shall be posted for those transmitter adjustments which the lesser grade operator is authorized to make. Should the transmitting apparatus be observed to be operating in any manner inconsistent with this subpart or the current instrument of authorization for the station at any time when an operator holding a valid radiotelephone first-class operator license is not immediately available, and none of the above adjustments is effective in correcting the condition of improper operation, the emissions of the station shall be immediately terminated.

(b) One or more operators holding a radio operator license or permit of a grade specified in this section, shall be in actual charge of the transmitting system, and shall be on duty either at the transmitter location or at the remote control point. If operation by remote control has not been authorized, the transmitter, required monitors and other required metering equipment, shall be readily accessible and located sufficiently close to the operator at the normal operating position that deviations from normal indications of required instruments can be observed within a 360° arc from that position. If operation by remote control is authorized, the required controls and instruments shall be readily accessible, and located sufficiently close to the operator at the normal operating position that deviations from normal indications of required metering instruments can be observed in a 360° arc from that position.

Q. 10. What are the power limitations on broadcast stations? (R & R 73.52)

A. The actual antenna input power of each station shall be maintained as near as is practicable to the authorized antenna input power and shall not be less than 90 percent nor greater than 105 percent of the authorized power; except that, if, in an emergency, it becomes technically impossible to operate with the authorized power, the station may be operated with reduced power for

a period of 10 days, or less, without further authority from the Commission. If causes beyond the control of the permittee or licensee prevent restoration of authorized power within the allowed period, informal written request shall be made to the Commission in Washington, D. C., no later than the 10th day for such additional time as may be deemed necessary.

Q. 11. What logs must be kept by broadcast stations according to the Rules and Regulations of the FCC? (R & R 73.111)

A. The licensee or permittee of each standard broadcast station shall maintain program, operating and maintenance logs. The logs shall be kept in an orderly and legible manner, in suitable form, and in such detail that the data required for the particular class of station concerned is readily available. Time entries shall be either in local standard or daylight saving time and shall be indicated accordingly. Each log sheet shall be numbered and dated. No log or preprinted log or schedule which becomes a log, or portion thereof, shall be erased, obliterated, or willfully destroyed within the period of retention provided by the provision of this part. Any necessary correction shall be made only pursuant to Sections 73.112 and 73.113, and only by striking out the erroneous portion, or by making a corrective explanation on the log or attachment to it, as provided in those sections. Entries shall be made in the logs as required by Sections 73.112 and 73.113.

The operating log and the maintenance log may be kept individually on the same sheet in one common log, at the option of the permittee or licensee.

Q. 12. Who keeps the logs? (R & R 73.111)

A. Each log shall be kept by the station employee or employees (or contract operator) competent to do so, having actual knowledge of the facts required, who in the case of program and operating logs, shall sign the appropriate log when starting duty, and again when going off duty.

Q. 13. What entries are made in the program log? (R & R 73.112) In the operating log? (R & R 73.113)

A. The following entries shall be made in the program log:

(1) For each program: an entry identifying the program by name or title, an entry of the time each program begins and ends, an entry classifying each program as to type (news, religious, entertainment, sports), an entry classifying each program as to source, an entry for each program presenting a political candidate showing the name and political affiliation for such candidate.

(2) For commercial matter: an entry identifying the sponsor(s) of the program, the person(s) who paid for the announcement, or the person(s) who furnished materials or services of any kind (such as records, transcriptions, talent, scripts, etc.), an entry showing the total amount of commercial continuity within each commercially sponsored program, an entry showing the duration of each commercial announcement, an entry which shows either the begin-

ning time of each such announcement or which divides the log to show the fifteen minute time segment within which the announcement was broadcast, and an entry showing that the appropriate announcements (sponsorship, furnishing material, or services, etc.) have been made.

(3) For Public service announcements: an entry showing that a public service announcement has been broadcast, together with the name of the organization or interest on whose behalf it has been made.

(4) For other announcements: an entry of the time that each station identification is made (call letters and licensed location), an entry for each announcement presenting a political candidate showing the name and political affiliation of such candidate, and entry showing that a mechanical reproduction announcement has been made. The licensee, whether employing manual or automatic logging, or a combination thereof, must be accurately able to furnish the Commission with all information required to be logged.

Manually kept log. Where, in any program log, or preprinted program log, or program schedule which upon completion is used as a program log, a correction is made before the person keeping the log has signed the log upon going off duty, such correction, no matter by whom made, shall be initialed by the person keeping the log prior to his signing of the log when going off duty, as attesting to the fact that the log, as corrected, is an accurate representation of what was broadcast. If corrections or additions are made on the log after it has been so signed, explanation must be made on the log or on an attachment to it, dated and signed by either the person who kept the log, the station program director or manager, or an officer of the licensee.

The following entries shall be made in the operating log by the properly licensed operator in actual charge of the transmitting apparatus only:

(1) An entry of the time the station begins to supply power to the antenna and the time it stops.

(3) An entry at the beginning of operation in each mode and at intervals not exceeding three hours, of the following (actual readings observed prior to making any adjustments to the equipment) and, when appropriate, an indication of corrections made to restore parameters to normal operating values: (i) Operating constants of last radio stage (total plate voltage and plate current). (ii) Antenna current or common point current (if directional) without modulation. (iii) Frequency monitor reading.

