

Airmen's Academic Examination

E40

Qualification	Instrument Rating (Airplane) (Rotorcraft)	No. of questions; time allowed	20 questions; 2 hours
Subject	Instrument Flight - General (subject code: 14)	Code	H1CC141950

- ☆ Explanatory Notes:
- (1) In the designated spaces on the Airmen's Academic Examination Answer Sheet (Multiple-Choice Answers) (mark sheet), write your examinee number, examinee number mark, subject, subject code, subject code mark, qualification, qualification category, name, and date of birth.
If you write your examinee number, examinee number mark, subject code, and/or subject code mark incorrectly, computer grading will not be possible and you will fail the subject.
 - (2) Write your answers on the Airmen's Academic Examination Answer Sheet (Multiple-Choice Answers) (mark sheet).
 - (3) You don't need to submit the navigation log.
- ☆ Point Allocation: All questions are worth five points each.
- ☆ Pass Mark: The pass mark is 70 %.

[Flight plan exercise]

Complete the navigation log and answer Questions 1 to 6 with regard to the following flight plan for a flight to be conducted under instrument flight rules.

Day of departure: yymmdd

Estimated time of departure: 08:00 (JST)

Departure airport: ZZ Airport

Destination airport: YY Airport

Alternate airport: WW Airport

Cruising altitude: 9,000 ft

Route: ZZ Airport → A-VOR → B-VOR → C-VOR → D-VOR → YY Airport

Route to alternate airport: YY Airport → E-VOR → WW Airport

Cruising altitude to alternate airport: 9,000 ft (climbs and descents not taken into account)

Performance particulars

Speed (TAS): Climb 120 kt; cruise 150 kt; descent 140 kt

Fuel consumption rate: Climb 40 gal/h; cruise 26 gal/h; descent 21 gal/h

Climb rate: 1,000 ft/min

Descent rate: 900 ft/min

Flight details:

- 1) For departure, arrival, approach and landing, the aircraft flies the "ZZ Airport - A-VOR - B-VOR - C-VOR - D-VOR - YY Airport" route according to the entry in the navigation log. The elevations of the departure and destination airports are both 0 (zero) ft. No crossing altitudes are designated between take-off and cruising altitude. Descent shall be commenced so that the altitude will reach 0 (zero) ft at the destination. No crossing altitudes are designated on the descent.
- 2) Wind direction/velocity values to be used for calculations are 325°/20 kt for the climb, 250°/10 kt for the descent, and the values in appropriate boxes in the navigation log for cruising altitude. These wind directions are stated relative to the magnetic north.

Question 1: Which of the following estimated times of arrival (JST) to YY Airport is the closest to the planned time?

- (1) 09:57
- (2) 10:03
- (3) 10:09
- (4) 10:15

Question 2: Which of the following estimated times en route from YY Airport to WW Airport is the closest to the planned time?

- (1) 25 minutes
- (2) 27 minutes
- (3) 29 minutes
- (4) 31 minutes

Question 3: Which of the following points is the closest to the point where the aircraft reaches the cruising altitude after taking off from ZZ Airport?

- (1) Point where the aircraft has flown approximately 9 nm from ZZ Airport
- (2) Point where the aircraft has flown approximately 21 minutes after taking off from ZZ Airport
- (3) Point where the aircraft has flown approximately 21 nm from ZZ Airport
- (4) Point nearly halfway between ZZ Airport and A-VOR

- Question 4: If this flight is not for air transport service and the alternate airport is indicated in the flight plan, which of the following quantities is the closest to the minimum quantity of fuel that must be carried by the aircraft prior to departure from ZZ Airport as designated by the Act?
(Calculate to the first decimal place for each leg.)
In the case of a rotorcraft, consider the fuel consumption rate during holding to be the same as that during cruising.
- (1) 80 gal
 - (2) 83 gal
 - (3) 86 gal
 - (4) 89 gal
- Question 5: At 10 minutes after passing over B-VOR, measurement of GS was performed. The aircraft proceeded 10.0 nm in 3 minute 32 seconds. CH was kept at 075°. In this state, how many of the following statements (a) to (d) regarding the navigation particulars are correct? Choose from (1) to (5) below.
- (a) GS is lower than the GS calculated from the forecasted wind.
 - (b) WCA is approximately -2°.
 - (c) The wind velocity is lower than the forecasted wind velocity.
 - (d) The wind direction is shifted to the west from the forecasted wind direction.
- (1) 1 (2) 2 (3) 3 (4) 4 (5) None
- Question 6: Regarding the navigation particulars obtained from the completed navigation log, how many of the following statements (a) to (d) are correct? Choose from (1) to (5) below.
- (a) WCA at the leg immediately after reaching cruising altitude is approximately -7°.
 - (b) At the leg where GS is the largest during cruising to YY Airport, the aircraft proceeds 3.6 nm in 1 minute.
 - (c) Directly above D-VOR in a standard atmosphere, the DME display will indicate approximately 1.2 DME.
 - (d) TOD to YY Airport is the point 25 nm away from YY Airport.
- (1) 1 (2) 2 (3) 3 (4) 4 (5) None
- Question 7: Which of the following statements regarding the Civil Aeronautics Act is incorrect?
- (1) No aircraft shall, when it is possible to determine its position and course by utilizing ground references, engage in a flight by instrument flight rules.
 - (2) Flight crew-members carrying out instrument flight shall have more than 6 hours instrument flight experience (including simulator flight) over the 180 days preceding the date of flight maneuvers.
 - (3) Aircraft flying under the instrument flight rules shall, when flying on an airway within control area or control zone, fly at the centerline of the applicable airway except for when there are unavoidable circumstances.
 - (4) Any aircraft under instrument meteorological conditions shall be navigated in accordance with instrument flight rules within an air traffic control area, air traffic control zone or air traffic information zone, and shall not fly in any other airspace; provided, however, that the same shall not apply when there is an unforeseeable rapid deterioration in weather conditions or other compelling reasons, or when permitted by the Minister of Land, Infrastructure, Transport and Tourism.
- Question 8: How many of the following combinations (a) to (d) regarding abbreviations used for design criteria for flight procedures and their meanings are correct? Choose from (1) to (5) below.
- (a) FAP: Final approach point
 - (b) IAP: Instrument approach procedure
 - (c) OIS: Obstacle identification surface
 - (d) PDG: Procedure design gradient
- (1) 1 (2) 2 (3) 3 (4) 4 (5) None

