

Which of the following statements about SBAS (Satellite-Based Augmentation Systems) is correct?

In an SBAS the pseudo-range corrections are sent to the users by a network of ground stations



In an SBAS the pseudo-range corrections are sent to the users by the satellites of the respective systems, e.g. by GPS-satellites for GPS



In an SBAS the pseudo-range corrections can be read from the receiver's internal database



In an SBAS the pseudo-range corrections are sent to the users by geostationary satellites



Question 2 (Multiple Choice)

Which statement about Satellite Based Augmentation Systems (SBAS) is correct?

- The use of SBAS improves both the accuracy and the integrity of the position of the user.
- The use of SBAS improves only the integrity of the position of the user, not the accuracy.
- The use of SBAS improves only the accuracy of the position of the user, not the integrity.
- The use of SBAS improves neither the integrity nor the accuracy of the position of the user.

Question 3 (Multiple Choice)

Which of the following parameters can all be determined by a GNSS receiver which is tracking signals from 4 different satellites?

 Longitude, altitude and time Latitude, longitude and time Latitude and longitude only Latitude, longitude, altitude and time

Question 4 (Multiple Choice)

The RAIM function used by GNSS receivers enables use of (1) ___ range measurements to (2) ___ calculated from the minimum number of satellites required to provide a 3D fix.

(1) redundant, (2) verify the position

(1) minimum, (2) enhance precision of the position

(1) three, (2) enhance precision of the position

(1) four, (2) verify the position

Question 5 (Multiple Choice)

Almanac data stored in the receiver of the NAVSTAR/GPS system is used for the:

fast identification of received signals coming from visible satellites

assignment of received PRN-codes to the respective satellite

correction of the receiver clock error

check of Selective Availability (SA) operation

062 PT2 062.06

Toolbar...

0:23:34



Question 6 (Multiple Choice)

Aircraft Autonomous Integrity Monitoring (AAIM) is a type of Airborne Based Augmentation System which ...

only relies on information from additional on-board sensors. ✖

is self-contained and works without any equipment located outside the aircraft. ✖

only relies on GNSS information. ✖

relies on GNSS information as well as information from additional on-board sensors. ✓

Which statement about the principle of integrity monitoring used by Airborne-Based Augmentation Systems (ABAS) is correct?

ABAS uses Ground-Based Augmentation System (GBAS) to broadcast differential corrections and integrity messages in UHF frequencies.



ABAS uses Satellite-Based Augmentation System (SBAS) to broadcast differential corrections and integrity messages in VHF frequencies.



ABAS uses ground-based radio navigation aids to support Fault Detection (FD) or Fault Detection and Exclusion (FDE).



ABAS uses the redundant range measurements for Fault Detection (FD) or Fault Detection and Exclusion (FDE).



062 PT2 062.06

Toolbar...

0:23:34



☰ Question 8 (Multiple Choice)

The type of clock used in NAVSTAR GPS satellites is...

atomic



mechanical



pendulum



electric



Question 9 (Multiple Choice)

Typical coverage for a GBAS station is projecting out (1) ____ either side of the final approach path to 28 km (15 NM) and (2) ____ either side of the final approach path to 37 km (20 NM).

(1) plus/minus 5°, (2) plus/minus 10°

(1) plus/minus 10°, (2) plus/minus 20°

(1) plus/minus 10°, (2) plus/minus 35°

(1) plus/minus 35°, (2) plus/minus 10°

Question 10 (Multiple Choice)

By using L1 and L2 frequencies, GPS receivers can almost eliminate...

 clock error and propagation delay. ionospheric propagation delay. tropospheric propagation delay. atmospheric propagation delay.

Question 11 (Multiple Choice)

A position line in a Satellite-Assisted Navigation System (GNSS) is obtained by...

the aircraft's receiver measuring the phase angle of the signal received from a satellite in a known position.

measurement of distance and bearing from the aircraft's receiver to the satellite.

timing the period that is taken for an aircraft's transmission to reach the respective satellite.

timing the period that is taken for a satellite's transmission to reach the aircraft's receiver.

 Question 12 (Multiple Choice)

To improve integrity, Satellite-Based Augmentation System (SBAS) uses up to (1) ___ satellites to improve accuracy to (2) ___ horizontally and to advise any GPS malfunctions to users within (3) ___.

(1) six polar-orbiting, (2) 1 m, (3) 60 seconds 

(1) four geostationary, (2) 1 m - 2 m, (3) 6 seconds 

(1) four polar-orbiting, (2) 10 m, (3) 6 seconds 

(1) six geostationary, (2) 5 m, (3) 60 seconds 

Which of the following statements about geometric dilution of precision (GDOP) is correct?

The value of the dilution of precision depends on the...

accuracy of the range measurement between the satellite and receiver. ✖

availability of aircraft-based and ground-based augmentation systems. ✖

geometry and the number of satellites in view. ✓

availability of receiver autonomous integrity monitoring software. ✖

Which answer lists all functions of the control segment in the NAVSTAR/GPS system?

1. Monitoring of the constellation status
2. Correction of orbital parameters
3. Navigation data uploading

2 and 3



1, 2 and 3



1 and 3



1 and 2



Which of the following statements is correct regarding the satellites (that transmit the corrections to the users) of a Satellite Based Augmentation System (SBAS)?

These polar orbiting satellites can also be used as navigation satellites to which pseudo-ranges can be measured.



These geostationary satellites can also be used as navigation satellites to which pseudo-ranges can be measured.



These satellites are geostationary and determine the corrections independently from a ground station network.



These polar orbiting satellites cannot be used as navigation satellites, pseudo-ranges to them cannot be measured.



With regard to PBN operations, RNAV 2 can be used for the following phases of flight:

1. En-route continental
2. Arrival
3. Departure

1, 2 and 3.



1 and 2 only.



1 only.



2 and 3 only.



Question 17 (Multiple Choice)

According ICAO Doc 9316, a specific, curved path radius in a terminal or approach procedure defined by radius, arc length, and fix, is referred to as:

 Radius leg (RL). Radius to fix (RF) leg. Fly-by (FB) turn. Fix-radius Transition (FRT).

Question 18 (Multiple Choice)

According ICAO Doc 9613, the difference between the on-board navigation specifications "RNP" and "RNAV" is:

Performance-monitoring function is required for "RNAV" operations only.

Performance-monitoring and alerting function is required for "RNP" operations only.

Performance-monitoring and alerting function is required for "RNAV" operations only.

Alerting function is required for "RNAV" operations only.

In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP 1, with the Navigation Display (ND) displaying:

"RNP 1.00 / ANP 0.10" in green colour.

This means:

Required Navigation performance is satisfied, because the aircraft is less than 0.10 NM off-track.



The current (actual) navigation performance with 0.10 is better than the required performance 1.00.



Green colour signals that the actual navigation performance is less the required limits.



The current (actual) navigation performance is better than the required performance by a factor of 0.05.



With regard to PBN concept, which of the following statements is correct?

1. In the approach phases of flight, PBN accommodates linear laterally guided operations.
2. In the approach phases of flight, PBN accommodates angular laterally guided operations.

1 is correct, 2 is correct.



1 is correct, 2 is incorrect.



1 is incorrect, 2 is correct.



1 is incorrect, 2 is incorrect.



ATC informs to expect RNP Approach (RNP APCH) Runway 09. In case one waypoint of the RNP APCH is missing in the navigation database, the recommended action should be:

to request a different approach procedure from ATC, because a RNP APCH requires to be retrievable from the on-board navigation database and to conform to the charted procedure.



manually update the RNP APCH route retrieved from the on-board navigation database to conform to the charted procedure.



to continue approach procedure, because RNP APCH waypoints may be omitted in accordance with ATC clearance.



to create a new RNP APCH to the on-board navigation database taking into account all waypoints from the charted procedure.



With regard to RNP APCH to LNAV/VNAV minima based on Baro-VNAV, which of the statements is correct?

1. Temperature compensation systems with an airworthiness approval provide corrections to the Baro-VNAV guidance during Final approach segment.
2. High temperatures reduce the effective glide path angle.

1 is incorrect, 2 is incorrect.



1 is incorrect, 2 is correct.



1 is correct, 2 is correct.



1 is correct, 2 is incorrect.



With regard to PBN concept, "availability" can be understood as:

- the degree of conformance between the estimated, measured or desired position.
- as the portion of time (percentage annually) during which reliable navigation information is presented to the crew.
- the capability of the total system to perform its function without non-scheduled interruptions during the intended operation.
- the ability of a system to provide timely warnings to users when the system should not be used for navigation.

In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP "X", a message with aural warning appears saying:

"NAV ACCUR DOWNGRAD".

This means:

Navigational sources have been lost, leaving Estimated Position Error (EPE) undefined.



The current navigation accuracy is less than the that required by the RNP.



RAIM function is activated to re-acquire the prescribed navigation accuracy required by the procedure.



AAIM function is activated to re-acquire the prescribed navigation accuracy required by the procedure.



Why may an aircraft that is approved for a RNP or RNAV specification with a stringent accuracy requirement, NOT automatically be approved for another navigation specification that has a less stringent accuracy requirement?

Because there is only a limited number of aircraft permitted for certain navigation specification at a time.



