

Qualification	Instrument Rating (Airplane) (Rotorcraft)	No. of questions; time allowed	20 questions; 2 hours
Subject	Instrument Flight - General (subject code: 14)	Code	H1CC141650

- ☆ 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: 10:00 (JST)

Departure airport: ZZ Airport

Destination airport: YY Airport

Alternate airport: WW Airport

Cruising altitude: 16,000 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 150 kt; cruise 200 kt; descent 180 kt

Fuel consumption rate: Climb 900 lb/h; cruise 500 lb/h; descent 360 lb/h

Climb rate: 2,000 ft/min

Descent rate: 1,000 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 240°/26 kt for the climb, 285°/26 kt for the descent, and the values in appropriate boxes in the navigation log for cruising altitude. These wind directions are stated relative to magnetic north.

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

- (1) 12:07
- (2) 12:10
- (3) 12:13
- (4) 12:16

Question 2: Which of the following headings is the closest to the compass heading (CH) when the aircraft proceeds to cruising after taking off and climbing?

- (1) 198°
- (2) 200°
- (3) 218°
- (4) 220°

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 17 nm from ZZ Airport
- (2) Point where the aircraft has flown 10 minutes after taking off from ZZ Airport.
- (3) Point where the aircraft has flown 25 nm from ZZ Airport
- (4) Above 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) 1,600 lb
- (2) 1,650 lb
- (3) 1,700 lb
- (4) 1,750 lb

- Question 5: At 10 minutes after passing over B-VOR, measurement of GS was performed. The aircraft proceeded 10.3 nm in 3 minutes 52 seconds. CH was kept at 270°. In this state, how many of the following statements (a) to (d) regarding the navigation particulars are correct? Choose from (1) to (5) below.
- ETA of C-VOR calculated from ATA of B-VOR coincides with that on the navigation log.
  - WCA is +10°.
  - The wind velocity is the same as the forecasted wind velocity.
  - The wind direction is shifted to the south 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.
- WCA after taking off is approximately +5°.
  - At the leg where GS is the largest during cruising to YY Airport, the aircraft proceeds 3.6 nm in 1 minute.
  - TOD to YY Airport is the point 57 nm away from YY Airport.
  - If the descent angle to YY Airport is 3°, the descent rate is approximately 825 ft/min.
- (1) 1      (2) 2      (3) 3      (4) 4      (5) None
- Question 7: Which of the following flights is not included in the flights which shall not be performed unless the pilot has obtained instrument flight certification?
- Instrument flight
  - Instrument navigation flight which exceeds the distance of 110 km or the duration of 30 minutes
  - Night flight which exceeds the distance of 185 km or the duration of 30 minutes
  - Flight under instrument flight rules
- Question 8: If the lowest usable flight level is 155, in which of the following ranges does the atmospheric pressure (QNH) of that flight area fall?
- 29.91 inHg - 29.42 inHg
  - 29.41 inHg - 28.92 inHg
  - 28.91 inHg - 28.42 inHg
  - 28.41 inHg - 27.92 inHg
- 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.
- 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.
  - 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.
  - R34 /////: RVR of Runway 34 exceeds the upper limit of the measurable range.
  - 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: The following items (a) to (d) apply to the devices which an aircraft making an instrument flight shall be equipped under the provisions of Article 60 of the Act. How many of these items are correct? Choose from (1) to (5) below.

- (a) Gyroscopic heading indicator
- (b) Magnetic compass
- (c) Sensitive altimeter
- (d) Stall warning system with means for preventing freezing

(1) 1      (2) 2      (3) 3      (4) 4      (5) None

Question 11: 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.