(4) An entry each day of the following where applicable: (i) Antenna base current(s) without modulation for each mode of operation: (a) Where remote antenna meters or a remote common point meter are normally employed but are defective. (b) Where required by the station license for directional antenna operation. (ii) Where there is remote control operation of a directional antenna station, readings for each pattern taken at the transmitter (within two hours of commencement or operation with each pattern)

of: (a) Common point current without modulation. (b) Base current(s) without modulation. (c) Phase monitor sample loop current(s) without modulation. (d) Phase indications.

(5) Any other entries required by the instrument of authorization or the provisions of this part.

(6) The entries required by Section 17.49 and (c) of this chapter. (b) Automatic devices accurately calibrated and with appropriate time, date and circuit functions may be utilized to record the entries in the operating log: Provided, That: (1) They do not affect the operation of circuits or accuracy of indicating instruments of the equipment being recorded; (2) The recording devices have an accuracy equivalent to the accuracy of the indicating instruments; (3) The calibration is checked against the original indicators at least once a week and the results noted in the maintenance log; (4) Provision is made to actuate automatically an aural alarm circuit located near the operator on duty, if any of the automatic log readings are not within the tolerances or other requirements specified in the rules or instrument of authorization; (5) Devices which record each parameter in sequence must read each parameter at least once during each 10-minute period and clearly indicate the parameter being recorded; (6) The automatic logging equipment is located at the remote control point if the transmitter is remotely controlled, or at the transmitter location if the transmitter is manually controlled; (7) The automatic logging equipment is located in the near vicinity of the operator on duty and is inspected by him periodically during the broadcast day; and (8) The indicating equipment conforms with the requirements of Sec. 73.39 except that the scales need not exceed 2 inches in length and arbitrary scales may not be used.

Manually kept log. Any necessary corrections in a manually kept operating log shall be made only by the person making the original entry who shall make and initial each correction prior to signing the log when going off duty, in accordance with 73.111(a). If corrections or additions are made on the log after it has been so signed, explanation must be made on the log or on an attachment to it, dated and signed by either the operator who kept the log, the station technical supervisor or an officer of the licensee.

FM stations, using the direct method of determining power, log the RF transmission line meter reading rather than the antenna current, as in AM stations.

Q. 14. When may abbreviations be used in the station's logs? (R & R 73.111)

A. Key letters or abbreviations may be used if proper meaning or explanation is contained elsewhere in the log.

Q. 15. How may a station's logs be corrected?(R & R 73.111).

A. Any necessary correction to a station's logs may be made by striking out the erroneous portion, initialing the correction made, and indicating the date of correction. Also, see Answer 13 above.

Q. 16. According to the Rules and Regulations of the FCC, how long must station logs be retained? (R & R 73.115)

A. Logs of standard broadcast stations shall be retained by the licensee or permittee for a period of two years: Provided, however, That logs involving communications incident to a disaster or which include communications incident to or involved in an investigation by the Commission and concerning which the licensee or permittee has been notified, shall be retained by the licensee or permittee until he is specifically authorized in writing by the Commission to destroy them: Provided, further, That logs incident to or involved in any claim or complaint of which the licensee or permittee has notice, shall be retained by the licensee or permittee until such claim or complaint has been fully satisfied, or until the same has been barred by statute limiting the time for the filing of suits upon such claims.

Q. 17. What information must be given to an FCC inspector at any reasonable hour? (R & R 73.116)

A. The following shall be made available upon request by an authorized representative of the FCC: (a) Program, operating and maintenance logs. (b) Equipment performance measurements required by Sec. 73.47. (c) Copy of most recent antenna resistance or common-point impedance measurements submitted to the Commission. (d) Copy of most recent field intensity measurements to establish performance of directional antennas required by Sec. 73.151.

Q. 18. What must be included in a station identification and how often is it given? (R & R 73.117)

A. Station identification shall consist of the call letters and location of the station.

These identification announcements must be made: (1) At the beginning and ending of each time of operation, and (2) hourly, as close to the hour as feasible, at a natural break in program offerings. Television broadcast stations may make these announcements visually or aurally.

Q. 19. What should an operator do if the modulation monitor becomes defective? (R & R 73.56)

A. (a) Each station shall have in operation, either at the transmitter or at the place the transmitter is controlled, a modulation monitor of a type approved by the Commission. (b) In the event that the modulation monitor becomes defective, the station may be operated without the monitor, pending its repair or replacement, for a period not in excess of 60 days without further authority of the Commission: Provided, That: (1) Appropriate entries shall be made in the maintenance log of the station showing the date and time the monitor was removed from and restored to service.
(3) The degree of modulation of the station shall be monitored with a cathode ray oscilloscope or other acceptable means.

Q. 20. What should an operator do if the frequency monitor meter becomes defective? (R & R 73.252)

A. (a) The licensee of each station shall have in operation, either at the transmitter or at the place where the transmitter is controlled, a frequency monitor of a type approved by the Commission which shall be independent of the frequency control of the transmitter.

(b) In the event that the frequency monitor becomes defective, the station may be operated without the monitor pending its repair or replacement, for a period not in excess of 60 days, without further authority of the Commission: Provided, That: (1) Appropriate entries shall be made in the maintenance log of the station showing the date and time the monitor was removed from and restored to service. (2) The frequency of the station shall be compared with an external frequency source of known accuracy at sufficiently frequent intervals to insure that the frequency is maintained within the tolerance prescribed in Sec. 73.269. An entry shall be made in the station log as to the method used and the results thereof.