Because monitoring and indication systems may not be suitable for that type of specification.



Because the aircraft might NOT meet all the functional requirements.



Because operation is only permitted for one type of specification.



ARINC 424 path terminators are described by a (1) ___, which defines a specific type of flight path along a segment of a procedure and a specific type of termination of that flight path. They are assigned to (2) ___ in an airborne navigation database.

(1) 2-letter code, (2) SID, STAR and approach procedure segments



(1) 2-letter code, (2) all RNAV, SID, STAR and approach procedure segments



(1) 3-letter code, (2) all RNAV, SID, STAR and approach procedure segments



(1) 3-letter code, (2) RNAV approach procedure segments



Question 29 (Multiple Choice)

With regard to PBN concept, aircraft RNAV and RNP system performance requirements are defined by:

terms of accuracy, integrity and continuity.



terms of redundancy, integrity and endurance.



terms of independence, continuity and reliability.



terms of endurance, precision and continuity.



☰ Question 29 (Multiple Choice)

According ICAO Doc 9613, Path Definition Error (PDE)...

occurs when the path defined in the RNAV system does not correspond to the desired path.

is a Gaussian distribution with a standard deviation equal to the root sum square (RSS) of the standard deviations of all contributing errors.

refers to the difference between the aircraft's estimated position and actual position.

relates to the air crew or autopilot's ability to follow the defined path or track, including any display error (e.g. CDI centring error).



Question 28 (Multiple Choice)

In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP 1, with the Navigation Display (ND) displaying:

"RNP 1.00 / ANP 0.10" in green colour.

This means:

Green colour signals that the actual navigation performance is less than the required limits.

The current (actual) navigation performance with 0.10 is better than the required performance 1.00.

The current (actual) navigation performance is better than the required performance by a factor of 0.05.

Required Navigation performance is satisfied, because the aircraft is less than 0.10 NM off-track.



Question 26 (Multiple Choice)

With regard to PBN, which statement about Path Definition Error (PDE) is correct?

1. PDE depends on the database integrity and functional requirements on the defined path.
2. PDE is considered negligible.

1 is incorrect, 2 is correct.

1 is correct, 2 is correct.

1 is correct, 2 is incorrect.

1 is incorrect, 2 is incorrect.



☰ Question 20 (Multiple Choice)

ATC informs to expect RNP Approach (RNP APCH) Runway 09. In case one waypoint of the RNP APCH is missing in the navigation database, the recommended action should be:

manually update the RNP APCH route retrieved from the on-board navigation database to conform to the charted procedure.

to request a different approach procedure from ATC, because a RNP APCH requires to be retrievable from the on-board navigation database and to conform to the charted procedure.

to continue approach procedure, because RNP APCH waypoints may be omitted in accordance with ATC clearance.

to create a new RNP APCH to the on-board navigation database taking into account all waypoints from the charted procedure.



☰ Question 17 (Multiple Choice)

With regard to PBN navigation, an advanced navigation system like a FMS will evaluate an internal "Flight Management (FM) position" and an "Estimated Position Error (EPE)".

This is done by...

FMS position is adjusted to the IRS position, with the difference resulting in the EPE.

In case of dual FMS operation, FMS positions will be compared, with the difference resulting in the EPE.

several sources will be used by FMS, and, depending on their expected accuracies, these position data are compared with the FM position.

In case of single FMS operation, comparing of calculated positions is not possible, thus making evaluation of EPE impossible.



Question 16 (Multiple Choice)

With regard to PBN, RNP systems supporting "RF-leg" type provide the same ability to conform to the track-keeping accuracy during the turn as in the straight line segments by...

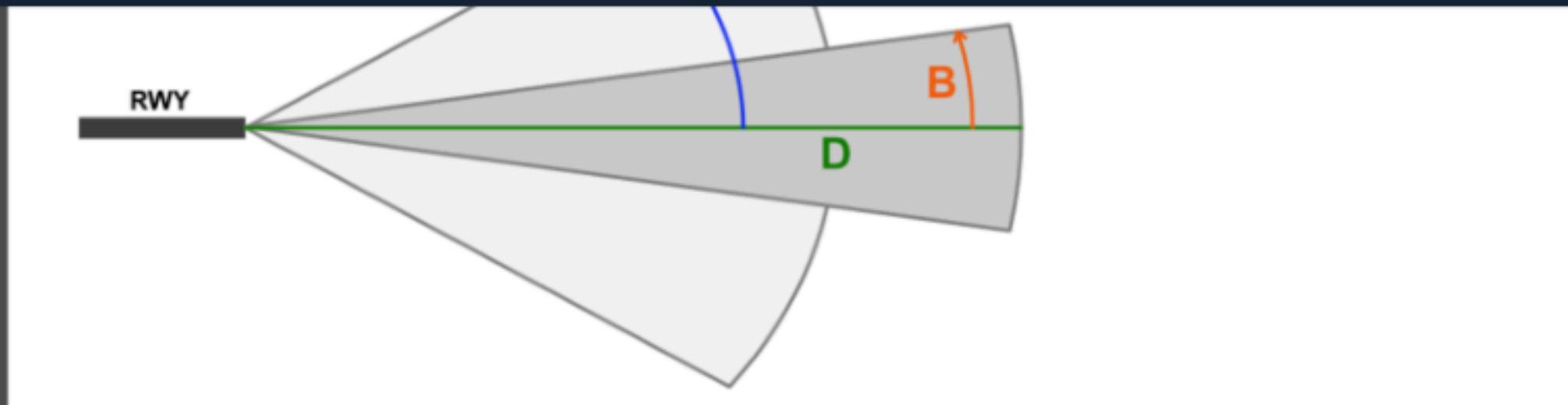
using the flight director or autopilot to provide/establish the necessary level of guidance and precision during the turn.

commencing the turn in a pre-calculated distance from the fix to initiate the fly-by manoeuvre.

using TAS/bank angle calculations to provide the necessary level of accuracy during the turn.

using the displayed distance from an ARC waypoint to provide the necessary level of guidance during the turn.





(See attachment IC-062-116)

The correct coverage area for a Ground-Based Augmentation System (GBAS) providing three-dimensional (3D) guidance in the final approach segment is given by the following values:

(A) 10°, (C) 20 NM

(A) 35°, (C) 15 NM

(A) 50°, (C) 35 NM

(A) 25°, (C) 10 NM



☰ Question 10 (Multiple Choice)

The type of clock used in NAVSTAR GPS satellites is...

 pendulum ✖ atomic ✓ mechanical ✖ electric ✖

☰ Question 7 (Multiple Choice)

A fix in a Satellite-Assisted Navigation System (GNSS) is obtained by:

measuring the time taken for an aircraft's transmissions to reach all satellites of the system

measuring the time taken for a minimum number of satellites' transmissions, in known positions, to reach the aircraft's receiver

measuring the time taken for all of the system's satellites' transmissions to reach an aircraft

the aircraft's receiver measuring the phase angle of signals received from a number of satellites in known positions



Question 4 (Multiple Choice)

A GPS-based SBAS (Satellite-Based Augmentation System) uses satellites to transmit corrections to users' receivers.

Which of the following statements about these satellites is true?

Pseudo-range measurements to these satellites can be made as they are GPS satellites which are part of the GPS satellite constellation.

Pseudo-range measurements to these geostationary satellites cannot be made as they do not transmit on a GPS frequency.

Pseudo-range measurements to these geostationary satellites cannot be made as they do not transmit a valid GPS navigation message.

Pseudo-range measurements to these geostationary satellites can be made as they also transmit a valid GPS navigation message on the GPS frequency.



Question 2 (Multiple Choice)

When the aircraft on final approach is fitted with a GBAS receiver, GBAS corrects the aircraft's on-board GPS position and...

replaces the aircraft's on-board GPS position.



corrects only for vertical approach path details.



provides the precision approach path details.



corrects only for lateral approach path details.



062 PT2 062.06

Toolbar...

🕒 0:37:45   Question 1 (Multiple Choice)

Regarding determining GNSS position:

The DOP has to be more than 6 for position fixing in en-route navigation 

GPS can be used only for approach guidance, but not for enroute navigation 

The clock error of the satellite clock is important for accurate position fixing 

There is no advantage in combining GPS and INS. 

062 PT2 062.06

Toolbar...

🕒 0:37:45 ⓘ ⏪

☰ Question 2 (Multiple Choice)

To improve integrity, Satellite-Based Augmentation System (SBAS) uses up to (1) ___ satellites to improve accuracy to (2) ___ horizontally and to advise any GPS malfunctions to users within (3) ___.

(1) six geostationary, (2) 5 m, (3) 60 seconds ✖

(1) six polar-orbiting, (2) 1 m, (3) 60 seconds ✖

(1) four polar-orbiting, (2) 10 m, (3) 6 seconds ✖

(1) four geostationary, (2) 1 m - 2 m, (3) 6 seconds ✓

 Question 3 (Multiple Choice)

A range calculated by the GNSS receiver defines:

an ellipse with its centre at the receiver.



a sphere with its centre at the receiver.



an ellipse with its centre at the satellite.



a sphere with its centre at the satellite.