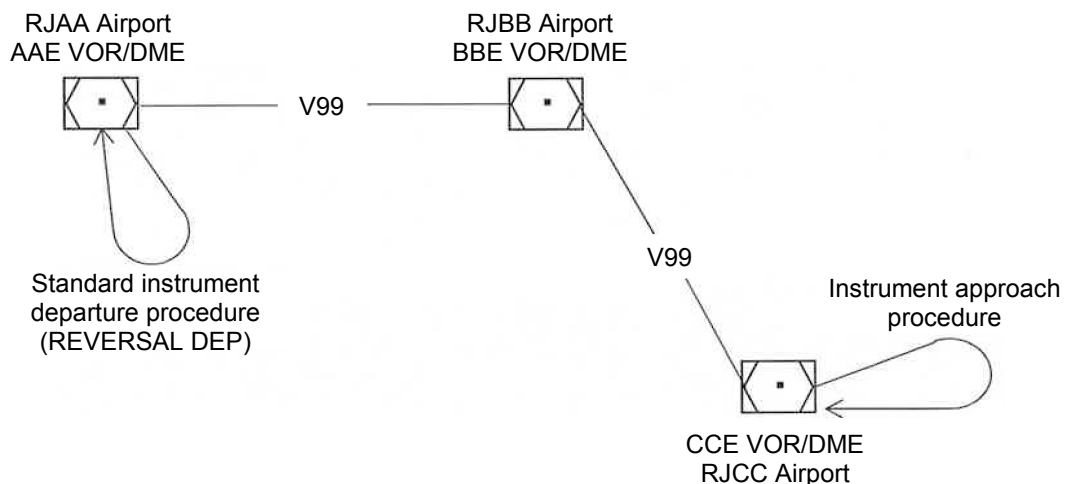
Question 12: Of the following combinations of radiotelephony phrases and their meanings, which one is correct?

- (1) Execute missed approach: Stop the missed approach.
- (2) Comply with restrictions: Comply with the altitude restrictions.
- (3) Delay not determined: No delay planned.
- (4) Cleared visual approach Runway 27: Cleared for visual approach to Runway 27.

Question 13: When an aircraft takes off from RJAA Airport, passes over VOR/DME at RJBB Airport, and lands at RJCC Airport as shown in the following drawing under instrument flight rules, how should Item 15 of the flight plan be filled in? Choose the correct one.

Here, the air navigation radio facilities for each route are AAE VOR/DME, BBE VOR/DME and CCE VOR/DME.

- (1) RJAA V99 BBE V99 RJCC
- (2) AAE V99 BBE V99 CCE
- (3) RJAA V99 RJCC
- (4) AAE V99 CCE



Question 14:

How many of the following statements (a) to (d) regarding instrument approach is correct? Choose from (1) to (5) below.

- (a) Prior to commencing an instrument approach, if the weather conditions at the airport of intended landing are worse than the published or pilot's approach minima, the pilot should notify the ATC facility or Airport Advisory Service Units of this fact, and should request clearance to hold or to proceed to an alternate airport.
- (b) After commencing an instrument approach (after a pilot determined that he could continue the approach at a prescribed point such as FAF, OM, 1,000 ft above airport elevation or other points accepted by the authorities), even if the weather conditions at the airport of intended landing have worsened below the published or pilot's minima, he may continue the instrument approach.
- (c) When a pilot is instructed to execute a missed approach or he discontinues an approach to land due to the worsening of weather, etc. before reaching over the MAP (Missed Approach Point) after commencing a final approach, he may discontinue the descent and level off at or above the decision height or the minimum descent altitude, or climb to an altitude specified in the missed approach procedure published in that IAP or instructed beforehand by ATC.
- (d) After commencing a final approach and prior to reaching over MAP, if a pilot discontinued an approach to land due to the worsening of weather, etc., he may deviate from the instrument approach procedure after obtaining clearance to fly a different route (other than the missed approach procedure published or instructed beforehand, holding, proceeding to an alternate airport, etc.).

(1) 1          (2) 2          (3) 3          (4) 4          (5) None

Question 15:

How many of the following statements (a) to (d) regarding the take-off minima are correct? Choose from (1) to (5) below.

- (a) On a multi-engined airplane without take-off alternate airport flight-planned or single-engined airplane, if the available approach procedure is CAT-I precision approach, the ceiling (rounded up to the nearest 100 ft) equal to MDH for non-precision approach and VIS equal to the minima for non-precision approach are applied.
- (b) On a multi-engined airplane without take-off alternate airport flight-planned or single-engined airplane, if the available approach procedure is the non-precision approach, MDH for non-precision approach plus 200 ft is applied as the ceiling (rounded up to the nearest 100 ft) and VIS equal to the minima for non-precision approach plus 1,000 m is applied.
- (c) On a multi-engined airplane without take-off alternate airport flight-planned or single-engined airplane, if the available approach procedure is the circling approach, the ceiling equal to MDH for circling approach (rounded up to the nearest 100 ft) and VIS equal to the minima for circling approach are applied.
- (d) When RVR is not available, use the reported visibility by converting it to CMV.