(c) If conditions beyond the control of the licensee prevent the restoration of the monitor to service within the above allowed period, informal request, in accordance with Sec. 1.549 of this chapter, may be filed with the Engineer-in-Charge of the radio district in which the station is located, for such additional time as may be required to complete repairs of the defective instrument.

NOTE: The above rule may be changed in the near future. It is advisable to keep informed about any possible changes.

Q. 21. When should minor corrections to the transmitter be made? Before or after logging the meter readings? (R & R 73.113)

A. Minor corrections to the transmitter should be made after logging the meter readings.

Q. 22. Should the sponsor's name ever be omitted when reading commercials on the air? (R & R 73.119)

A. No. Additional information: (a) When a standard broadcast station transmits any matter for which money, services or other valuable consideration is either directly or indirectly paid or promised to, or charged or received by, such station, the station shall broadcast an announcement that such matter is sponsored, paid for, or furnished, either in whole or in part, and by whom or on whose behalf such consideration was supplied: Provided, however, That "service or other valuable consideration" shall not include any service or property furnished without charge or at a nominal charge for use on, or in connection with, a broadcast unless it is so furnished in consideration for an identification in a broadcast of any person, product, service, trademark, or brand name beyond an identification which is reasonably related to the use of such service or property on the broadcast.

Q. 23. When should an operator announce a program as "recorded? (R & R 73.118)

A. Any taped, filmed or recorded program material in which time is of special significance, or by which an affirmative attempt is made to create the impression that it is occurring simultaneously with the broadcast, shall be announced at the beginning as taped, filmed or recorded. The language of the announcement shall be clear and in terms commonly understood by the public. For television stations, the announcement shall be made visually or aurally.

Taped, filmed or recorded announcements which are of a commercial, promotional or public service nature, need not be identified as taped, filmed or recorded.

Q. 24. How often should the tower lights be checked for proper operation? (R & R 17.47)

A. (a) The licensee of any radio station which has an antenna structure requiring illumination: (1) shall make an observation of the tower lights at least once each 24 hours, either visually or by observing an automatic and properly maintained indicator designed to register any failure of such lights; or alternatively, (2) Shall provide and properly maintain an automatic alarm system designed to detect any failure of such lights and to provide indication of such failure to the licensee.

(b) Shall inspect at intervals not to exceed 3 months, all automatic or mechanical control devices, indicators, and alarm systems associated with the tower lighting to insure that such apparatus is functioning properly.

Q. 25. What record is kept of tower light operation? (R & R 17.49)

A. The licensee of any radio station which has an antenna structure requiring illumination, shall make the following entries in the station record of the inspections:

(a) The time the tower lights are turned on and off each day, if manually controlled;

(b) The time the daily check of proper operation of the tower lights was made, if automatic alarm system is not provided;

(c) In the event of any observed or otherwise known failure of a tower light: (1) Nature of such failure. (2) Date and time the failure was observed, or otherwise noted. (3) Date, time and nature of the adjustments, repairs or replacements made. (4) Identification of Flight Service Station (Federal Aviation Agency) notified of the failure of any code or rotating beacon light or top light not corrected within 30 minutes, and the date and time such notice was given. (5) Date and time notice was given to the Flight Service Station (Federal Aviation Agency) that the required illumination was resumed.

(d) Upon completion of the periodic inspection required at least once each three months: (1) The date of the inspection and the

condition of all tower lights and associated tower lighting control devices, indicators and alarm systems. (2) Any adjustments, replacements or repairs made to insure compliance with the lighting requirements, and the date such adjustments, replacements or repairs were made.

Q. 26. What should an operator do if the tower lights fail? (R & R 17.48)

A. (a) If the tower lights fail, the operator shall report immediately by telephone or telegraph to the nearest Flight Service Station, or office of the Federal Aviation Agency, any observed or otherwise known failure or improper functioning of a code or rotating beacon light or top light not corrected within 30 minutes, regardless of the cause of such failure. Further notification by telephone or telegraph shall be given immediately upon resumption of the required illumination.

(b) Any extinguishment or improper functioning of a steady burning side or intermediate light, or lights, shall be corrected as soon as possible, but notification to the FAA of such extinguishment or improper functioning is not required.

Q. 27. What is an Emergency Action Notification? (R & R 73.907)

A. The Emergency Action Notification is the notice (with or without an Attack Warning) to all licensees and regulated services of the Federal Communications Commission and to the general public, of the existence of an Emergency Action Condition. The Emergency Action Notification is released upon direction of the President of the United States, and is disseminated only via the Emergency Action Notification System.

Q. 28. What is an Emergency Action Condition? (R & R 73.908)

A. An Emergency Action Condition is the condition which exists after the transmission of an Emergency Action Notification and before the transmission of the Emergency Action Termination.

Q. 29. What equipment must be installed in broadcast stations in regard to reception of an Emergency Action Notification? (R & R 73.933)

A. (a) All broadcast station licensees must install and operate, during their hours of broadcast operation, equipment capable of receiving Emergency Action Notifications or Terminations transmitted by other radio broadcast stations. This equipment must be maintained in operative condition, including arrangements for human listening watch or automatic alarm devices, and shall have its termination at each transmitter control point. However, where more than one broadcast transmitter is controlled from a common point by the same operator, only one set of equipment is required at that point.