- Question 9: The following items (a) to (d) are combinations of codes and their meanings used to report the runway visual range (RVR) in METAR. How many of these items are correct?
Choose from (1) to (5) below.
- (a) R34 / 1400N: RVR of Runway 34 was 1,400 m. No specific change was observed between the former and latter halves of the observation duration.
 - (b) R34C / 1400D: RVR of Runway 34 is corrected. The correct RVR is 1,400 m and a downward tendency was observed between the former and latter halves of the observation duration.
 - (c) R34 /////: RVR of Runway 34 exceeds the upper limit of the measurable range.
 - (d) R34 / 0400V0800D: On Runway 34, the 1-minute average RVR values in a 10-minute period immediately before the observation time vary largely; the minimum value was 400 m and the maximum value was 800 m, and a downward tendency was observed.
- (1) 1 (2) 2 (3) 3 (4) 4 (5) None

- Question 10: How many of the following combinations (a) to (d) regarding equipments and letters inserted in item 10 "Equipment" of the flight plan is correct?
Choose from (1) to (5) below.
- (a) E: DME
 - (b) L: ILS
 - (c) O: VOR
 - (d) S: SBAS
- (1) 1 (2) 2 (3) 3 (4) 4 (5) None

- Question 11: Which of the following combinations of ATC phraseologies and meanings is correct?
- (1) HOLD ON THE GROUND. Maintain ground control frequency.
 - (2) NO DELAY EXPECTED. No delays on ETA expected.
 - (3) DELAY NOT DETERMINED. Do not mind the delay.
 - (4) RESUME OWN NAVIGATION. Resume your own navigational responsibility.

- Question 12: Which of the following statements regarding the take-off minima in design criteria for flight procedure is incorrect?
- (1) At airports equipped with multiple RVR equipments, the highest RVR can be applied for take-off minima only when all RVR equipments are operating normally.
 - (2) Take-off minima is identified depending on the installation and operation of the runway edge lights, runway centerline lights and runway centerline marking.
 - (3) If all aerodrome lights and markings indicated in the take-off minima is not available, only daytime take-offs are permitted.
 - (4) When CAT I precision approach is available at the departure airport for non-multi-engine aircrafts flight-planned with take-off alternate airport, RVR (VIS when RVR is not available) equal to minima for CAT I precision approach becomes the take-off minima.

- Question 13: How many of the following statements (a) to (d) regarding speed adjustments during IFR arrivals are correct?
Choose from (1) to (5) below.
- (a) Speed adjustment specified by a transferring facility remains in effect when transferred to another facility.
 - (b) Speed adjustment is automatically terminated when holding is instructed during a speed adjustment.
 - (c) Speed adjustment is automatically terminated when an approach clearance is issued during a speed adjustment.
 - (d) When a speed adjustment is imposed during radar approach, it is automatically terminated 5 nm from touchdown or the point to commence final descent whichever is closer.
- (1) 1 (2) 2 (3) 3 (4) 4 (5) None

- Question 14: Which of the following statements regarding the step down fix (SDF) in the instrument approach is incorrect?
- (1) On an approach procedure, SDF is the point from where the pilot may commence descent to the next fix.
 - (2) After passing the SDF, descent to the specified altitude of the next fix may be performed.
 - (3) By setting SDF, the conditions for the minimum descent altitude and the weather minima can be improved.
 - (4) Setting as many SDFs as possible reduces the operation load of the pilot.