 Question 4 (Multiple Choice)

The Doppler frequency shift of the received NAVSTAR/GPS carrier frequency may be used to...

calculate the height of the aircraft more accurately. 

correct the calculated position for a change in receiver clock error. 

determine the groundspeed of the aircraft. 

correct the calculated position for frequency shifts. 

 Question 5 (Multiple Choice)

To calculate an aircraft's groundspeed, a GNSS receiver measures the...

phase of the received satellite signal.



difference in depth of modulation.



time travelled by the satellite signal between satellite and receiver.



Space Vehicle (SV) Doppler shift of the satellite carrier frequency.



062 PT2 062.06

Toolbar...

🕒 0:37:45 ⓘ ⏪

 Question 6 (Multiple Choice)

When using SBAS, in case of a GPS malfunction the users will be alerted by broadcasting data from geostationary satellites within...

6 seconds.



60 seconds.



0.6 seconds.



6 minutes.



 Question 7 (Multiple Choice)

Amongst others, a task of the GNSS control segment is:

- to transmit differential corrections to users. 
- to control whether the pilot flies the correct GPS track. 
- to control the motion of the GPS-satellites. 
- to detect the malfunctioning of satellites. 

What minimum number of satellites is required for:

- signal reception to perform an independent 3-dimensional fix
- Receiver Autonomous Integrity Monitoring (RAIM)
- and the detection / exclusion of a faulty satellite?

9



7



6



3



With regard to Airborne-Based Augmentation System (ABAS), a common method of integrity monitoring that relies on information from the GNSS and from additional on-board sensors (like IRS) is referred to as:

RAIM (Receiver Autonomous Integrity Monitoring)



AAIM (Aircraft Autonomous Integrity Monitoring).



GAIM (GNSS Autonomous Integrity Monitoring)



Local Area Augmentation System (LAAS)



Which statement about Local Area Augmentation System (LAAS) of the NAVSTAR/GPS system is correct?

The accuracy of position fixes is independent of the distance between the aircraft receiver and the LAAS ground reference station.



A LAAS utilises a geostationary satellite instead of a ground station to correct the position of the aircraft.



The further away the receiver is from a LAAS ground reference station, the more accurate is the aircraft position fix.



GBAS based on GPS is sometimes called local area augmentation system (LAAS).



With regard to GBAS operations, one ground station can support (1) ___ within its coverage providing the aircraft with approach data, corrections and integrity information for GNSS satellites in view via a (2) ___.

- (1) all the aircraft subsystems, (2) VHF data broadcast (VDB)
- (1) a maximum of 100 aircraft subsystems, (2) VHF data broadcast (VDB)
- (1) all the aircraft subsystems, (2) Satellite broadcast datalink.
- (1) a maximum of 100 aircraft subsystems, (2) Satellite broadcast datalink.

 Question 13 (Multiple Choice)

Data from GBAS defining the Final Approach Segment (FAS) is transmitted on (1) ____ including position correction and (2) ____.

(1) UHF, (2) clock error correction information.



(1) UHF, (2) information about dilution of precision (DOP)



(1) SHF, (2) correction information about ionospheric errors.



(1) VHF, (2) integrity information about each satellite



Which of the statements below correctly describes the principle of RAIM?

RAIM uses a minimum of 5 satellites with good geometry to detect faulty signals and trigger alert to the crew.



RAIM uses a minimum of 5 satellites with good geometry in addition to board-side source like IRS.



RAIM becomes effective when signals from at least 3 satellites are supported by barometric altitude values.



RAIM is available in the complete area covered by Global Navigation Satellite Systems (GNSS) signals.



Which of the following correctly lists the most significant factors affecting the accuracy of the Satellite-Assisted Navigation System (GNSS/GPS)?

Satellite orbit displacement, atmospheric propagation, Doppler frequency shift and satellite clock error.



Satellite frequency failure, satellite ephemeris, and atmospheric propagation, multipath, frequency drift.



Ionospheric propagation delay, dilution of precision, satellite clock error, satellite orbital variations, multipath.



Satellite mutual interference, frequency drift, and satellite-to-ground time lag.



With regard to PBN, which statement about Path Definition Error (PDE) is correct?

1. PDE depends on the database integrity and functional requirements on the defined path.
2. PDE is considered negligible.

1 is incorrect, 2 is incorrect.



1 is correct, 2 is incorrect.



1 is incorrect, 2 is correct.



1 is correct, 2 is correct.



 Question 17 (Multiple Choice)

RNAV 1, RNAV 2, RNP 1, RNP 2 SIDs and STARs should be programmed into the FMS by:

manual entry using the latitude and longitude of the waypoints. 

route name from the on-board navigation database. 

manual entry using place/bearing/distance information of the waypoints. 

automatic transfer of the route via Electronic Flight Bag. 

In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP 1, with the Navigation Display (ND) displaying:

"RNP 1.00 / ANP 0.10" in green colour.

This means:

The current (actual) navigation performance is better than the required performance by a factor of 0.05. ✖

Required Navigation performance is satisfied, because the aircraft is less than 0.10 NM off-track. ✖

The current (actual) navigation performance with 0.10 is better than the required performance 1.00. ✓

Green colour signals that the actual navigation performance is less the required limits. ✖

062 PT3 062.07

Toolbar...

🕒 0:37:45   Question 19 (Multiple Choice)

RNAV 1, RNAV 2, RNP 1, RNP 2 routes may be modified by...

inserting the latitude and longitude of a new waypoint according to ATC instructions. 

inserting or deleting specific waypoints as instructed by ATC and/or NOTAM. 

inserting or deleting specific waypoints from the database, as instructed by ATC. 

inserting the range/bearing to a new waypoint according to ATC instructions. 

With regard to PBN navigation, an advanced navigation system like a FMS will evaluate an internal "Flight Management (FM) position" and an "Estimated Position Error (EPE)".

This is done by...

In case of single FMS operation, comparing of calculated positions is not possible, thus making evaluation of EPE impossible.



In case of dual FMS operation, FMS positions will be compared, with the difference resulting in the EPE.



several sources will be used by FMS, and, depending on their expected accuracies, these position data are compared with the FM position.

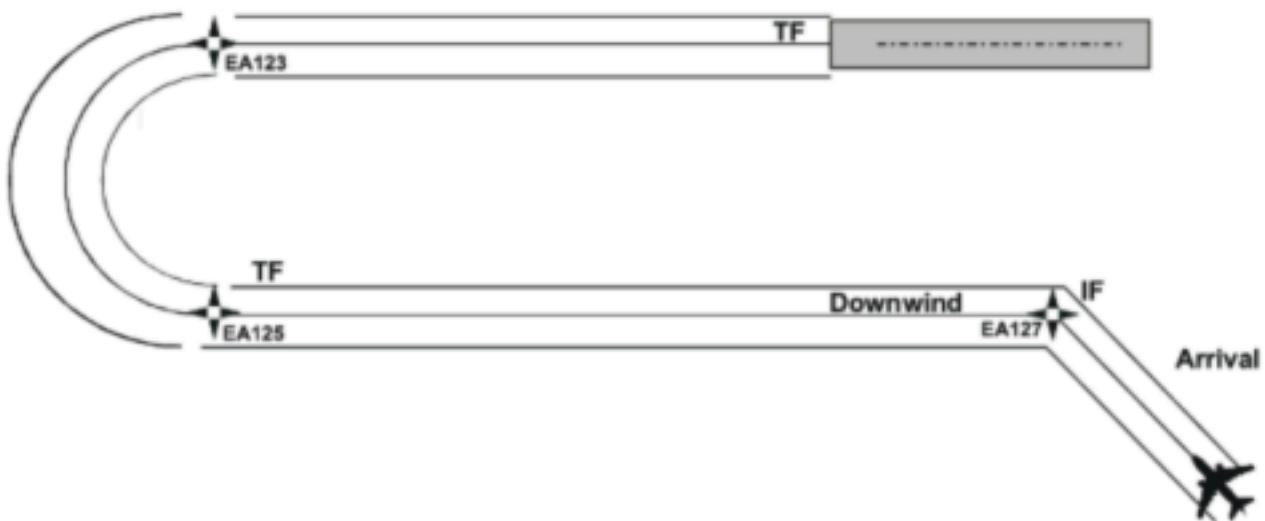


FMS position is adjusted to the IRS position, with the difference resulting in the EPE.





IC-062-117

Figure A**Figure B**

waypoint



(See attachment IC-062-117)

According ICAO Doc 9316, a form of fixed radius path (FRP) shown in the annex Figure A is referred to as:

Fly-by (FB) turn.



Radius leg (RL).



Fix-radius Transition (FRT).



Radius to fix (RF) leg.



With regard to PBN, the term "Offset flight path" is defined as:

a path with a lateral offset from a defined route, to be intercepted with an angle of 45 degrees or more. ✖

a path with a lateral offset from a defined route, specified in increments of 1 NM up to 20 NM. ✔

a path with a lateral offset from a defined route, to be flown in opposite direction of the cleared direction. ✖

a path with a lateral offset from a defined route, specified in increments of 5 NM up to 20 NM. ✖

062 PT3 062.07

Toolbar...

