Civil Aeronautics Manual 26

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Control-Tower Operator Certificates

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Second Edition

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Introductory Note

Civil Aeronautics Manual 26 contains in a consolidated form (1) Civil Air Regulations Part 26, Control-Tower Operator Certificates, adopted by the Civil Aeronautics Board and amendments 26–1 through 26–8; and (2) the rules, policies, and interpretations issued by the Administrator of Civil Aeronautics in application to the various sections of the regulations.

CAA *rules* are supplementary regulations issued pursuant to authority expressly conferred on the Administrator in the Civil Air Regulations. Such rules are mandatory and must be complied with.

CAA *policies* provide detailed technical information on recommended methods of complying with the Civil Air Regulations. Such policies are for the guidance of the public and are not mandatory in nature.

CAA *interpretations* define or explain words and phrases of the Civil Air Regulations. Such interpretations are for the guidance of the public and will be followed by the Administration in determining compliance with the regulations.

This manual is arranged to give the number, title, and text of each section of the regulations followed by any rules, policies, or interpretations applicable to that section. These rules, policies, or interpretations of the Administrator are identified by consecutive dash numbers appended to the regulation section number.

This manual contains all material published as Supplement No. 1, dated August 23, 1949; Supplement No. 2, dated September 15, 1950; Supplement No. 3, dated November 27, 1950; Supplement No. 4, dated July 24, 1951; and Supplement No. 5, dated January 14, 1954, to Civil Aeronautics Manual 26. It will be revised from time to time in accordance with the changes in the Civil Air Regulations Part 26, or as the need for additional explanations are brought to the attention of the Administrator.

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Control-Tower Operator Certificates

Qualifications for Certificate

26.1 ***Control-tower operator certificate requirements.*** **To be eligible for an air-traffic control-tower operator certificate an applicant shall comply with the following requirements:**

(a) *Age.* An applicant shall be at least 21 years of age; or, if serving as a member of the military services of the United States, at least 18 years of age: *Provided,* That certificates issued to members of the military services who are less than 21 years of age shall, until the holder thereof reaches the age of 21, be valid only when the holder is serving as a member of the military services in a control tower operated by such services.

(b) *Character.* An applicant shall be a person of good moral character.

(c) *Education.* An applicant shall be able to read, write, and understand the English language and to speak the English language without any accent or impediment of speech which would interfere with two-way radio conversation.

(d) *Citizenship.* An applicant for a control-tower operator certificate may be a citizen of any country or a person without nationality.

26.2 *Physical condition.* Applicant shall meet the physical standards of the Second Class prescribed in Part 29 of this subchapter.

26.3 *Knowledge.* An applicant must pass an examination in the following subjects: [1]

(a) Air traffic rules set forth in Part 60 of this subchapter;

(b) Airport traffic control procedures, and this part;

(c) Airway traffic control procedures;

(d) Radio frequencies and procedures used for airport traffic control;

(e) Use of radio aids to air navigation;

(f) The making of weather observations;

(g) Pertinent rules and regulations of the Federal Communications Commission. An applicant who presents satisfactory evidence that he possesses a restricted radiotelephone operator permit or higher grade of radiotelephone operator license issued by the Federal Communications Commission will not be required to take the examination prescribed in this paragraph.

26.3–1 *The content and scope of the written examination required for a control-tower operator certificate in proof of aeronautical knowledge (CAA policies which apply to sec. 26.3).* The written examination is designed for the purpose of determining whether an applicant possesses the basic theoretical knowledge required for the safe performance of his duties as a control-tower operator. Since a control-tower operator's aeronautical knowledge requirements are extensive in scope, complete coverage in the examination is not feasible. The written theoretical examination is offered, therefore, as a sampling device wherein a limited number of questions are proposed for the purpose of determining knowledge.[1]

(Published in 18 F. R. 7536, Nov. 26, 1953, effective Nov. 30, 1953.)

26.3–2 *Demonstration of knowledge on equivalent examination (CAA interpretations which apply to sec. 26.3).* An applicant for an air-traffic control-tower certificate who has passed the written examination for an Airways Operations Specialist Certificate will be deemed to have passed the examination prescribed in section 26.3, since the examinations are equivalent in content and scope.

(Published in 18 F. R. 7536, Nov. 26, 1953, effective Nov. 30, 1953.)

[1] **Lists of source material covering the subject matter of these examinations can be obtained from any Regional Administrator of the Civil Aeronautics Administration.**

[1] The Administrator has compiled a study guide to aid applicants in preparing for the control-tower operator certificate examination. This guide is contained in appendix A.

Qualifications for Ratings

26.6 *Character of ratings.* The holder of an air-traffic control-tower operator certificate (hereinafter referred to as "certificate") may receive a junior or senior rating, depending upon his qualifications to perform the duties of an air-traffic control-tower operator (hereafter referred to as "operator") at a particular airport.

26.7 *Qualifications for junior rating.* An applicant must pass an examination on the following subjects:

(a) Local airport rules and characteristics of local air traffic of the airport for which the rating is sought;

(b) Local aircraft operations and such other aircraft operations as may affect conditions at the airport for which the rating is sought.