(b) The off-the-air monitoring assignment of each standard, FM and television broadcast station is specified in the Detailed

State Emergency Broadcast System (EBS) Operational Plan. Particular attention should be paid to avoiding "closed loops" in monitoring assignments.

(c) Prior to commencing routine operation or originating any emissions under program test, equipment test, experimental, or other authorizations or for any other purpose, licensees or permittees shall first ascertain whether an Emergency Action Condition exists and, if so, shall operate only in accordance with the Basic Emergency Broadcast System (EBS) Plan and Detailed State Emergency Broadcast System (EBS) Operational Plan.

Q. 30. How often should EBS test transmissions be sent? During what time period are they sent? (R & R 73.961)

A. EBS test transmissions of the Emergency Action Notification System will be conducted by standard, FM and television broadcast stations once each week on an unscheduled basis, between the hours of 8:30 a.m. and local sunset. Noncommercial educational FM broadcast stations with a transmitter output of 10 watts or less, are not required to conduct these tests. The Blue Card, identified as Third Method EAN Tests, which has been furnished to all standard, FM and television broadcast stations, sets forth details of these test transmissions.

Q. 31. During a period of an Emergency Action Condition, what should all non-participating stations do? (R & R 73.932(a))

A. Non-participating stations must observe radio silence. Additional information: All broadcast stations are to be furnished complete instructions on color coded cards (yellow, white, red, blue). Each card specifies the procedure to be followed (texts of these cards are included in Annex V of the EBS Plan). Immediately upon receipt of an Emergency Action Notification (yellow card) all standard, commercial FM and noncommercial educational FM broadcast stations with a transmitter output of over 10 watts, and television broadcast stations, including all such stations operating under equipment or program test authority, will proceed as set forth in paragraph (a) or (b) of this section, as applicable:

(a) Receipt of the Emergency Action Notification without Attack Warning:

(1) Discontinue normal program and follow the detailed transmission procedures set forth on the White Card entitled "Broadcast Message" EAN-1. This White Card has been furnished to all licensed broadcast stations for posting in all studios and broadcast positions.

(2) Upon completion of these detailed transmission procedures, all licensed broadcast stations which do not hold a National Defense Emergency Authorization (NDEA) shall discontinue operation for the duration of the Emergency Action Condition.

(b) Receipt of the Emergency Action Notification with Attack Warning:

(1) Discontinue normal program and follow the detailed transmission procedures set forth on the Red Card entitled "Broadcast Message" EAN-2. This Red Card has been furnished to all licensed broadcast stations for posting in all studios and broadcast operating positions.

(2) Upon completion of these detailed transmission procedures, all licensed broadcast stations which do not hold a National Defense Emergency Authorization (NDEA) shall discontinue operation for the duration of the Emergency Action Condition.

Q. 32. If the tower lights of a station are required to be controlled by a light-sensitive device, and this device malfunctions, when should the tower lights be "on"? (R & R 17.25(a)(3))

A. If the light sensitive device malfunctions, the tower lights should be on at all times.

Additional information: (a) Antenna structures over 150 feet up to and including 300 feet in height above the ground shall be lighted. (3) All lights shall burn continuously or shall be controlled by a light sensitive device, adjusted so that the lights will be turned on at a north sky light intensity level of about 35 foot candles and turned off at a north sky light intensity level of about 58 foot candles.

Q. 33. (a) What is meant by the term "rebroadcast"? (b) What is the rule regarding the rebroadcasting of a program of another broadcasting station? (R & R 73.1207)

A. (a) The term "rebroadcast" means reception by radio of the programs of a radio station, and the simultaneous or subsequent retransmission of such programs by a broadcast station.

(b) No broadcasting station shall rebroadcast the program, or any part thereof, of another broadcasting station without the express authority of the originating station. A copy of the written consent, of the licensee originating the program shall be kept by the licensee of the station rebroadcasting such program, and shall be made available to the Commission upon request.

FCC-TYPE EXAMINATION
ELEMENT 1

1. A response to a Notice of Violation must be made within:
   a. 10 days
   b. 24 hours
   c. 3 days
   d. 30 days

2. After receipt of a Notification of Suspension, the suspension order becomes effective within:
   a. 24 hours
   b. 30 days
   c. 3 days
   d. 15 days

3. The urgency signal is second in priority to:
   a. Communications relative to direction-finding bearings
   b. Communications preceded by a safety signal
   c. Distress calls, distress messages, and distress traffic
   d. Important international commerce bulletins

4. Corrections in the radio log may be made by:
   a. An operator licensed by the FCC
   b. The person who made the initial entry
   c. A notary public
   d. A person familiar with the operation of the installation

5. Radio stations are subject to inspection by:
   a. Any federal agency
   b. The Federal Bureau of Investigation
   c. The Federal Communications Commission
   d. The Federal Radio and Wire Authority

6. An application for renewal of a radio operator's license may be made:
   a. 15 months before expiration of the current license
   b. Within a year of expiration of the current license
   c. At all times, if there have been no violations
   d. Within 15 days of issuance of the original license

7. The secrecy provisions of the law do not apply to:
   a. Commercial bulletins
   b. Danish bulletins
   c. Holders of 1st Class Radiotelephone Operator's Licenses
   d. Distress messages