🕒 0:37:45   Question 23 (Multiple Choice)

If the lateral guidance of an RNP APCH to LNAV/VNAV minima is based on GNSS, its vertical guidance is based on....

either Baro-VNAV or SBAS.



either RADAR ALT or GBAS.



either Baro-VNAV or RADAR ALT.



either SBAS or GBAS.



062 PT3 062.07

Toolbar...

🕒 0:37:45   Question 24 (Multiple Choice)

For PBN operations on a route for which RNP 10 is required (oceanic and remote continental navigation applications), the ground-based NAVAID infrastructure components require:

No ground-based navaid infrastructure or assessment.



VOR/DME



VOR/NDB



DME/DME



 Question 25 (Multiple Choice)

According ICAO Doc 9613, the components for the application of PBN include:

airspace concept, navigation infrastructure, navigation application 

navaid performance, navigation specification, aircraft type 

navaid infrastructure, navigation specification, navigation application 

lateral performance, vertical performance, ATS and ATM and Communication 

Regarding PBN operations, which statement about "fly-by" and "fly-over"-waypoints is correct?

1. At "fly-by" waypoints, turn is commenced prior to reaching the waypoint.
2. At "fly-over" waypoints, turn is commenced when overhead the waypoint.

1 is correct, 2 is incorrect.



1 is incorrect, 2 is incorrect.



1 is incorrect, 2 is correct.



1 is correct, 2 is correct.



According ICAO Doc 9316, a form of fixed radius path (FRP) intended to be used with en-route procedures, which falls upon the RNP system to create the fixed radius turn between route segments, is referred to as:

Radius leg (RL)



Fix-radius Transition (FRT)



Fly-by (FB) turn



Radius to fix (RF) leg



According ICAO Doc 9613, Flight Technical Error (FTE)...

refers to the difference between the aircraft's estimated position and actual position. 

relates to the air crew or autopilot's ability to follow the defined path or track, including any display error (e.g. CDI centring error). 

occurs when the path defined in the RNAV system does not correspond to the desired path. 

is considered as a radial error so that on-board performance monitoring and alerting is provided in all directions. 

062 PT3 062.07

Toolbar...

🕒 0:37:45   Question 29 (Multiple Choice)

With regard to PBN, a navigation specification suitable for all phases of flight except for oceanic/remote and final approach, is:

RNAV 10 RNP 4 RNP 2 RNP 0.3 

With regard to Airborne-Based Augmentation System (ABAS), a common method of integrity monitoring that relies on information from the GNSS and from additional on-board sensors (like IRS) is referred to as:

RAIM (Receiver Autonomous Integrity Monitoring)



Local Area Augmentation System (LAAS)



GAIM (GNSS Autonomous Integrity Monitoring)



AAIM (Aircraft Autonomous Integrity Monitoring.)



062 PT2 062.06



Toolbar...

0:43:43



Question 6 (Multiple Choice)

The time corrected by the clock correction parameters in the navigation message is...

the receiver time.



the satellite time and receiver time.



the coordinated time.



the satellite time.





Question 5 (Multiple Choice)

The parameters of the model of the ionosphere are contained in the navigation message of a NAVSTAR/GPS satellite.

This enables...

the receiver to select the satellites with the best geometric dilution of precision. ✖

the receiver to use data from all satellites in the constellation simultaneously. ✖

the receiver to calculate the delay of signals passing through the ionosphere. ✔

the authorised users to work on the frequencies L1 and L2. ✖

062 PT2 062.06

Toolbar...

0:43:43



Question 3 (Multiple Choice)

In which frequency bands do the L1 and L2 frequencies operate, which are used by the NAVSTAR/GPS system for transmission of the navigation message?

LF



VHF



AHF



UHF



 Question 2 (Multiple Choice)

A range calculated by the GNSS receiver defines:

a sphere with its centre at the satellite.



an ellipse with its centre at the satellite.



a sphere with its centre at the receiver.



an ellipse with its centre at the receiver.



062 PT2 062.06



Toolbar...

0:43:43



Question 10 (Multiple Choice)

Aircraft Autonomous Integrity Monitoring (AAIM) is a type of Airborne Based Augmentation System which ...

relies on GNSS information as well as information from additional on-board sensors.

is self-contained and works without any equipment located outside the aircraft.

only relies on GNSS information.

only relies on information from additional on-board sensors.

 Question 9 (Multiple Choice)

Almanac data stored in the receiver of the NAVSTAR/GPS system is used for the:

check of Selective Availability (SA) operation

correction of the receiver clock error

fast identification of received signals coming from visible satellites

assignment of received PRN-codes to the respective satellite

062 PT2 062.06

•••

Toolbar...

0:43:43



Question 8 (Multiple Choice)

With regard to Airborne-Based Augmentation System (ABAS), which on-board sensor can be used to augment GNSS positional information?

EGNOS VOR/DME ADS-B IRS

 Question 7 (Multiple Choice)

Amongst others, a task of the GNSS control segment is:

to transmit differential corrections to users.



to detect the malfunctioning of satellites.



to control the motion of the GPS-satellites.



to control whether the pilot flies the correct GPS track.



Assume the case that a satellite used by a GNSS receiver is faulty.

When the signals of 5 satellites, including the faulty one, are received, the receiver's RAIM software...

is able to detect one faulty signal but is unable to identify which is the faulty one. 

will not work because the software needs at least 24 satellites to function correctly. 

is able to detect one faulty signal and is able to identify the faulty one. 

is unable to identify the faulty one and is also unable to detect that one satellite is faulty. 

062 PT2 062.06



Toolbar...

0:43:43



Question 14 (Multiple Choice)

For differential GPS positioning error correction with GBAS, the (1) ___ uses signals from at least (2) ___ satellites to acquire the position error correction, which is relayed to (3) ___.

(1) the aircraft's GPS receiver, (2) five, (3) ground-based receiver ✖

(1) ground-based receiver, (2) five, (3) the aircraft's GPS receiver ✖

(1) ground-based receiver, (2) four, (3) the aircraft's GPS receiver ✓

(1) the aircraft's GPS receiver, (2) four, (3) ground-based receiver ✖

With regard to GBAS operations, one ground station can support (1) ____ within its coverage providing the aircraft with approach data, corrections and integrity information for GNSS satellites in view via a (2) ____.

(1) all the aircraft subsystems, (2) Satellite broadcast datalink. ✖

(1) a maximum of 100 aircraft subsystems, (2) VHF data broadcast (VDB) ✖

(1) a maximum of 100 aircraft subsystems, (2) Satellite broadcast datalink. ✖

(1) all the aircraft subsystems, (2) VHF data broadcast (VDB) ✔

The required navigation functionalities of RNAV and RNP specifications include:

1. Continuous indication of lateral deviation
2. Continuous indication of vertical deviation
3. Distance/bearing to active (TO) waypoint
4. Groundspeed / time to active (TO) waypoint
5. Navigation data storage

1, 3, 4 and 5.



1, 2, 3, 4 and 5.



1, 2 and 3.



2, 3, 4 and 5.



With regard to PBN operation, which statements about the Estimated Position Error (EPE) is correct?

1. EPE is a measure for accuracy of the FMS position by applying specific validations on the available navigation inputs.
2. EPE is calculated using statistical models of position error probabilities.

1 is correct, 2 is correct.



1 is incorrect, 2 is incorrect.



1 is correct, 2 is incorrect.



1 is incorrect, 2 is correct.



According Definition from Annex I to Part-FCL with regard to linear and angular laterally guided operations during approach phases of flight, which of the following statements is correct?

Linear guidance means instrument approach operation in which the maximum tolerable error/deviation from the planned track is expressed in percent of maximum deviation angle for cross-track lateral deviation.



Angular guidance means instrument approach operation in which the maximum tolerable error/deviation from the planned track is expressed in units of length, for instance nautical miles, for cross-track lateral deviation.



Linear guidance means instrument approach operation in which the maximum tolerable error/deviation from the planned track is expressed in terms of deflection of the needles on the Course Deviation Indicator (CDI) or equivalent display in the cockpit.



Angular guidance means instrument approach operation in which the maximum tolerable error/deviation from the planned track is expressed in terms of deflection of the needles on the Course Deviation Indicator (CDI) or equivalent display in the cockpit.



062 PT3 062.07

Toolbar...