(c) Teletype symbols and weather sequences of the airways converging on the airport and other pertinent data regarding meteorological reports available within a circular area of a radius of 125 miles measured from the airport for which the rating is sought.

(d) Any other subject or subjects in which the Administrator may deem an examination necessary. The applicant will be given adequate notice of the subject of the examination.

26.7–1 *Qualifications for control-tower operator certificate junior rating (CAA rules which apply to sec. 26.7).*

(a) *Authority.* Section 26.7 specified certain subjects to be covered in the examination for a junior rating and in paragraph (d) permits additional subjects in which the Administrator may deem an examination necessary.

(b) *Area of examination.* Because of the additional privileges accorded the control-tower operator with junior rating in section 26.26, the current written junior rating examination is inadequate to cover the added duties. In the interest of safety, and so that full appraisal of the scope of the examination will become matters of public notice, the present written rating examination is changed to a practical examination. The following subjects in outline form will be the area of examination:

(1) *Junior rating.*

(i) *The control-tower.*

Hazards to operation.
Equipment.
Use of equipment.

(ii) *The airport.*

Hazards to operation.
Rules.
Facilities.
Use of facilities.

(iii) *The control zone.*

Hazards to operation.
Prominent objects.
Reporting points.
Traffic pattern.

(iv) *Notices to airmen.*

(v) *Weather facilities and procedures.*

Weather stations.
Sequence reports.
Forecasts.
Visibility check points.

(vi) *A demonstration of knowledge in the control of air traffic under VFR conditions.*

(Published in 14 F. R. 6283, Oct. 15, 1949, effective upon publication.)

26.8 *Qualifications for senior rating.*

(a) *Knowledge.* An applicant must pass an examination in the subjects required for a junior rating and, in addition, the following subjects:

(1) Air navigation facilities within a radius of 200 miles of the airport for which the rating is sought;

(2) Airway traffic control procedures in the area in which the airport for which the rating is sought is located;

(3) Instrument approach and departure procedures at the airport for which the rating is sought;

(4) Any other subject or subjects in which the Administrator may deem an examination necessary.

The applicant will be given adequate notice of the subject of the examination.

(b) *Experience.* An applicant must have performed satisfactory service:

(1) As an operator with a senior rating for at least 6 months; or

(2) As an operator with a junior rating at the airport for which the rating is sought for the 6 months immediately preceding application; or

(3) As an air-traffic control trainee in Federal service for at least 6 months; or

(4) For 1 year of the 2 years immediately preceding application as:

(i) An operator with a junior rating at an airport other than that at which the rating is sought; or

(ii) An operator at a landing area under military or naval jurisdiction.

(c) *Other requirements.* The applicant must demonstrate his ability to supervise and manage all activities of the airport control tower or airport control station, which shall at least include the preparation of such reports as may be required from time to time by the airport manager or the Administrator.

26.8–1 *Qualifications for control-tower operator certificate—senior rating (CAA rules which apply to sec. 26.8 (a) (4)).*

(a) *Authority.* Section 26.8 (a) specifies certain subjects to be covered in the examination for a senior rating and in paragraph (a) (4) permits additional subjects in which the Administrator may deem an examination necessary.

(b) *Area of examination.* Because of additional facilities provided for the control of air traffic, it is deemed necessary that the rating examination be enlarged to cover the operation of such facilities. In the interest of safety and so that full appraisal of the area of the examination will become matters of public notice, the present written rating examination is changed to a practical examination. The following subjects in outline form will be the area of examination:

(1) *Senior rating.*

(i) *The air traffic control facilities serving the airport.*

The tower.
The center.
The airways.

(ii) *Air navigation facilities.*

Beacons.
Ranges.
Fan markers.
Compass locators.
ILS.[2]
GCA.[2]
Any other.

(iii) *Use of Airman's Guide.*

(iv) *Use of the Flight Information Manual.*

(v) *Holding procedures.*

(vi) *Standard approach procedures—aircraft, tower.*

Approach control.[2]

(vii) *Missed approaches.*

(viii) *Alternate airports.*

(ix) *Search and rescue procedures.*

(x) *A demonstration of ability to control air traffic under IFR conditions.*

(Published in 14 F. R. 6283, Oct. 15, 1949, effective upon publication.)

Examinations

26.12 *General.* The prescribed examinations will be conducted by representatives of the Administrator at a designated time andplace.

26.13 *Physical examinations.*

(a) The prescribed physical requirements must be met before any practical or theoretical examination will be given and must be completed within the 12 months immediately preceding application for a certificate.

(b) In lieu of a physical examination conducted by an authorized medical examiner of the Administrator, a form acceptable to the Administrator, signed by a medical officer on duty with the Army, Navy, Marine Corps, or Coast Guard who is authorized to conduct physical examinations for flying stating that the applicant is an active member of his service and has met within the preceding 12 months the physical requirements prescribed by section 26.2.