8. A response to a Notice of Violation must be addressed to:
   a. Any office of the Federal Communications Commission
   b. Any police authority of the continental United States
   c. The office of the FCC that originated the official notice
   d. The nearest Federal District Court

9. A person who has received an order of suspension may:
   a. Disregard the violation if he feels it to be unjust
   b. Request a hearing
   c. Order a court injunction on the FCC office
   d. Operate with an input power of less than 1 kilowatt

10. False signals of distress are:
   a. Allowed only if very low power is used
   b. Prohibited by law
   c. Common practical jokes among experienced operators
   d. Good tests of rescue facilities

11. Applicants for FCC licenses must generally be:
   a. Citizens of the United States only
   b. Citizens of the United States and Canada only
   c. Citizens of any country, provided they have held a radio operator's license of their respective country
   d. Citizens of English speaking countries

12. The usual license term for a radio operator is:
   a. one year
   b. two years
   c. three years
   d. five years

13. The second class radiotelephone license of a radio operator who qualifies for a first class license is:
   a. Kept in force for a period of one year
   b. Automatically cancelled
   c. Kept in force as long as the first class license is valid
   d. Kept in force for a period of two years

14. An operator who loses a license must:
   a. Not operate until he receives a duplicate
   b. Notify the FCC within 15 days
   c. Exhibit a copy of his application for a duplicate license while continuing to operate the station pending receipt of the duplicate license.
   d. Notify (within 10 days) the field office that issued the orginal license

15. Which of the following need not be done in correcting an error in a log:
   a. Indicate date of correction
   b. Indicate time of correction
   c. Initial the correction
   d. Strike out erroneous portion

16. Unidentified or superfluous radio communications may:
   a. Be transmitted on frequencies above 30 Mc.

b. Not be transmitted at all
c. Be transmitted on frequencies that are not used for distress, urgent or safety signals.
d. None of the above

17. A person who willfully violates a provision of the Communications Act of 1934 faces a penalty of:
a. Not more than $500 fine
b. Not more than $10, 000 fine
c. Not more than $10, 000 fine and imprisonment for a term not exceeding one year
d. Not more than $5, 000 fine and imprisonment for a term not exceeding two years

18. Any person who knowingly violates a rule made by the Federal Communications Commission, shall, in addition to other penalties provided by law, receive a fine of not more than:
a. $500 for each day during which the offense occurs
b. $1000 for each day during which the offense occurs
c. $50 for each day during which the offense occurs
d. None of the above

19. A licensee who receives a notice that he has violated an FCC rule, must:
a. Send a written answer to the FCC in Washington, D. C. within 10 days.
b. Send a written answer to the FCC in Washington, D. C. within 15 days
c. Send a written answer to the FCC office originating the notice within 10 days.
d. Send a written answer to the FCC office originating the notice within 15 days.

20. The FCC may not suspend an operator license upon proof that the licensee:
a. Has failed to carry out a lawful order of the master of the ship on which he is employed.
b. Has transmitted superfluous radio communications
c. Has assisted another to obtain an operator's license by fraudulent means
d. None of the above

FCC-TYPE EXAMINATION

ELEMENT 2—SERIES "O"

1. The word "OVER" indicates:
   a. The conclusion of a series of transmissions
   b. The station is leaving the air temporarily
   c. The transmission is over and no response is expected
   d. The transmission is over and a reply is expected

2. The system of substituting words for corresponding letters is known as:
   a. The Dewey system
   b. The substitute transmission method
   c. The phonetic system
   d. The safety-sending method

3. The word "OUT" means:
   a. The station is being interfered with
   b. The station is leaving the air
   c. The transmission is ended and a response is expected.
   d. The transmission is concluded and no response is expected.

4. Shouting into a microphone may cause:
   a. Deattenuation
   b. Amplification
   c. Rectification
   d. Overmodulation

5. When speaking into a microphone in a noisy location, it is good practice to:
   a. Shield the microphone with the hands
   b. Shout directly into the microphone
   c. Turn down the audio gain control
   d. Speak very softly

6. Unnecessary calling should be avoided since it may cause:
   a. Overmodulation
   b. Interference with other stations
   c. Electro-magnetic decoupling
   d. Antenna wear

7. In radiotelephony, the words "READ BACK" mean:
   a. I am repeating my previous transmission
   b. This transmission is being read
   c. Repeat the entire message back to me exactly as you have received it
   d. This is a "copied" transmission, not an original reading.

8. A separation between portions of a single transmission should be indicated by inserting the word:
   a. SEPARATE
   b. STOP
   c. BREAK
   d. SECURITY

9. The licensed operator of a ship's radiotelephone station exhibits his authority to operate by:
   a. Wearing a lapel pin with his registration number
   b. Printing circulars with his qualifications stated plainly
   c. Demonstrating proficiency in reception of American Morse Code
   d. Posting his license conspicuously at the principal location of the station

10. All calling should be:
   a. Lengthy and detailed
   b. Done on working frequencies
   c. Clear and concise
   d. Repeated several times

11. When voice transmissions are not being made, the transmitter should be:
   a. Dismantled
   b. Moved away from windows, air vents, etc.
   c. Kept on the air
   d. Kept off the air

12. If an operator is told that his voice is distorting, he should:
   a. Speak more softly or back away from the microphone
   b. Report the insult to the FCC
   c. Dismantle the modulator immediately
   d. Use A1 emission promptly