0:43:43

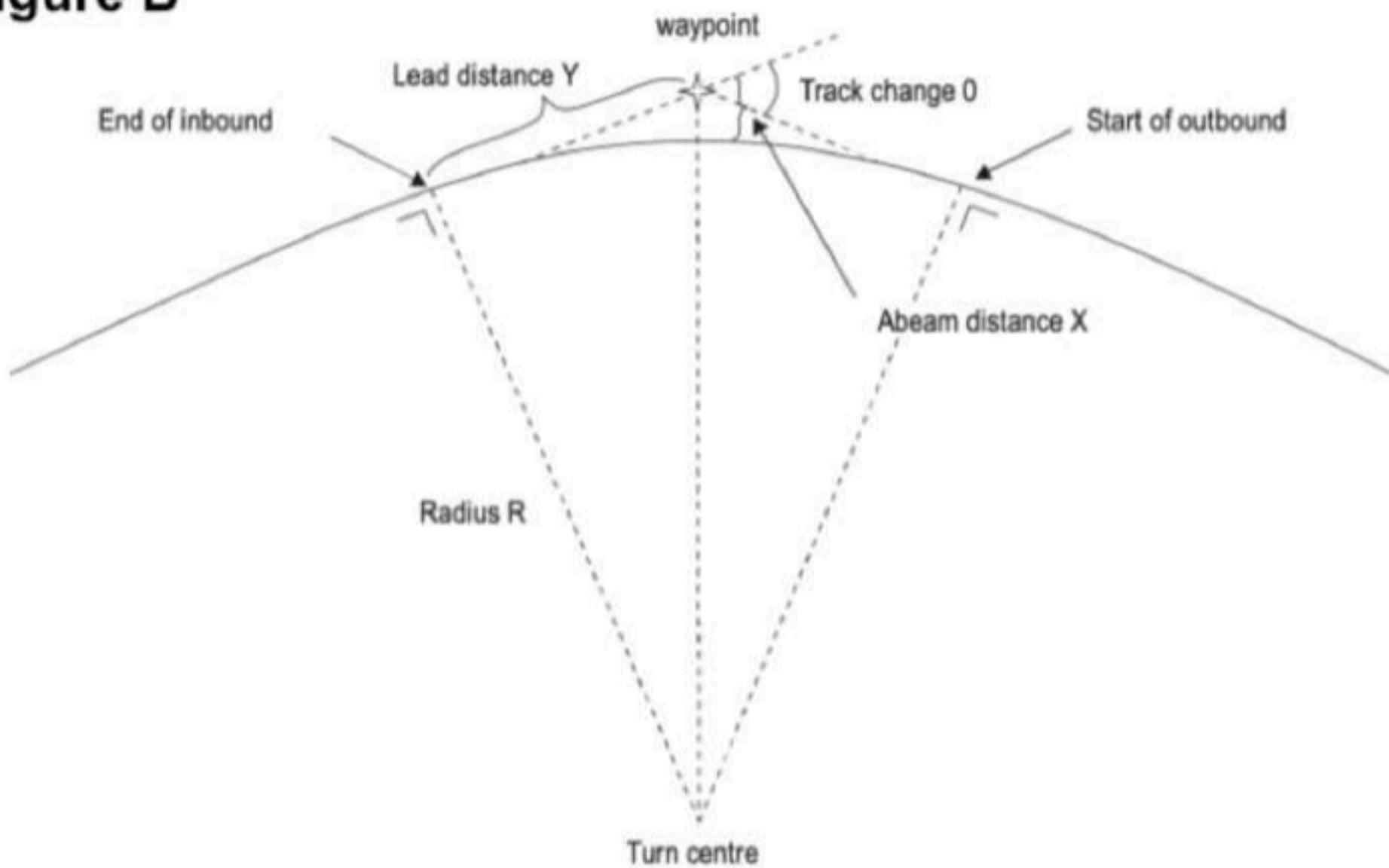


Question 24 (Multiple Choice)

For PBN operations on a route for which RNP 10 is required (oceanic and remote continental navigation applications), the ground-based NAVAID infrastructure components require:

 DME/DME VOR/NDB VOR/DME No ground-based navaid infrastructure or assessment.

Figure B



 Question 28 (Multiple Choice)

With regard to PBN concept, aircraft RNAV and RNP system performance requirements are defined by:

terms of accuracy, integrity and continuity. 

terms of redundancy, integrity and endurance. 

terms of independence, continuity and reliability. 

terms of endurance, precision and continuity. 

Basic functional requirements of RNAV and RNP specifications include continuous indication of:

1. Lateral deviation
2. Distance/bearing to the active (TO) waypoint
3. Display/distance and bearing from the previous (FROM) waypoint
4. Groundspeed/time to the active (TO) waypoint
5. Failure indication

1, 2, 4 and 5.



3, 4 and 5.



1, 3, 4 and 5.



1, 2 and 3.



With regard to PBN navigation, an advanced navigation system like a FMS will evaluate an internal "Flight Management (FM) position" and an "Estimated Position Error (EPE)".

This is done by...

FMS position is adjusted to the IRS position, with the difference resulting in the EPE.



several sources will be used by FMS, and, depending on their expected accuracies, these position data are compared with the FM position.



In case of dual FMS operation, FMS positions will be compared, with the difference resulting in the EPE.



In case of single FMS operation, comparing of calculated positions is not possible, thus making evaluation of EPE impossible.



 Question 25 (Multiple Choice)

Select the correct way a pilot can retrieve RNAV / RNP1 / RNP2 SID or STAR:

Referring to the route number according to NOTAM. 

Using a route name conforming to the charted route. 

Using individual route waypoints according to the charted route. 

Using the company route database. 

 Question 29 (Multiple Choice)

According ICAO Doc 9613, the difference between the on-board navigation specifications "RNP" and "RNAV" is:

Alerting function is required for "RNAV" operations only.



Performance-monitoring and alerting function is required for "RNP" operations only.



Performance-monitoring function is required for "RNAV" operations only.



Performance-monitoring and alerting function is required for "RNAV" operations only.



Question 1 (Multiple Choice)

To calculate an aircraft's groundspeed, a GNSS receiver measures the...

difference in depth of modulation.



Space Vehicle (SV) Doppler shift of the satellite carrier frequency.



phase of the received satellite signal.



time travelled by the satellite signal between satellite and receiver.



 Question 3 (Multiple Choice)

Which error can be compensated for by a NAVSTAR/GPS receiver comparing L1 and L2 frequencies?

1. Ionospheric delay
2. Multipath disruption
3. Receiver noise

1 only



2 only



2 and 3



1 and 3



 Question 4 (Multiple Choice)

Amongst others, a task of the GNSS control segment is:

to control the motion of the GPS-satellites.



to control whether the pilot flies the correct GPS track.



to detect the malfunctioning of satellites.



to transmit differential corrections to users.



 Question 6 (Multiple Choice)

With regard to GNSS receivers, an estimation of position accuracy can be obtained by combining...

User Equivalent Range Error (UERE) with Geometric Dilution of Precision (GDOP). 

Geometric Dilution of Precision (GDOP) Ionospheric Propagation Delay (IPD). 

User Equivalent Range Error (UERE) with Satellite Clock Error. 

Satellite Orbital Variations Error with Ionospheric Propagation Delay (IPD). 

 Question 8 (Multiple Choice)

When the aircraft on final approach is fitted with a GBAS receiver, GBAS corrects the aircraft's on-board GPS position and...

replaces the aircraft's on-board GPS position.



corrects only for lateral approach path details.



provides the precision approach path details.



corrects only for vertical approach path details.



 Question 10 (Multiple Choice)

To improve integrity, Satellite-Based Augmentation System (SBAS) uses up to (1) ___ satellites to improve accuracy to (2) ___ horizontally and to advise any GPS malfunctions to users within (3) ___.

(1) six geostationary, (2) 5 m, (3) 60 seconds 

(1) six polar-orbiting, (2) 1 m, (3) 60 seconds 

(1) four geostationary, (2) 1 m - 2 m, (3) 6 seconds 

(1) four polar-orbiting, (2) 10 m, (3) 6 seconds 

 Question 11 (Multiple Choice)

With regard to GNSS receivers, the remaining error after corrections for the known, most significant errors, is referred to as:

 Satellite Orbital Variations Error  Geometric Dilution of Precision (GDOP)  User Equivalent Range Error (UERE)  Ionospheric Propagation Delay (IPD) 

 Question 12 (Multiple Choice)

A GNSS ground-based augmentation system transmits a correction for...

satellite failure and receiver clock errors.



ionospheric delays only.



single- and multipath errors and receiver errors.



tropospheric and ionospheric delays.



 Question 13 (Multiple Choice)

The parameters of the model of the ionosphere are contained in the navigation message of a NAVSTAR/GPS satellite.

This enables...

the receiver to calculate the delay of signals passing through the ionosphere. 

the authorised users to work on the frequencies L1 and L2. 

the receiver to use data from all satellites in the constellation simultaneously. 

the receiver to select the satellites with the best geometric dilution of precision. 

Examples of operational SBAS are:

1. WAAS (USA)
2. IRNSS (India)
3. MSAS (Japan)
4. EGNOS (Europe)
5. GAGAN (India)
6. SDCM (Japan)

1, 3, 4 and 5.



1, 2, 3 and 4.



1, 3, 5 and 6.



1, 2, 4 and 5.



Question 16 (Multiple Choice)

According ICAO Doc 9613, Total System Error (TSE)...

refers to the difference between the aircraft's estimated position and actual position.

occurs when the path defined in the RNAV system does not correspond to the desired path.

relates to the air crew or autopilot's ability to follow the defined path or track, including any display error (e.g. CDI centring error).

as the sum of all contributing errors is a measure of navigation accuracy.

 Question 17 (Multiple Choice)

With regard to PBN, what navigation error(s) of an on-board system can be monitored by the flight crew?

FTE (Flight Technical Error) only



NSE (Navigation System Error) and FTE (Flight Technical Error)



TSE (Total System Error) and PDE (Path Deviation Error)



PDE (Path Deviation Error) and NSE (Navigation System Error)



Question 18 (Multiple Choice)

RNAV 1, RNAV 2, RNP 1, RNP 2 SIDs and STARs should be programmed into the FMS by:

manual entry using the latitude and longitude of the waypoints.



automatic transfer of the route via Electronic Flight Bag.



route name from the on-board navigation database.



manual entry using place/bearing/distance information of the waypoints.