26.14 *Reexamination after failure.* An applicant who has failed any prescribed written or practical examination or test may not apply for reexamination within a 30-day period unless he presents a statement signed by a certificated air-traffic control-tower operator, a certificated ground instructor, or an equally qualified individual acceptable to the Administrator, which attests that the applicant has received an additional 5 hours of instruction in each of the subjects failed and that the applicant is considered competent for reexamination.

Issuance and Expiration of Certificate

26.18 *Duration.*

(a) An air-traffic control-tower operator cer-

[2] Applicable only where the procedures have been established or facility is installed.

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tificate issued to a United States citizen shall remain in effect until surrendered, suspended, revoked, or otherwise terminated by order of the Board. A certificate issued to an applicant other than a United States citizen shall remain in effect for a period no longer than 12 months after the date of issuance, but it may be reissued without further demonstration of technical competence.

(b) After revocation, and upon request after suspension, the certificate shall be returned to the Administrator.

(c) Nothing in this section shall be construed to deny or defeat the jurisdiction of the Federal courts, the Administrator, or the Board to impose any authorized sanction, including revocation of the certificate, for a violation of the Act or of the Civil Air Regulations occurring during the effective period of the certificate.

26.19 *Temporary certificates.* The Administrator or his authorized representative may issue a temporary air-traffic control-tower operator certificate for a period of not to exceed 90 days, subject to the terms and conditions specified therein by the Administrator.

26.20 *Change of address.* Within 30 days after any change in the permanent mailing address of a holder of an air-traffic control-tower operator certificate, the holder shall notify the Administrator in writing of such change. Such notice shall be mailed to the Administrator of Civil Aeronautics, attention Airman Records Branch, Washington 25, D. C.

26.21 *Termination of certificates.* All air-traffic control-tower operator certificates issued to individuals other than United States citizens prior to September 27, 1950, shall expire on September 26, 1951, but they may be reissued with a duration of 12 months without further demonstration of technical competence.

Regulations

26.25 *Rating record.* A certificated operator shall not serve as such unless there is attached to his certificate the appropriate rating record prescribed and issued by the Administrator, nor serve otherwise than in accordance with the limitations prescribed by the Administrator in his certificate or rating record.[2]

[2] The rating record is a sheet which will be attached to all certificates when they are issued and will prescribe the airports at which the holder is authorized to serve and the class of rating held.

26.26 *Exercise of authority.* A certificated air-traffic control-tower operator shall control traffic in accordance with the procedures and practices prescribed by the Administrator to provide for the safe, orderly, and expeditious flow of air traffic and in accordance with the following requirements:

(a) When weather conditions are equal to or better than the basic minimums prescribed for VFR flight by Part 60 of this subchapter, air traffic may be controlled by an operator with either a junior or senior rating for the airport involved: *Provided*, That where the Administrator finds the volume or character of the air traffic, the type and equipment of aircraft utilizing the airport, or the airport facilities require that an operator with a junior rating be supervised, he may require all air traffic at such airport to be controlled under the supervision of an operator with a senior rating.

(b) When weather conditions are below the basic minimums prescribed for VFR flight by Part 60 of this subchapter, air traffic shall be controlled by an operator with senior rating, and such operator shall not issue an air traffic clearance for flight without prior authorization from the appropriate air traffic control center.

(c) In an emergency an operator with a senior rating may delegate his authority to an operator with a junior rating.

Cross Reference: For air-traffic control regulations implementing section 26.26 see Part 617, Subpart B, of this title.

26.27 *Relaying information.* An operator shall not relay information or instructions received from airway traffic control personnel, airway communications or United States Weather Bureau airport stations, otherwise than in the manner approved by the Administrator.

26.28 *Maximum hour.* Except in case of an emergency, a certificated operator shall be relieved of all duty for not less than 24 consecutive hours at least once during each 7 consecutive days, and shall not serve, nor be required to serve as such:

(a) In excess of 10 consecutive hours;

(b) In excess of 10 hours during a period of 24 consecutive hours unless the operator is given a rest period of not less than 8 hours at or before the termination of such 10 hours of duty.

26.29 *Display of certificate.* An operator shall keep his certificate readily available when he is on duty and shall present it for inspection upon request of any officer or employee of the Administrator or Board and of any State or municipal official charged with a duty of enforcing local laws or regulations involving Federal compliance.

26.30 *Medical certificate.* A medical certificate issued by an authorized medical examiner of the Administrator or other evidence satisfactory to the Administrator that the air-traffic control-tower operator has met the physical requirements prescribed in this part shall be carried by such airman while on duty.

26.31 *Equipment standards.* A certificated air-traffic control-tower operator shall not control air traffic with facilities which the Administrator has determined to be inadequate.

26.32 *Inspection.* An applicant or a holder of a certificate or rating, upon reasonable request by any representative of the Administrator, shall cooperate fully in any examination which may be made of him.

26.34 *Periodic physical examination.* The holder of an air-traffic control-tower operator certificate shall not exercise the privileges thereunder unless within the preceding 12 calendar months he has met the physical standards of the Second Class prescribed in Part 29 of this subchapter by passing an examination conducted by an authorized medical examiner of the Administrator.