13. An operator will find specifications for obstruction marking and lighting for antenna towers in:
   a. The Communications Act of 1934
   b. Part 17 of the FCC Rules and Regulations
   c. The Geneva Radio Regulations of 1934
   d. The bulletins issued by the nearest FCC office

14. In the event of an emergency, an operator may:
   a. Increase his power in excess of the amount specified in the instrument of authorization
   b. Utilize his station in a manner other than that specified in the instrument of authorization
   c. Not utilize his station at all
   d. Transmit on frequencies other than those specified in the instrument of authorization

15. When a person other than the licensed operator speaks into a microphone, responsibility for proper operation of the station is borne by:
    a. The owner of the station
    b. The licensed operator in charge of the station
    c. The person himself, provided he is over 21 years of age
    d. The person himself, provided he is over 18 years of age

16. In radiotelephone communications, a common expression "Repeat" means:
    a. Speak slower
    b. Say again
    c. Repeat twice
    d. Use the phonetic alphabet

17. An operator who leaves his station unattended in a public place:
    a. Is not responsible for the transmitter when he is not present
    b. Must make it inaccessible to unauthorized persons
    c. Must always leave another licensed operator with the transmitter during daytime hours
    d. Must turn the transmitter off

18. An operator who hears profanity being used at his station need not:
    a. End the transmission
    b. Enter relevant details into the log
    c. Repeat the incident to the FCC
    d. Personally order a citizens arrest of the person uttering the profanity.

19. The word "Clear" when used in radiotelephone indicates that:
    a. The transmission is completed and no response is expected
    b. The immediately preceding message has been received and is completely understood
    c. The transmission is completed and a response is expected
    d. The next message has nothing to do with the previous message.

20. In testing a radiotelephone transmitter, an operator should not:
    a. Clearly indicate that he is testing
    b. Give the station call sign
    c. Interfere with other communications
    d. Test for as short a time as possible

FCC-TYPE EXAMINATION

ELEMENT 2 — SERIES "M"

1. The Radiotelephone distress signal is indicated by the word:
   a. Distress
   b. S.O.S.
   c. Attention
   d. Mayday

2. The spoken word "PAN" is the:
   a. Security signal
   b. Invitation to transmit
   c. Symbol for Pan American Navigation stations
   d. Urgent signal

3. A distress message should NOT include:
   a. The name of the vessel
   b. The name of the operator on duty
   c. The nature of the distress
   d. The position of the vessel

4. The safety signal consists of the word:
   a. Attention
   b. Security
   c. Danger
   d. Safety

5. A safety message consists of:
   a. Information concerning the safety of navigation
   b. Information concerning radio maintenance
   c. Standard hints for maintaining on-the-air safety
   d. Tests for checking the safety of radar units

6. The safety signal has priority over:
   a. The distress signal
   b. Communications relative to direction-finding bearings
   c. Communications preceded by an urgent signal
   d. Distress traffic

7. A mobile radio station may send a distress message for another mobile station in distress if:
   a. The station in distress is not capable of sending one itself.
   b. Weather conditions appear to be deteriorating
   c. There is a risk of loss of life
   d. Many Coast Guard cutters appear to be rushing to the scene.

8. In the case of a mobile radio station in distress, responsibility for the control of distress traffic is upon:
   a. All stations in the area

b. The station in distress, or any station that it may delegate such power to
c. The most powerful station in the area
d. All stations outside of the continental limits of the U.S.

9. The signal with lowest priority is:
   a. The general communication call
   b. The distress signal
   c. The security signal
   d. The urgency signal

10. Stations using a shared frequency should:
   a. Limit transmissions to 3 minutes in duration
   b. Never operate at night
   c. Keep the power level high at all times
   d. Leave an interval between calls

11. Before making a call on the calling frequency, it is good operating practice to:
   a. Test the transmitter on the calling frequency
   b. Listen on the working frequency that is to be used later
   c. Check for intermittent parasitic oscillations
   d. Issue a vague distress message

12. The international calling frequency of the maritime mobile service is:
   a. 14 megacycles
   b. 14.2 megacycles
   c. 2182 kilocycles
   d. 2182 megacycles

13. No charge is made for messages relating to:
   a. Birthday greetings
   b. News bulletins
   c. Distress traffic
   d. Personal messages

14. Upon hearing the word "SECURITY" repeated 3 times, an operator must:
   a. Call the station
   b. Attempt to jam the frequency
   c. Continue listening on the frequency until the message is over
   d. Try to attract the attention of all stations in the vicinity

15. The shipboard radiotelephone station should be tested by:
   a. Noticing the color of the chassis during operation
   b. Transmitting a random text of 5 minutes duration
   c. Transmitting the official call sign followed by the word "TEST"
   d. Transmitting the appropriate Coast Guard call letters

16. In acknowledging a distress call, care should be taken so that the acknowledgment:
    a. Is not received by the distressed vessel
    b. Is not picked up by foreign ships
    c Does not imply that the distress message has been received
    d. Does not interfere with acknowledgments of other acknowledgments from vessels better able to assist

17. Calling frequencies should be used for:
    a. All personal messages
    b. Normal exchange of prolonged messages
    c. All transmitter tests
    d. Safety messages

18. The spoken word "MAYDAY" repeated 3 times is the:
    a. Official radio call of Russia
    b. International radiotelephone distress signal
    c. Equivalent of "N. J. Z."
    d. Foreign testing signal

19. Intervals between calls on a shared frequency:
    a. Waste valuable air time
    b. Permit other stations to carry on communications
    c. Confuse monitoring stations
    d. Are prohibited by law

20. Before transmitting on a shared frequency, an operator should:
    a. Listen to insure that he is not interfering with already-established communication
    b. Increase his power, to make sure that his message will be received
    c. Disconnect his receiver
    d. Call the other stations sharing the frequency, to make sure that they do not intend to transmit while he is transmitting.