Question 19 (Multiple Choice)

According ICAO Doc 9613, Navigation System Error (NSE)...

is a Gaussian distribution with a standard deviation equal to the root sum square (RSS) of the standard deviations of all contributing errors.

refers to the difference between the aircraft's estimated position and actual position.

occurs when the path defined in the RNAV system does not correspond to the desired path.

relates to the air crew or autopilot's ability to follow the defined path or track, including any display error (e.g. CDI centring error).

Question 20 (Multiple Choice)

The "AR" in "RNP AR APCH" means that:

the approach is flown "all in radar" contact.



this approach "requires authorization".



there exist "approach restrictions".



it must be flown with "augmented reality" equipment



 Question 21 (Multiple Choice)

With regard to RNP APCH to LNAV/VNAV minima based on Baro-VNAV, which of the statements is correct?

1. Temperature compensation systems with an airworthiness approval provide corrections to the Baro-VNAV guidance during Final approach segment.
2. High temperatures reduce the effective glide path angle.

1 is incorrect, 2 is incorrect.



1 is incorrect, 2 is correct.



1 is correct, 2 is incorrect.



1 is correct, 2 is correct.



ATC informs to expect RNP Approach (RNP APCH) Runway 09. In case one waypoint of the RNP APCH is missing in the navigation database, the recommended action should be:

- to continue approach procedure, because RNP APCH waypoints may be omitted in accordance with ATC clearance. ✖
- to request a different approach procedure from ATC, because a RNP APCH requires to be retrievable from the on-board navigation database and to conform to the charted procedure. ✓
- to create a new RNP APCH to the on-board navigation database taking into account all waypoints from the charted procedure. ✖
- manually update the RNP APCH route retrieved from the on-board navigation database to conform to the charted procedure. ✖

 Question 26 (Multiple Choice)

According ICAO Doc 9316, a form of fixed radius path (FRP) intended to be used with en-route procedures, which falls upon the RNP system to create the fixed radius turn between route segments, is referred to as:

 Radius to fix (RF) leg  Radius leg (RL)  Fix-radius Transition (FRT)  Fly-by (FB) turn 

 Question 28 (Multiple Choice)

According ICAO Doc 9613, Total System Error (TSE)...

relates to the air crew or autopilot's ability to follow the defined path or track, including any display error (e.g. CDI centring error). 

is a Gaussian distribution with a standard deviation equal to the root sum square (RSS) of the standard deviations of all contributing errors. 

occurs when the path defined in the RNAV system does not correspond to the desired path. 

refers to the difference between the aircraft's estimated position and actual position. 

 Question 29 (Multiple Choice)

Select the correct way a pilot can retrieve RNAV / RNP1 / RNP2 SID or STAR:

Using individual route waypoints according to the charted route. 

Using the company route database. 

Using a route name conforming to the charted route. 

Referring to the route number according to NOTAM. 

☰ Question 1 (Multiple Choice)

With regard to the L1/L2 frequencies used by NAVSTAR/GPS, which of the following statements is correct?

1. Standard Positioning Service (SPS, C/A) used L1 frequency only.
2. L1 and L2 frequencies are used for Precision Positioning Service (PPS).

1 is correct, 2 is incorrect.



1 is incorrect, 2 is incorrect.



1 is incorrect, 2 is correct.



1 is correct, 2 is correct.



 Question 3 (Multiple Choice)

The time corrected by the clock correction parameters in the navigation message is...

the receiver time.



the satellite time.



the coordinated time.



the satellite time and receiver time.



 Question 6 (Multiple Choice)

The receiver clock error in the NAVSTAR/GPS satellite navigation system is...

negligible because there are atomic clocks in the satellites.



the biggest part of the total error and cannot be corrected.



corrected by using signals from four satellites.



corrected by using signals from two satellites.



 Question 7 (Multiple Choice)

Compared to ILS, an advantage of GLS (GBAS Landing System) is that...

there is no need for any additional receivers to perform GBAS operations. 

GLS approaches can be operated without further approval. 

GLS allows for more precise navigation within the terminal area. 

GLS approaches can be dynamically adjusted during the approach. 

 Question 9 (Multiple Choice)

The Doppler frequency shift of the received NAVSTAR/GPS carrier frequency may be used to...

determine the groundspeed of the aircraft.



correct the calculated position for frequency shifts.



correct the calculated position for a change in receiver clock error.



calculate the height of the aircraft more accurately.



With regard to the L1/L2 frequencies used by NAVSTAR/GPS, which of the following statements is correct?

1. Both frequencies are used for Standard Positioning Service (SPS, C/A).
1. L2 frequency is used for Standard Positioning Service (SPS, C/A).

1 is incorrect, 2 is correct.



1 is incorrect, 2 is incorrect.



1 is correct, 2 is correct.



1 is correct, 2 is incorrect.



 Question 11 (Multiple Choice)

About the visibility of NAVSTAR/GPS satellites, it can be said that:

It is greatest at the equator 

It is the same at any time and any location 

It is greatest in the mid-latitudes 

It varies, depending on time and location 

Which statement about Local Area Augmentation System (LAAS) of the NAVSTAR/GPS system is correct?

- GBAS based on GPS is sometimes called local area augmentation system (LAAS).
- The further away the receiver is from a LAAS ground reference station, the more accurate is the aircraft position fix.
- The accuracy of position fixes is independent of the distance between the aircraft receiver and the LAAS ground reference station.
- A LAAS utilises a geostationary satellite instead of a ground station to correct the position of the aircraft.

 Question 13 (Multiple Choice)

The frequency band used by Satellite-Assisted Navigation systems (GNSS) to provide position information available to civil aircraft is...

 EHF  VHF  UHF  SHF 

 Question 14 (Multiple Choice)

Which of the following statements characterises a Satellite Based Augmentation System (SBAS)?

SBAS is able to provide approach and landing operations with vertical guidance (three-dimensional Type-A and Type-B approaches). 

SBAS is an augmentation device for Ground Based Augmentation Systems (GBAS). 

SBAS is able to provide approach and landing operations with horizontal guidance only. 

SBAS is not able to provide guidance for any approach or landing operations. 

Question 15 (Multiple Choice)

Which statement about Satellite Based Augmentation Systems (SBAS) is correct?

The use of SBAS improves only the accuracy of the position of the user, not the integrity.

The use of SBAS improves only the integrity of the position of the user, not the accuracy.

The use of SBAS improves both the accuracy and the integrity of the position of the user.

The use of SBAS improves neither the integrity nor the accuracy of the position of the user.

Classified as 3D Approach Operations are:

1. RNP1
2. ILS
3. PAR
4. RNP APCH (GNSS and baro VNAV)
5. GLS
6. RNP APCH (SBAS)

2, 3, 4, 5 and 6



1, 2, 4, 5 and 6



1, 3 and 5.



1, 4 and 6.



With regard to PBN navigation, an advanced navigation system like a FMS will evaluate an internal "Flight Management (FM) position" and an "Estimated Position Error (EPE)".

This is done by...

In case of dual FMS operation, FMS positions will be compared, with the difference resulting in the EPE. ✖

In case of single FMS operation, comparing of calculated positions is not possible, thus making evaluation of EPE impossible. ✖

several sources will be used by FMS, and, depending on their expected accuracies, these position data are compared with the FM position. ✓

FMS position is adjusted to the IRS position, with the difference resulting in the EPE. ✖

 Question 19 (Multiple Choice)

According ICAO Doc 9613, the difference between the on-board navigation specifications "RNP" and "RNAV" is:

Performance-monitoring and alerting function is required for "RNP" operations only. 

Performance-monitoring and alerting function is required for "RNAV" operations only. 

Performance-monitoring function is required for "RNAV" operations only. 

Alerting function is required for "RNAV" operations only. 

 Question 20 (Multiple Choice)

Select the correct way a pilot can retrieve RNAV / RNP1 / RNP2 SID or STAR:

Using the company route database.



Referring to the route number according to NOTAM.



Using a route name conforming to the charted route.



Using individual route waypoints according to the charted route.



 Question 22 (Multiple Choice)

With regard to PBN concept, aircraft RNAV and RNP system performance requirements are defined by:

terms of independence, continuity and reliability. 

terms of accuracy, integrity and continuity. 

terms of redundancy, integrity and endurance. 

terms of endurance, precision and continuity. 

 Question 24 (Multiple Choice)

With regard to Required Navigation Performance (RNP) operations, area navigation includes requirements for...

on-board performance monitoring and alerting.



satellite performance monitoring and alerting.



performance monitoring and alerting by ATC.



ground-based performance monitoring and alerting.



With regard to PBN concept, "availability" can be understood as:

as the portion of time (percentage annually) during which reliable navigation information is presented to the crew.



the capability of the total system to perform its function without non-scheduled interruptions during the intended operation.



the ability of a system to provide timely warnings to users when the system should not be used for navigation.



the degree of conformance between the estimated, measured or desired position.