26.35 *Operation during physical deficiency.* A certificated air-traffic control-tower operator shall not serve as such during the period of any known physical deficiency which would render him unable to meet the physical requirements prescribed for the original issuance of his certificate: *Provided,* That if the deficiency is of a temporary nature, he may perform any duties not affected thereby when there is present and on duty another certificated and properly qualified air-traffic control-tower operator.

26.36 *Recent experience requirements.* The holder of an air-traffic control-tower operator certificate shall not exercise the privileges thereunder unless:

(a) If rated as a junior air-traffic control-tower operator he has served for at least three months as an operator at the airport to which the rating applies during the twelve calendar months immediately preceding, or

(b) If rated as a senior air-traffic control-tower operator he has served for at least three months as an operator at the airport to which the rating applies during the six calendar months immediately preceding, or

(c) He has demonstrated to the satisfaction of the Administrator that he is able to meet the standards currently prescribed by the regulations of this subchapter for the issuance of the certificate and rating.

26.37 *Identification.* The holder of a certificate issued under the provisions of this part shall not exercise the privileges conferred by the certificate unless he has readily available a current airman identification card or other identification card acceptable to the Administrator which duly describes him. The airman identification card may be obtained from the Administrator who shall prescribe its form and the manner of applying for it.

Appendix A

Study Guide for the Written Examination Required for a Control-Tower Operator Certificate

(a) Taking the Examination.

The applicant should read each statement or question carefully so that it is fully and completely understood before looking at the multiple choices given as possible answers. An attempt should be made by the applicant to frame in his mind not only the problem but also what he conceives to be a satisfactory answer. After this process is followed, the applicant should then determine which answer among those given most exactly corresponds with the answer which he has arrived at from reading and understanding the problem involved. The questions posed are operational. The applicant, therefore, is required to know not only the applicable rule but also its application.

Only one of the alternate answers given is correct in its entirety. The others may be answers that are a direct result of an incorrect procedure, wrong interpretations of the question, or popular misconceptions. The applicant should see that he thoroughly understands the question and then select the answer which he considers to be the best and most complete answer.

If difficulty is encountered with a particular problem, the applicant should proceed to the next problem where the answer is known. When the particular section of the examination has been completed, he should go back to the unanswered problems. By utilizing this procedure, the applicant's time and energy will be conserved to maximum advantage in the demonstration.

An applicant who is adequately prepared will have ample time to complete his work within the time limit established for each section of the examination. An applicant's inability to complete the examination within the time specified may indicate that he has not acquired adequate proficiency or that his reactions and thinking processes are not sufficiently rapid to assure reasonable skill in making decisions and taking appropriate action.

If the applicant remembers these facts and if he knows the subject matter on which he is being tested, he will have no difficulty with the examination.

The applicant's answer sheet, together with any papers used during the examination for computation, should be surrendered to the proctor before he leaves the examination room. Examination answer sheets are mailed immediately to the Washington office of the Civil Aeronautics Administration where a grade in each section is determined by an electric scoring machine. Applicants must receive a grade of at least 70 percent in each section to be successful in the examination.

A complete record of grades and other matters pertaining to the applicant's activity as an airman are maintained in the Washington office of the Civil Aeronautics Administration.

(b) The examination—Reference Material.[3]

The publications listed below which are marked "GPO" may be ordered from the Government Printing Office. Orders must be accompanied by money order or check made payable and addressed to the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Publications marked "CAA" may be obtained from the Office of Aviation Information, Civil Aeronautics Administration, Washington 25, D. C.

(1) *Section one—Air Traffic Rules.* The applicant can prepare himself for this section of the written theoretical examination, which con-

[3] The list of reference material has been brought up-to-date as of June 1956.

sists of 30 questions, by studying the following material:

Study Material	Where Obtained	Cost
Civil Air Regulations Part 60	GPO	$0.10
Flight Information Manual	GPO	.55

(2) *Section two—Airport Traffic Control Procedures.* The applicant can prepare himself for this section of the written theoretical examination, which consists of 30 questions, by studying the following material:

Study Material	Where Obtained	Cost
ANC (Air Force-Navy-CAA) Procedures for the Control of Air Traffic	GPO	$1.00
Flight Information Manual	GPO	.55
Civil Air Regulations Part 26	GPO	.05

(3) *Section three—Airway (Air Route) Traffic Control Procedures.* The applicant can prepare himself for this section of the written theoretical examination, which consists of 30 questions, by studying the following material:

Study Material	Where Obtained	Cost
ANC Procedures for the Control of Air Traffic	GPO	$1.00
Flight Information Manual	GPO	.55

(4) *Section four—Aids to Air Navigation and Procedures.* The applicant can prepare himself for this section of the written theoretical examination, which consists of 30 questions, by studying the following material:

Study Material	Where Obtained	Cost
Pilots' Radio Handbook TM—102	GPO	$0.55
Practical Air Navigation. Revised Second Edition	[a]	[b]
Airways Operations Training Bulletin Series:		
No. 1—Instrument Landing System	GPO	.20
No. 2—Location Markers and Homing Facilities	GPO	.15
No. 3—Visual-Aural Ranges and Omniranges	GPO	.20
No. 4—Distance Measuring Equipment and Offset Course Computer	GPO	.15
No. 6—Radar Fundamentals and Surveillance, Precision and Route Radar	GPO	.35
No. 7—LORAN	GPO	.10
Airman's Guide	GPO	[c]
Flight Information Manual	GPO	.55
FCC Rules, Part 9, Rules and Regulations Governing Aviation Services	GPO	$0.10
Study Guide and Reference Material for Commercial Radio Operator Examinations	GPO	.25
Instrument En Route Radio Facility Charts	[d]	[e]

(5) *Section five—Weather Observations.* The applicant can prepare himself for this section of the written theoretical examination, which consists of 30 questions, by studying the following material:

Study Material	Where Obtained	Cost
Weather Bureau Circular "N" including WBAN Manual of Surface Weather Observation	GPO	$0.75
Pilot's Weather Handbook TM-104	GPO	1.50
CAA-WB Standards and Procedures for Flight Assistance Service	CAA	[f]
Weather Bureau Upper Wind Code, 1955 Edition	GPO	.65
Flight Information Manual	GPO	.55

(c) Sample Examination Questions.

(1) *Section one—Civil Air Regulations.*

1. Air traffic rules are divided into the following categories:
    1. Air traffic rules, instrument flight rules, and visual flight rules.
    2. General flight rules, visual flight rules, and instrument flight rules.
    3. General rules, contact and instrument flight rules.
    4. General rules, instrument flight rules, and contact flight rules.
2. The pilot of an airplane is approaching an airport for a landing making a long final approach. He notices an airplane ahead making right hand traffic for the field with the aircraft's hatch cover engaged in the elevator controls. Directly ahead he sees a glider making a tight turn directly over the field. Below the glider a blimp is descending for a landing. The aircraft having the right-of-way under these circumstances is:

[a] Obtainable from Thoburn C. Lyon, 2706 Gaither, Washington 21, D. C.

[b] Cost: $3 includes supplementary services.

[c] Variable.

[d] Obtainable from the Director, U. S. Coast and Geodetic Survey, Washington 25, D. C. Make check payable to Treasurer, United States.

[e] Cost: $15 per set; 25¢ each.

[f] No charge.

1. Blimp.
2. Glider.
3. The aircraft with the hatch cover engaged in the elevator.
4. Landing aircraft on final approach.

3. Military aircraft are not required to abide by Air Traffic Rules when:
   1. They are within a military control zone.
   2. Military authority determines noncompliance necessary and the Administrator is given prior notice.
   3. They are flown outside of control zones and control areas.
   4. They are within civil control zones.
4. An airport manager and operator wishes to hold an air meet which will include air races and acrobatic flights. Before holding the meet he should obtain:
   1. Permission from the city council.
   2. Permission from the state aviation officials.
   3. A certificate of waiver from a CAA Office of Aviation Safety.
   4. Permission from the chief controller of the nearest control tower.
5. One airplane is about to overtake another. The airplane having the right of way is:
   1. The one being overtaken.
   2. The overtaking aircraft.
   3. Determined by weight.
   4. Determined by horsepower.
6. All cruising altitudes are expressed in relation to:
   1. Height above the terrain.
   2. The highest obstruction on the route.
   3. The airport of takeoff.
   4. Sea level.
7. A pilot report indicates that between points "A" and "C" there is an overcast with a ceiling of 600 feet and the top at 4,000 m. s. l. A pilot desiring to fly between "A" and an intermediate point "B" will encounter this overcast for the entire flight necessitating a climb and descent through clouds. The pilot desires to fly on top. Under these conditions the flight from "A" to "B" would be classified as:
   1. Over the top operation.
   2. Dead reckoning.
   3. Instrument flight.
   4. On top operation.
8. An aircraft is being flown under visual flight rules inside a control zone without a traffic clearance. The minimum flight visibility required for this type flight is:
   1. One mile.
   2. Not specified in the Civil Air Regulations.
   3. Unlimited.
   4. Three miles.
9. A pilot is flying north along a controlled amber airway. If the flight is conducted in accordance with VFR, the pilot will maintain a cruising flight level of:
   1. An even thousand altitude plus 500.
   2. An odd thousand altitude.
   3. Any altitude so long as flight visibility is more than 3 miles.
   4. An odd thousand foot altitude if he is 3,000 feet or more above the surface.
10. Aircraft in flight are required by regulations to maintain a safe distance from other aircraft. A safe distance is defined as:
    1. 500 feet.
    2. 1,000 feet.
    3. Sufficient distance to avoid collision hazard.
    4. No closer than 500 feet except by prior arrangements.