FCC-TYPE EXAMINATION
ELEMENT 9

1. The percentage of modulation on negative peaks of frequent recurrence in an FM transmitter must not be more than:
   a. 50%
   b. 75%
   c. 85%
   d. 100%

2. 18 milliamperes is equal to:
   a. 18000 amperes
   b. .018 amperes
   c. 1.8 amperes
   d. .18 amperes

3. Using the indirect method, what is the operating power of a transmitter with an efficiency factor of 0.65, whose last RF stage has a plate voltage of 850 volts and a plate current of 60 ma.
   a. 33 watts
   b. 33,150 watts
   c. 51 watts
   d. 51,000 watts

4. Abbreviations may be used in a log:
   a. Only if the operator holds a first class radiotelephone license
   b. Only if they are approved FCC-type abbreviations
   c. If proper meaning or explanation is given elsewhere in the log
   d. Abbreviations may not be used in a log.

5. Corrections in a manually kept operating log may be made:
   a. only by the person making the original entry
   b. By persons competent to do so, having actual knowledge of the facts
   c. Only by the person in charge of the station
   d. Corrections may not be made in a log

6. Station logs must be retained for a period of:
   a. 1 year
   b. 2 years
   c. 3 years
   d. 5 years

7. Logs pertaining to communications involving a disaster must be retained for a period of:
   a. 2 years
   b. 3 years
   c. 5 years
   d. until authorized by the FCC to destroy them

8. The following must be included in a station identification:
   a. Call letters and location.
   b. Call letters.

c. Call letters, location and time.
d. Call letters and time.

9. In general, station identification must be made:
   a. At the beginning and end of each time of operation.
   b. Every 15 minutes.
   c. Every 30 minutes.
   d. At the beginning and end of each time of operation and hourly, as close to the hour as feasible during a natural break in the program.

10. The Standard Broadcast Band refers to the band of frequencies between:
   a. 500 kc. to 1600 kc.
   b. 535 kc. to 1605 kc.
   c. 88 Mc. to 108 Mc.
   d. 550 kc. to 1700 kc.

11. An operator must announce that a recorded program is in fact recorded:
   a. If the program lasts at least one half minute.
   b. Even if it is obvious to all that the program is recorded.
   c. If an attempt is made to create the impression that it is occurring simultaneously with the broadcast.
   d. An announcer need not indicate the fact that a particular program is recorded.

12. E B S stands for:
   a. Emergency Broadcast System.
   b. Energy Broadband System.
   c. Electronic Broadcast Service.
   d. None of the above.

13. E B S test transmissions should be sent at least:
   a. Once a week.
   b. Once a month.
   c. Once each day.
   d. Twice a week.

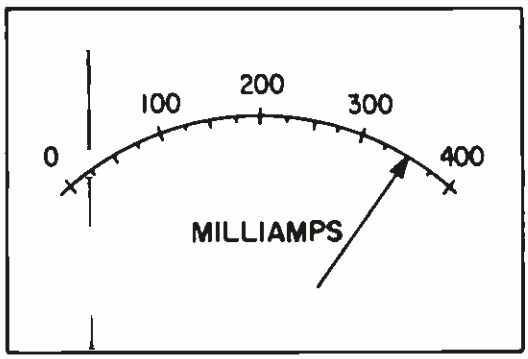
14. During a period of an Emergency Action Condition, non-participating stations:
   a. Must continue their usual activity.
   b. Must observe radio silence.
   c. Must monitor specific stations.
   d. Must keep their carriers on but stop modulation.

15. Tower lights shall be checked:
   a. At least once each week.
   b. At the beginning and end of each days activities.
   c. At exactly one hour after sunset.
   d. At least once each day.

16. If the tower lights fail, the operator must immediately notify the nearest:
    a. Federal Aviation Agency office
    b. F.C.C. office
    c. Civil Air Patrol office
    d. E B S station

17. Which of the following exceeds the power limitations for a 25 kw. broadcast station?
    a. 25.900 kw.
    b. 23 kw.
    c. 22,600 watts.
    d. 26,300 watts.

18. The meter reads:
    a. 350 amperes
    b. 3.5 milliamperes
    c. .35 amperes
    d. 35 amperes



AMMETER

19. In making a log correction, the erroneous portion must be struck out, the corrections made and:
    a. The correction must be initialed
    b. The correction must be initialed and the date of correction must be entered
    c. The bottom of each page where corrections are made must be signed by the operator making the corrections
    d. Slight corrections need not be initialed

20. In the event of a malfunction of a part of the remote control equipment, the licensee:
    a. Must notify the nearest FCC office
    b. May operate for a period of 24 hours while repairs are being made
    c. Must cease operation by remote control
    d. None of the above