(1) 1          (2) 2          (3) 3          (4) 4          (5) None

Question 16:

The following statements (a) to (d) describe the cases when VDP for the non-precision, straight-in approach is not announced. How many of these statements are correct? Choose from (1) to (5) below.

- (a) The existing navigation procedure does not use DME in the final approach phase.
- (b) The approach procedure to an airport without PAPI
- (c) VDP is located before the step-down fix.
- (d) VDP is located between the missed approach point and the runway threshold.

(1) 1          (2) 2          (3) 3          (4) 4          (5) None

- Question 17: The following statements describe the pilot procedures for communication failure while navigating under IFR. Which one is incorrect?
- (1) If an aircraft is in the visual meteorological condition and there is an airport, etc. nearby to which the aircraft may continue to fly in the visual meteorological condition and land safely, the aircraft shall land at that airport, etc.
  - (2) If an aircraft is in the instrument meteorological condition, the aircraft shall fly by the shortest route to the airspace over the nearest airport, etc. where a safe landing is considered possible.
  - (3) If an aircraft is in the instrument meteorological condition and in an airspace where radar is not used for air traffic control, the aircraft shall maintain the last assigned altitude or minimum altitude, whichever is higher, and the last assigned speed for a period of 20 minutes following its failure to report its position over a compulsory reporting point, and thereafter adjust its altitude and speed in accordance with the filed flight plan.
  - (4) If an aircraft is in the instrument meteorological condition and in an airspace where radar is used for air traffic control, the aircraft shall maintain the last assigned altitude or minimum altitude, whichever is higher, and the last assigned speed for a period of 7 minutes following the time the last assigned altitude or the minimum altitude is reached or the time the transponder is set to Code 7600, whichever is later, and thereafter adjust its altitude and speed in accordance with the filed flight plan.

- Question 18: The following statements describe the status when the phrase “at the pilot’s discretion” is included in a clearance for descent. Which one is correct?
- (1) The time when the aircraft commences descent is at the pilot’s discretion.
  - (2) The pilot shall report if he/she will adjust the descent rate after commencing the descent.
  - (3) The aircraft is not allowed to perform level flight after commencing the descent.
  - (4) The aircraft may climb to an altitude which the aircraft has already crossed.

- Question 19: The following statements describe the collection efficiency method to analyze the ratio (amount) of icing on the airframe. Which one is incorrect?

$$\text{Collection efficiency} = \frac{Vr^2}{R}$$

- (1) As the airspeed decreases, the collection efficiency increases, and the amount of icing increases.
- (2) “R” is the radius of the object on which droplets in the cloud impinge.
- (3) “r” is the radius of the droplet in the cloud.
- (4) On the airframe, an area with a smaller radius has larger collection efficiency.

- Question 20: The following statements describe the effects of altitude on pilots navigating in an unpressurized cockpit. Which one is correct?
- (1) The 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.

ETD : JST				NAVIGATION LOG														
TIME						DEPARTURE AP			ZZ	FUEL								
TO DESTINATION						:	DESTINATION AP			YY	BURN OFF			lb	RESERVE		lb	
FR DESTINATION TO ALTERNATE						:	ALTERNATE AP			WW	ALTERNATE			lb	TOTAL		lb	
TO	ALT	TAS	WIND	MC	WCA	MH	DEV	CH	Z DIST	C DIST	G/S	Z TIME	C TIME	ETO	F/F	Z FUEL	C FUEL	REMARKS
ZZ																		
- A			285/36	209			1E		64									A VOR
- B			310/30	184			1E		90									B VOR
- C			280/42	260			2E		112									C VOR
- D			265/20	357			1E		20									D VOR
- YY			290/20	227			2E		101									
YY																		
- E			260/12	114			1E		63									E VOR
- WW			290/23	083			1E		33									