 Question 26 (Multiple Choice)

With regard to PBN navigation, the Total System Error (TSE) can be understood as...

a measure for the 3D position fix accuracy.



a fixed system value determined during certification.



a maximum value of the sum of all system errors.



as a measure for the navigation accuracy.



Question 27 (Multiple Choice)

According ICAO Doc 9316, a specific, curved path radius in a terminal or approach procedure defined by radius, arc length, and fix, is referred to as:

Fly-by (FB) turn.



Radius to fix (RF) leg.



Radius leg (RL).



Fix-radius Transition (FRT).



Question 28 (Multiple Choice)

According ICAO Doc 9613, for oceanic/remote, en-route and terminal phases of flight, PBN is limited to operations with...

angular vertical performance requirements and time constraints.

angular lateral performance requirements and time constraints.

linear vertical performance requirements and time constraints.

linear lateral performance requirements and time constraints.

 Question 1 (Multiple Choice)

The receiver clock error in the NAVSTAR/GPS satellite navigation system is...

negligible because there are atomic clocks in the satellites. 

the biggest part of the total error and cannot be corrected. 

corrected by using signals from four satellites. 

corrected by using signals from two satellites. 

☰ Question 2 (Multiple Choice)

With regard to GBAS operations, one ground station can support (1) ___ within its coverage providing the aircraft with approach data, corrections and integrity information for GNSS satellites in view via a (2) ___.

(1) all the aircraft subsystems, (2) Satellite broadcast datalink. 

(1) all the aircraft subsystems, (2) VHF data broadcast (VDB) 

(1) a maximum of 100 aircraft subsystems, (2) Satellite broadcast datalink. 

(1) a maximum of 100 aircraft subsystems, (2) VHF data broadcast (VDB) 

062 PT2 062.06

Toolbar...

0:44:59 ⓘ ⏪

☰ Question 4 (Multiple Choice)

Regarding determining GNSS position:

GPS can be used only for approach guidance, but not for enroute navigation ✖

The DOP has to be more than 6 for position fixing in en-route navigation ✖

There is no advantage in combining GPS and INS. ✖

The clock error of the satellite clock is important for accurate position fixing ✓

062 PT2 062.06

Toolbar...

0:44:59 ⓘ ⏪

☰ Question 5 (Multiple Choice)

When during flight using GNSS and ABAS with IRS, in case the IRS signal is temporary lost, how does this effect the use of the GNSS?

GNSS accuracy is reduced.



AAIM and RAIM is lost.



ABAS is reduced to RAIM and barometric altitude only.



ABAS is reduced to AAIM and barometric altitude only.



Which statement about the principle of integrity monitoring used by Airborne-Based Augmentation Systems (ABAS) is correct?

ABAS uses ground-based radio navigation aids to support Fault Detection (FD) or Fault Detection and Exclusion (FDE). 

ABAS uses Ground-Based Augmentation System (GBAS) to broadcast differential corrections and integrity messages in UHF frequencies. 

ABAS uses the redundant range measurements for Fault Detection (FD) or Fault Detection and Exclusion (FDE). 

ABAS uses Satellite-Based Augmentation System (SBAS) to broadcast differential corrections and integrity messages in VHF frequencies. 

Question 7 (Multiple Choice)

One task of the control segment of the NAVSTAR/GPS system is to...

manipulate the precision of the position fix.

monitoring of the satellite constellation status.

grant and monitor user authorisations.

manufacture and service the satellites.

☰ Question 11 (Multiple Choice)

A range calculated by the GNSS receiver defines:

an ellipse with its centre at the satellite.



an ellipse with its centre at the receiver.



a sphere with its centre at the receiver.



a sphere with its centre at the satellite.



The main task of the user segment of the NAVSTAR/GPS system is to calculate receiver position by...

requesting position information from the associated ground stations and sending the data to the satellites.



transmitting signals to the ground station as well as to the satellites automatically, and measuring the time taken for signals to reach the receiver.



monitoring the status of the satellites, determining their positions and measuring the time interval between signals.



selecting appropriate satellites automatically, tracking the signals and measuring the time taken for signals from the satellites to reach the receiver.



With regard to Airborne-Based Augmentation System (ABAS), a common method of integrity monitoring that relies on information from the GNSS and from additional on-board sensors (like IRS) is referred to as:

GAIM (GNSS Autonomous Integrity Monitoring)



Local Area Augmentation System (LAAS)



RAIM (Receiver Autonomous Integrity Monitoring)



AAIM (Aircraft Autonomous Integrity Monitoring).



Question 14 (Multiple Choice)

Errors in GNSS satellite orbits arise due to...

Earth variation and lunar precession.



the lunar wind and the gravitation of the Moon and stars.



the solar wind and the gravitation of the Sun, Moon and planets.



solar radiation and lunar precession.



With regard to PBN concept, "accuracy" can be understood as:

the degree of conformance between the estimated, measured or desired position. 

the ability of a system to provide timely warnings to users when the system should not be used for navigation. 

the capability of the total system to perform its function without non-scheduled interruptions during the intended operation. 

as the portion of time (percentage annually) during which reliable navigation information is presented to the crew. 

A certain number of independent and serviceable Long Range Navigation Systems (LRNSs) are required for operation in the RNAV 10 airspace.

The minimum number of equipment required includes:

- two LRNSs using input from VOR/DME or DME/DME RNAV.
- one LRNS using input from VOR/DME or DME/DME RNAV.
- one LRNS such as INS, an IRS FMS or a GNSS.
- two LRNSs such as INS, IRS FMS or GNSS.

Question 20 (Multiple Choice)

With regard to PBN, what navigation error(s) of an on-board system can be monitored by the flight crew?

TSE (Total System Error) and PDE (Path Deviation Error)

NSE (Navigation System Error) and FTE (Flight Technical Error)

FTE (Flight Technical Error) only

PDE (Path Deviation Error) and NSE (Navigation System Error)

062 PT3 062.07

Toolbar...

0:44:59 ⓘ ⏪

Question 22 (Multiple Choice)

With regard to PBN, as a Non-Precision Approach (NPA) procedure is classified:

RNP APCH to LPV minima.



RNP APCH to LNAV/VNAV minima.



RNP APCH to LNAV minima.



RNP APCH to GLS minima.



ATC informs to expect RNP Approach (RNP APCH) Runway 09. In case one waypoint of the RNP APCH is missing in the navigation database, the recommended action should be:

- manually update the RNP APCH route retrieved from the on-board navigation database to conform to the charted procedure. ✖
- to create a new RNP APCH to the on-board navigation database taking into account all waypoints from the charted procedure. ✖
- to continue approach procedure, because RNP APCH waypoints may be omitted in accordance with ATC clearance. ✖
- to request a different approach procedure from ATC, because a RNP APCH requires to be retrievable from the on-board navigation database and to conform to the charted procedure. ✓

Question 28 (Multiple Choice)

With regard to PBN navigation, the Total System Error (TSE) can be understood as...

as a measure for the navigation accuracy.



a measure for the 3D position fix accuracy.



a maximum value of the sum of all system errors.



a fixed system value determined during certification.



Question 2 (Multiple Choice)

Aircraft Autonomous Integrity Monitoring (AAIM) is a type of Airborne Based Augmentation System which ...

is self-contained and works without any equipment located outside the aircraft.



only relies on GNSS information.



only relies on information from additional on-board sensors.



relies on GNSS information as well as information from additional on-board sensors.



Question 4 (Multiple Choice)

Regarding determining GNSS position:

There is no advantage in combining GPS and INS.



The clock error of the satellite clock is important for accurate position fixing



GPS can be used only for approach guidance, but not for enroute navigation



The DOP has to be more than 6 for position fixing in en-route navigation



Question 5 (Multiple Choice)

A GNSS ground-based augmentation system transmits a correction for...

single- and multipath errors and receiver errors.



tropospheric and ionospheric delays.



ionospheric delays only.



satellite failure and receiver clock errors.



Question 6 (Multiple Choice)

When during flight using GNSS and ABAS with IRS, in case the IRS signal is temporary lost, how does this effect the use of the GNSS?

ABAS is reduced to RAIM and barometric altitude only.



ABAS is reduced to AAIM and barometric altitude only.



AAIM and RAIM is lost.



GNSS accuracy is reduced.



Question 8 (Multiple Choice)

A fix in a Satellite-Assisted Navigation System (GNSS) is obtained by:

the aircraft's receiver measuring the phase angle of signals received from a number of satellites in known positions

measuring the time taken for an aircraft's transmissions to reach all satellites of the system

measuring the time taken for a minimum number of satellites' transmissions, in known positions, to reach the aircraft's receiver

measuring the time taken for all of the system's satellites' transmissions to reach an aircraft

Question 9 (Multiple Choice)

The influence of the ionosphere on the accuracy of the NAVSTAR/GPS system is...

significant only for satellites located at a small angle above the horizon.



minimised by computing the average accuracy of all signals.



very small and negligible for practical purposes.



reduced in Standard Positioning Service (SPS) receivers by using a model of the ionosphere transmitted by the satellites.



Question 10 (Multiple Choice)

Which of the following correctly lists the most significant factors affecting the accuracy of the Satellite-Assisted Navigation System (GNSS/GPS)?