ANSWERS TO FCC-TYPE EXAMINATIONS

ELEMENT 1

1. A	5. C	9. B	13. B	17. C
2. D	6. B	10. B	14. C	18. A
3. C	7. D	11. A	15. B	19. C
4. B	8. C	12. D	16. B	20. D

ELEMENT 2 — SERIES "O"

1. D	5. A	9. D	13. B	17. B
2. C	6. B	10. C	14. B	18. D
3. D	7. C	11. D	15. B	19. A
4. D	8. C	12. A	16. B	20. C

ELEMENT 2 — SERIES "M"

1. D	5. A	9. A	13. C	17. D
2. D	6. B	10. D	14. C	18. B
3. B	7. A	11. B	15. C	19. B
4. B	8. B	12. C	16. D	20. A

ELEMENT 9

1. D	5. A	9. D	13. A	17. D
2. B	6. B	10. B	14. B	18. C
3. A	7. D	11. C	15. D	19. B
4. C	8. A	12. A	16. A	20. C

OTHER BOOKS AND COURSES PUBLISHED BY THE AMECO PUBLISHING CORP.

COMMERCIAL RADIO OPERATOR THEORY COURSE. Complete, simplified course for 1st and 2nd Class Radiotelephone Commercial licenses. Contains 21 lessons and over 600 FCC-type multiple choice questions. No technical background needed. 448 pages. Cat. #15-01 ..... $5.95

COMMERCIAL RADIO OPERATOR'S QUESTION & ANSWER LICENSE GUIDE SERIES: #8-01 covers Elements 1, 2 & 9, #9-01 covers Element 3 and #10-01 covers Element 4. Each guide contains questions and answers and sample FCC-type examinations, using multiple-choice questions.

Cat. # 8-01 for 3rd Class Radiotelephone license. 48 pages $0.90
Cat. # 9-01 for 2nd Class Radiotelephone license. 160 pages ..... $2.25.
Cat. #10-01 for 1st Class Radiotelephone license. 80 pages $1.50

AMATEUR RADIO THEORY COURSE. Complete, simplified course covering requirements for Novice, Technician and General classes of licenses. Contains 14 lessons, 3 study guides and over 400 FCC-type multiple choice questions. No technical background required. 320 pages. Cat. #102-01 ... $4.95

RADIO AMATEUR QUESTION AND ANSWER LICENSE GUIDES. Study guides for all classes of radio amateur licenses. Each guide contains easy-to-understand answers for each FCC study question, plus sample FCC-type exams.

Cat. # 5-01 for Novice, Technician, General licenses. 64 pages... $0.75
Cat. #16-01 for Advanced Class license. 48 pages $0.75
Cat. #17-01 for Extra Class license. 48 pages..... $0.75

RADIO ELECTRONICS MADE SIMPLE. Radio theory explained completely in a simple, non-technical manner. No previous radio background is required. Starts with basic electricity and covers all phases of radio, right up through transmitters and receivers. 200 pages. Cat. #3-01..... $1.95

MASTERING THE MORSE CODE. How to learn the Morse code. Includes the code alphabet, sending and receiving, etc. 32 pages. Cat. #6-01..... $0.60

TRANSISTOR THEORY AND CIRCUITS MADE SIMPLE. Transistor theory is explained in a simple, straightforward manner. It explains how transistors operate in amplifiers, oscillators and other electrical circuits. Many practical circuits using transistors are given. 128 pages. Cat. #11-01.... $1.95

RADIO AMATEUR LOG BOOK. Modern, simplified format in small size (6" x 9") makes logging an easy task. 60 pages. Cat. #14-01..... $0.75

DIGITAL COMPUTERS MADE SIMPLE. A basic book, written for the layman with little technical background. Starts with simple number systems and covers all phases of digital computers. 128 pages. Cat. #18-01..... $1.75

CITIZENS BAND RADIO RULES AND REGULATIONS - PART 95. Complete set of CB rules required by FCC of CB users. 48 pages. Cat. #22-01.. $0.75

JUNIOR CODE COURSE. Prepares for Novice and Technician exams. Contains 10 lessons, code speed from start to 8 WPM. Course includes typical FCC-type code exams, instruction book on how to send and receive code the simplest, fastest way, charts to check receiving accuracy, etc.
Cat. #100-33 (33 RPM, 1 LP record) $3.95

SENIOR CODE COURSE. Contains everything given in Junior Code Course, plus 12 additional lessons to bring code speed up to 18 WPM. Prepares one for all Amateur and Second Class Telegraph code examinations.
Cat. #101-33 (33 RPM, 2 LP records)..... $7.50

ADVANCED CODE COURSE. Prepares for General Class license. Contains last 12 lessons of the Senior Code Course, plus FCC-type code examinations. Speed goes from 8-1/2 to 18 WPM. Cat. #103-33 (33 RPM, 1 LP)..... $3.95

EXTRA CLASS CODE COURSE. Increases code speed from 13 to 22 WPM. Includes FCC-type code examination. Cat. #104-33 (33 RPM, 1 LP)... $3.95

GENERAL CLASS SUPPLEMENTARY CODE COURSE. Concentrated code practice between 12 and 15 WPM. Provides additional code practice material for General Class code examination. Cat. #105-33 (33 RPM, 1 LP).... $3.95

EXTRA CLASS SUPPLEMENTARY CODE COURSE. Concentrated code practice between 19 and 24 WPM. Provides additional code practice material for Extra Class code examination. Cat. #106-33 (33 RPM, 1 LP)..... $3.95