(2) *Section two—Airport Traffic Control Procedures.*

1. A control-tower operator is required to be on the alert at all times to assist all traffic which enters or leaves his control zone with or without the proper clearance. This can best be accomplished if he:
   1. Keeps a complete record of all radio contacts.
   2. Has the assistant controller observe activity in the control zone.
   3. Checks constantly with the center for outbound and inbound aircraft.
   4. Personally maintains a continuous watch in all sectors of the control zone.
2. During IFR conditions, the controller observes a small aircraft operating in the control zone without proper authorization. The pilot of the aircraft indicates by radio

that he desires to land as soon as possible. The controller under these conditions should:

1. Refuse a landing clearance.
2. Direct the aircraft to the nearest airport where VFR conditions prevail.
3. Assist the pilot in every way to effect a landing.
4. Refuse permission to land until the pilot has satisfactorily explained his unauthorized presence in the control zone.

3. Aircraft N1950 is 2 miles east of your field and is requesting an emergency descent. The weather is VFR. There are other aircraft in the traffic pattern and vehicular and pedestrian traffic on the runway in use. The controller's first concern should be, under these conditions, to:
   1. Alert the crash equipment.
   2. Notify the airport manager.
   3. Clear the runway in use.
   4. Notify the rescue center.
4. A free swinging tetrahedron is used to denote:
   1. The runway in use.
   2. The surface wind direction.
   3. The clockwise flow of traffic.
   4. The airport is closed.
5. With a wind velocity of six or more miles per hour, the controller will generally instruct aircraft to use the runway which is:
   1. Most suitable for the type of aircraft involved.
   2. More nearly alined with the wind.
   3. More nearly alined into the wind.
   4. Most suitable for the direction in which the aircraft will proceed after takeoff.
6. A flight making a VFR "straight in" approach is reported as "arrived" when the aircraft:
   1. Crosses the airport boundary.
   2. Wheels touch the ground.
   3. Enters the control zone.
   4. Commences final approach.
7. In relaying an air traffic clearance received from the Chicago control center, the control-tower operator should preface the clearance with:
   1. ATC clears . . . (identification).
   2. Chicago Center clears you. . . .
   3. Chicago clears you. . . .
   4. Chicago Airways clears you. . . .
8. Sufficient separation shall be effected by a control-tower operator between arriving and departing traffic to insure that a landing aircraft will not cross the airport boundary until the departing aircraft which preceded it has:
   1. Left the ground on takeoff.
   2. Reached a point midway down the runway on its takeoff run.
   3. Crossed over the last 10 feet of the runway in use.
   4. Passed over the airport boundary.
9. At 1000 the Weather Bureau advises the control tower that the ground visibility is less than 3 miles in the control zone. The controller indicates this fact to inbound and outbound aircraft by turning on the:
   1. Rotating airport beacon.
   2. The boundary lights.
   3. Lights outlining the wind or traffic direction indicator.
   4. Amber flashing light.
10. N1250, a Waco aircraft in your traffic pattern, calls you by radio for landing clearance when on base leg. Your answer in correct phraseology would be:
    1. Waco fifty all clear.
    2. Waco twelve fifty cleared to land.
    3. Waco one two fifty cleared to land.
    4. Waco one two five zero cleared to land.

(3) *Section three—Airway (Air Route) Traffic Control.*

1. An air route traffic control center exercises jurisdiction over all aircraft operating on an IFR flight plan within a control area. A control area is defined as an airspace of definite dimensions designated by the Administrator. This area extends:
   1. Upward from an altitude of 500 feet above the earth's surface.
   2. Upward from an altitude of 700 feet above the earth's surface.
   3. From the earth's surface upward.
   4. Upward from an altitude of 1,000 feet above the earth's surface.