- Question 15: The following statements describe the procedure when a communication failure occurs while navigating under IFR. How many of these statements (a) to (d) are correct? Choose from (1) to (5) below.
- (a) If an aircraft is in visual meteorological conditions, the aircraft shall continue to fly in visual meteorological conditions and land at the nearest airport, etc. where a safe landing is considered possible.
 - (b) If an aircraft is in instrument meteorological conditions, the aircraft shall proceed according to the last assigned route to the point over the destination and land immediately.
 - (c) If an aircraft is in instrument meteorological conditions and the approach clearance had been issued before the communication failure, the approach clearance becomes void. Commence descent at the take off time plus the estimated elapsed time in the flight plan.
 - (d) If an aircraft is in instrument meteorological conditions and the holding instruction and EAT had been received, hold as advised and commence descent at EAT.
- (1) 1 (2) 2 (3) 3 (4) 4 (5) None

- Question 16: How many of the following statements (a) to (d) regarding the vectoring of aircrafts to final approach course are correct? Choose from (1) to (5) below.
- (a) Vectoring of aircrafts to final approach course in instrument approach procedure is generally called "vector to final".
 - (b) An aircrafts is vectored to intercept the final approach course outside the approach gate. The interception point is not closer than 2 nm outside the approach gate when the sum of the ceiling in the aerodrome and field elevation is below MVA + 500 ft or when the ground visibility is below 5 km.
 - (c) When an aircraft is vectored to final approach course and approach clearance had been issued, the initial approach segment (base turn/procedure turn) in the approach procedure is omitted and only the final approach is commenced.
 - (d) The maximum interception angle is prescribed as 30 degrees when the distance from interception point to approach gate is less than 2 nm, and 60 degrees when the distance is 2 nm or more respectively.
- (1) 1 (2) 2 (3) 3 (4) 4 (5) None

- Question 17: How many of the following statements (a) to (d) regarding visual approach is correct? Choose from (1) to (5) below.
- (a) Visual approach clearance is issued with the following phraseology: "Cleared contact approach runway (runway number)".
 - (b) There are two visual approaches; normal visual approach and altitude designated visual approach.
 - (c) Visual approach clearance is issued when ground visibility is 5 km or more and ceiling is MVA or more.
 - (d) Visual approach is conducted by a terminal control facility as an ordinary procedure without the pilot's request or consent.
- (1) 1 (2) 2 (3) 3 (4) 4 (5) None

- Question 18: The following statements describe the visual descent point in the term definitions of design criteria for flight procedures. Which one is correct?
- (1) Visual descent point is the marginal position in radar navigational guidance for landing.
 - (2) Visual descent point is the position to commence descent below decision height when an appropriate visual reference is in sight during contact approach.
 - (3) Visual descent point is the position to commence descent below decision height when an appropriate visual reference is in sight during precision approach.
 - (4) Visual descent point is the descent point on the final approach course of nonprecision approach procedure from which normal descent from the MDA may be commenced provided visual reference is established with which ALS or threshold is identified.

- Question 19: The following statements describe the effects of altitude on pilots navigating in an unpressurized cockpit. Which one is correct?
- (1) In an ordinary healthy pilot, deterioration in night vision starts at a cabin pressure altitude of around 10,000 ft.
 - (2) In an ordinary healthy pilot, significant effects of hypoxia usually do not occur below 18,000 ft.
 - (3) At 20,000 ft, the ability to take corrective and protective actions is lost in 40 to 50 minutes, and is soon followed by unconsciousness.
 - (4) Smoking lowers the altitude at which the significant effects of hypoxia occur.

- Question 20: Which of the following statements regarding the aeronautical lights is incorrect?
- (1) When taking off or landing at night, or especially under low visibility conditions, a visual source of information outside the cockpit is more likely to rely heavily on the aeronautical lights. Therefore, pilots shall correctly understand the meaning of each aeronautical light.
 - (2) By utilizing three different colors, aeronautical lights are distinguished from other common lights, provide identification among each aeronautical light, visual guidance and intuition.
 - (3) Once the aeronautical lights are sighted, the guidance obtained by the lights should be utilized such as identification, direction, distance, approach angle, touchdown point, correction of deviation and attitude.
 - (4) Pilots should take care not to stare at specific lights, or change attitude in searching for the lights.

NAVIGATION LOG

ETD : JST		NAVIGATION LOG																			
TIME		DEPARTURE AP						FUEL													
TO DESTINATION		DESTINATION AP						gal		RESERVE		gal									
FR DESTINATION TO ALTERNATE		ALTERNATE AP						gal		TOTAL		gal									
TO	ALT	TAS	WIND	MC	WCA	MH	DEV	CH	Z DIST	C DIST	ZZ	BURN OFF	G/S	Z TIME	C TIME	ETO	F/F	Z FUEL	C FUEL	REMARKS	
- A			300/36	151			1E		84												A VOR
- B			300/20	004			1E		63												B VOR
- C			290/30	079			2E		105												C VOR
- D			290/20	177			1E		21												D VOR
- YY			280/20	061			2E		58												
- E			280/10	115			1E		16												E VOR
- WW			290/10	076			1E		50												