2. Traffic and weather conditions require that Aircraft "B" and Aircraft "C" operating on instrument flight plans fly at the same altitude between "X" and "Y." The form of separation applied in this case by air route traffic control will be:
    1. Longitudinal.
    2. Sight.
    3. Lateral.
    4. Vertical.
3. Aircraft "B" will be flown between "X" and "Y" under IFR conditions at 6,000 feet. The center advises the pilot through the control tower that traffic will not permit approval of 6,000; however, he (the pilot) may fly at 8,000. The air route traffic control center has by the assignment of a different altitude effected.
    1. Longitudinal separation.
    2. Lateral separation.
    3. Vertical separation.
    4. Time separation.
4. Aircraft "B" is issued an IFR clearance which notifies the pilot to make his climb from the "X" airport to cruising altitude "well to the right of the course." In using this device ATC is effecting:
    1. Horizontal separation
    2. Lateral separation.
    3. Longitudinal separation.
    4. Altitude separation.
5. Aircraft "A" operating under IFR crosses the "X" fix at 1010. At 1015 Aircraft "B" reports over the same fix at the same altitude proceeding in the same direction as Aircraft "A." ATC in effecting the proper separation between Aircraft "A" and "B" will request:
    1. Aircraft "A" to climb or descend.
    2. Aircraft "B" to increase cruising speed.
    3. Aircraft "A" to lose time.
    4. Aircraft "B" to lose time, climb, or descend.
6. In order to expedite a departure, the center may suggest the direction of take-off when the wind velocity does not exceed:
    1. 16 m. p. h.
    2. 10 m. p. h.
    3. 15 m. p. h.
    4. 6 m. p. h.
7. Flight 56, a DC–6 of the "Y" air carrier company, departs the "X" airport at 0758C. The flight takes off north and will climb and cruise on a north heading at 7,000 feet. Flight 54, a DC–6 of the "Q" air carrier company, will take off in the same direction from the "X" airport, climb to and cruise at 5,000 feet. The earliest possible time which you as the controller can clear Flight 54 using time separation only is:
    1. 0808C.
    2. 0759C.
    3. 0801C.
    4. 0803C.
8. Beechcraft 4678 is estimated over the Herkan range at 1330. At 1300 the flight was cleared to the range "No delay expected." Neither the tower nor communications station can contact the flight at 1325 for delivery of an expected approach clearance time. To minimize the danger of possible collision, the center under these conditions must restrict other IFR traffic in the vicinity until:
    1. 1400.
    2. 1350.
    3. 1335.
    4. 1340.
9. Two departing aircraft propose to fly the same course on which radio facilities permit frequent check on speed and position. The succeeding aircraft will be flown through the altitude level of the preceding aircraft. Under the conditions, the minimum time separation in minutes required when altitude levels are crossed is:
    1. 10 minutes.
    2. 5 minutes.
    3. 3 minutes.
    4. 15 minutes.
10. Aircraft "A," a DC–4 operating under IFR conditions, will take off North and proceed East on a right turn. Aircraft "B," a DC–4 operating under IFR conditions, will take off North and proceed West. Both aircraft are ready for takeoff. Aircraft "B" is cleared for takeoff at 1032. Aircraft "A" can be cleared at:
    1. 1035.
    2. 1033.

3. 1037.
4. 1042.

(4) *Section four—Aids to Air Navigation and Procedures.*

1. Pilot Jones is flying on the south leg of an SBRA Range. If he hears in his headset a steady 1020 cycle tone which is increasing in volume as he proceeds, he is:
    1. Approaching the cone of silence.
    2. Going away from the station.
    3. Flying in a quadrant.
    4. Approaching a fan marker.
2. Pilot Smith is flying a VAR Range along a red airway. In his headset he hears a clear N, and he notes that his pointer is off scale on the blue sides. Under these conditions he is flying in the:
    1. SW quadrant.
    2. SE quadrant.
    3. NE quadrant.
    4. NW quadrant.
3. The VOR Range was developed for the purpose of furnishing directional information to pilots at all times. Another advantage of VOR over VAR and the conventional low frequency range is in:
    1. The number of courses provided.
    2. The clarity of signal.
    3. The simplicity of construction.
    4. The cost of operation.
4. Beechcraft 5678 operating under IFR was over the Bentley Range at 1100 estimating Richardson at 1155. At 1115 Chicago control desires to amend the clearance previously given the flight over Bentley. The best and probably the quickest method for delivering the amended clearance would be through:
    1. Richardson tower.
    2. Chicago control direct.
    3. Bentley INSAC.
    4. Richardson Range.
5. The primary purpose of an FM marker is to:
    1. Provide a navigational fix so that pilots may definitely ascertain their relative position.
    2. Define the airport approach zone.
    3. Indicate the outer limit of a control area.
    4. Identify the range on which the fan is located.
6. ILS is a three element navigational system which permits the pilot to effect a landing through the use of instruments. The components of an ILS are:
    1. A localizer, glide path, and fan markers.
    2. A range, "Z" marker, and cone.
    3. A VOR, a VHF, and a VAR.
    4. DME, LORAN, MEDIS.
7. PAR has been or will be installed at major terminals throughout the country as a part of an instrument landing system. This device will permit:
    1. The pilot to actually see his approach on a screen in the cockpit.
    2. The monitoring of instrument approaches by control-tower personnel.
    3. Dispersal of fog conditions.
    4. Automatic warning of off-course operation.
8. The NOTAM code is provided to enable information regarding radio aid airdromes and lighting dangers to aircraft in flight, or landing or action regarding search and rescue, to be coded for easy transmission. The NOTAM code contains five-letter groups to avoid confusion. QAREL 332 kc/s BTN 1000–1200 DAILY decoded indicates the:
    1. Tower transmitter on 332 kc/s will operate between 1000 and 1200 daily.
    2. Radio range operating on 332 kc/s will be inoperative between 1000 and 1200 daily.
    3. Airdromes will be closed and all facilities shut down between 1000 and 1200 daily until further notice.
    4. Radio beacon is burning, but not revolving.
9. The Communications Act of 1934 establishes the law relative to all phases of communications. This law is administered by:
    1. FEPC.
    2. FCC.
    3. FEC.
    4. FTC.
10. Part 9, Rules and Regulations Governing Aviation Services, has been promulgated by the Federal Communications Commis-

sion under authority granted by Congress in the Communications Act of 1934. Under this part the emergency and distress frequency assigned for control-tower use is:

1. 121.7 mc/s.
2. 121.8 mc/s.
3. 500 kc/s.
4. 121.5 mc/s.

(5) *Section five—Weather Observations.*

1. A record airway weather observation is taken by the United States Weather Bureau every every:
   1. Half hour.
   2. Hour.
   3. Six hours.
   4. Fifteen minutes.
2. If radiation fog exists at the airport during the early morning hours you could expect the wind to be:
   1. Less than 8 miles an hour.
   2. Between 15 and 20 miles per hour.
   3. Less than 1 mile an hour.
   4. More than 20 miles per hour.
3. A thunderstorm is considered to be in progress at the station of observation when:
   1. Intense precipitation is observed.
   2. Cloud to ground lightning is observed.
   3. Thunder is heard.
   4. A wind shift occurs.
4. Aviation Forecast Centers prepare 12-hour forecasts of flying weather for approximately 275 air terminals in the United States every:
   1. Twelve hours.
   2. Six hours.
   3. Twenty-four hours.
   4. Hour.
5. The United States Weather Bureau maintains an office at each of the 26 air route traffic control centers in the United States for the purpose of giving weather service to the centers and to aircraft in flight. This service is known as:
   1. Flight Advisory Weather Service (FAWS).
   2. CAA information service.
   3. Forecast Center Service.
   4. Air Sea Search and Rescue.
6. A "special" weather is required when:
   1. Rain showers change to steady rain.
   2. A ceiling of 1,100 feet lowers to 900 feet.
   3. The sky condition above 15,000 feet changes from scattered to broken.
   4. The wind shifts from east to north.
7. The coded weather symbols T, R, L, ZR, and E are decoded as:
   1. Thunderstorm, rain, sleet, freezing rain, and hail.
   2. Heavy thunderstorm, moderate rain, moderate drizzle, moderate freezing rain, and moderate sleet.
   3. Heavy thunderstorm, rain, drizzle, freezing rain, and sleet.
   4. Thunderstorm, rain, light freezing drizzle, and ice crystals.
8. The coded obstruction to vision symbols F, GF, BD, H, K, BN are decoded:
   1. Fog, ground fog, blowing sand, haze, smoke, blowing rain.
   2. Fog, ground fog, blowing dust, haze, smoke, blowing sand.
   3. Moderate fog, moderate ground fog, moderate blowing dust, moderate haze, moderate smoke, moderate blowing sand.
   4. Moderate fog, ground fog, blowing dust, haze, moderate smoke, blowing sand.
9. A check observation issued by the United States Weather Bureau contains certain observational elements. These elements in proper order are:
   1. Altimeter setting, wind obstruction to vision, weather visibility, sky, and ceiling.
   2. Sky, visibility, altimeter setting, and wind.
   3. Ceiling, sky, visibility, wind, and altimeter setting.
   4. Ceiling, sky, visibility, weather, obstruction to vision, wind, and altimeter setting.
10. S7 0615 W2 x ¼F 132 51 51≳10 991 ALREPS OVR SFO 0630P FLD CLRY VSB THRU F 25 MSL DC–4. In interpreting this coded weather report for a pilot a controller would read:
    1. Special at zero six one five, ceiling indefinite, two hundred, sky ob-

scured, visibility one quarter mile, fog, temperature five one, dewpoint five one, wind west northwest one zero, altimeter two nine nine one. Airline pilot reports over San Francisco at zero six three zero Pacific Standard Time field clearly visible through fog at twenty five hundred m. s. l. DC–4.

2. Zero six one five measured two hundred closed one one quarter moderate, fog one three two five one five one, west variable to northwest ten nine nine one alreps, fld visible from two five hundred in a DC–2 at six thirty.

3. Special 7 at zero six one five, balloon ceiling at two hundred feet, sky obscured visibly one quarter fog, five one five one, west northwest ten nine nine one alreps over San Francisco at zero six three zero Pacific, field visible at two five hundred in DC–4

4. Special observation at zero six one five indefinite two hundred obscured one quarter due to fog, pressure one three two, five one five one wind west northwest one zero, altimeter nine nine one, airline pilot reports over San Francisco at zero six three zero field clearly visible through fog from two thousand five hundred m. s. l. in a DC–4.

(d) Answers to Sample Questions.

(1) *Civil Air Regulations.*

Question	*Answer*
1	2
2	3
3	2
4	3
5	1
6	4
7	3
8	4
9	4
10	3

(2) *Airport Traffic Control Procedures.*

Question	*Answer*
1	4
2	3
3	3
4	2
5	3
6	2
7	1
8	4
9	1
10	4

(3) *Airway (Air Route) Traffic Control.*

Question	*Answer*
1	2
2	1
3	3
4	2
5	4
6	2
7	1
8	1
9	2
10	2

(4) *Aids to Air Navigation and Procedures.*

Question	*Answer*
1	1
2	3
3	1
4	3
5	1
6	1
7	2
8	2
9	2
10	4

(5) *Weather Observations.*

Question	*Answer*
1	2
2	1
3	3
4	2
5	1
6	2
7	2
8	2
9	4
10	1

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