Satellite frequency failure, satellite ephemeris, and atmospheric propagation, multipath, frequency drift.



Satellite orbit displacement, atmospheric propagation, Doppler frequency shift and satellite clock error.



Satellite mutual interference, frequency drift, and satellite-to-ground time lag.



Ionospheric propagation delay, dilution of precision, satellite clock error, satellite orbital variations, multipath.



Question 13 (Multiple Choice)

Which of the following statements characterises a Satellite Based Augmentation System (SBAS)?

SBAS is able to provide approach and landing operations with horizontal guidance only.

SBAS is able to provide approach and landing operations with vertical guidance (three-dimensional Type-A and Type-B approaches).

SBAS is not able to provide guidance for any approach or landing operations.

SBAS is an augmentation device for Ground Based Augmentation Systems (GBAS).

Question 14 (Multiple Choice)

Regarding the principle of SBAS operation, a correction signal is broadcast...

from geostationary satellites to GNSS receivers distributed over a wide area.



from geostationary satellites to GNSS receivers located an aerodrome's terminal area.



ground-based transmitters to GNSS receivers located an aerodrome's terminal area.



from polar-orbiting satellites to GNSS receivers distributed over a wide area.



Question 15 (Multiple Choice)

The minimum number of satellites required by a GPS in order to obtain a three-dimensional fix is:

 3 4 2 5

ATC informs to expect RNP Approach (RNP APCH) Runway 09. In case one waypoint of the RNP APCH is missing in the navigation database, the recommended action should be:

- to request a different approach procedure from ATC, because a RNP APCH requires to be retrievable from the on-board navigation database and to conform to the charted procedure.
- manually update the RNP APCH route retrieved from the on-board navigation database to conform to the charted procedure.
- to create a new RNP APCH to the on-board navigation database taking into account all waypoints from the charted procedure.
- to continue approach procedure, because RNP APCH waypoints may be omitted in accordance with ATC clearance.

Question 18 (Multiple Choice)

With regard to Required Navigation Performance (RNP) operations, area navigation includes requirements for...

- performance monitoring and alerting by ATC. ✖
- satellite performance monitoring and alerting. ✖
- ground-based performance monitoring and alerting. ✖
- on-board performance monitoring and alerting. ✓

Question 19 (Multiple Choice)

With regard to PBN operation, which statements about the Estimated Position Error (EPE) is correct?

1. EPE is a measure for accuracy of the FMS position by applying specific validations on the available navigation inputs.
2. EPE is calculated using statistical models of position error probabilities.

1 is incorrect, 2 is correct.



1 is incorrect, 2 is incorrect.



1 is correct, 2 is correct.



1 is correct, 2 is incorrect.



Question 20 (Multiple Choice)

Navigation specifications covered by A-RNP include:

RNAV 5, RNAV 1, RNAV APCH and RNP APCH.



RNAV APCH, RNAV 1, RNP 1 / RNP 2 and RNP APCH.



RNAV 5, RNAV 1, RNP 1 / RNP 2 and RNAV APCH.



RNAV 5, RNAV 1, RNP 1 / RNP 2 and RNP APCH.



Question 21 (Multiple Choice)

For PBN operations on a route for which RNP 5 is required, the ground-based NAVAID infrastructure components require input from ___ of the following types of position sensors: VOR/DME, DME/DME, INS or IRS, GNSS.

 all one or a combination at least 2 none

Question 22 (Multiple Choice)

If the lateral guidance of an RNP APCH to LNAV/VNAV minima is based on GNSS, its vertical guidance is based on....

either RADAR ALT or GBAS.



either Baro-VNAV or SBAS.



either SBAS or GBAS.



either Baro-VNAV or RADAR ALT.



In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP 1, with the Navigation Display (ND) displaying:

"RNP 1.00 / ANP 0.10" in green colour.

This means:

- The current (actual) navigation performance is better than the required performance by a factor of 0.05.
- Required Navigation performance is satisfied, because the aircraft is less than 0.10 NM off-track.
- Green colour signals that the actual navigation performance is less the required limits.
- The current (actual) navigation performance with 0.10 is better than the required performance 1.00.

Question 26 (Multiple Choice)

According ICAO Doc 9613, Flight Technical Error (FTE)...

is considered as a radial error so that on-board performance monitoring and alerting is provided in all directions.

relates to the air crew or autopilot's ability to follow the defined path or track, including any display error (e.g. CDI centring error).

occurs when the path defined in the RNAV system does not correspond to the desired path.

refers to the difference between the aircraft's estimated position and actual position.

In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP 1, with the Navigation Display (ND) displaying:

"RNP 1.00 / ANP 1.23" in amber colour.

This means:

Amber colour signals that the actual navigation performance is within the required limits.

Required Navigation performance is satisfied, because the aircraft is less than 1 NM off-track.

The current (actual) navigation performance with 1.23 is lower than the required performance 1.00.

The current (actual) navigation performance is better than the required performance by a factor of 1.23.

Question 28 (Multiple Choice)

With regard to PBN concept, "integrity" can be understood as:

the degree of conformance between the estimated, measured or desired position.

the ability of a system to provide timely warnings to users when the system should not be used for navigation.

as the portion of time (percentage annually) during which reliable navigation information is presented to the crew.

the capability of the total system to perform its function without non-scheduled interruptions during the intended operation.

Question 2 (Multiple Choice)

When comparing a SBAS (Satellite-Based Augmentation System) with a GBAS (Ground-Based Augmentation System), it can be stated that...

an SBAS does not need ground stations for the pseudo-range corrections.

the coverage area of an SBAS is much larger than that of a GBAS.

the dilution of precision of an SBAS is much smaller than those of a GBAS.

an SBAS enables precision approaches at a higher final approach altitude.

Question 4 (Multiple Choice)

The different segments of the NAVSTAR/GPS system are the...

atomic clock, control, and transponder.



antenna, receiver, and space.



control, space, and user.



control station and monitoring station.



Question 5 (Multiple Choice)

What is the meaning of the term "Receiver Autonomous Integrity Monitoring (RAIM)" in the NAVSTAR/GPS system?

It is the ability of the GPS satellites to check the integrity of the data transmitted by the monitoring stations of the ground segment

It is a technique used by the receiver to check the reliability of the received signals, and to detect if one of the signals is faulty

It is a technique by which a receiver checks the number of signals it is receiving, however it cannot detect incorrect signals

It is a technique whereby the receivers of the ground segment determine the integrity of the navigation message automatically

Question 6 (Multiple Choice)

Compared to ILS, an advantage of GLS (GBAS Landing System) is that...

GLS approaches can be dynamically adjusted during the approach.

there is no need for any additional receivers to perform GBAS operations.

GLS allows for more precise navigation within the terminal area.

GLS approaches can be operated without further approval.

Question 7 (Multiple Choice)

The RAIM function used by GNSS receivers enables use of (1) ___ range measurements to (2) ___ calculated from the minimum number of satellites required to provide a 3D fix.

(1) minimum, (2) enhance precision of the position

(1) four, (2) verify the position

(1) redundant, (2) verify the position

(1) three, (2) enhance precision of the position

Question 8 (Multiple Choice)

Which of the following is the reason for a measured distance between a NAVSTAR/GPS satellite and a receiver being called a pseudo-range?

The measured range is just a vague approximation.

The calculated range is based on the pseudo-random noise code.

The difference between GNSS receiver and satellite time references initially creates an erroneous range.

The calculated range is based on an idealised orbit.

Question 9 (Multiple Choice)

For a GNSS receiver's RAIM function to operate properly, ...

the consistency of range measurements of at least 6 satellites has to be checked for Fault Detection and Exclusion (FDE).

the consistency of range measurements of at least 5 satellites has to be checked for Fault Detection and Exclusion (FDE).

the position calculations from 2 measurements each using 4 different satellites have to be averaged.

the range measurements of at least 4 satellites has to be crosschecked by position measurements from other board systems.

Question 10 (Multiple Choice)

Which frequency band is used by the datalink of a Satellite Based Augmentation System (SBAS)?

 VHF LF MF UHF

Question 11 (Multiple Choice)

Which statement is correct about the L1 and L2 NAVSTAR/GPS transmission frequencies and codes?

C/A and P codes are transmitted at different times on both frequencies.

The higher frequency is used to transmit both the C/A and P codes.

The lower frequency is used to transmit both the C/A and P codes.

C/A and P codes are transmitted simultaneously on both frequencies.

Question 13 (Multiple Choice)

UTC parameters in the navigation message determine the difference between

GPS time and local time.



GPS time and UTC.



Local time and UTC.



GMT and UTC.



Question 14 (Multiple Choice)

Amongst others, a task of the GNSS control segment is:

to control whether the pilot flies the correct GPS track.



to detect the malfunctioning of satellites.



to control the motion of the GPS-satellites.



to transmit differential corrections to users.



Question 15 (Multiple Choice)

With regard to Airborne-Based Augmentation System (ABAS), a common method of integrity monitoring that relies on information from the GNSS only is referred to as:

GAIM (GNSS Autonomous Integrity Monitoring)

AAIM (Aircraft Autonomous Integrity Monitoring.)

Local Area Augmentation System (LAAS)

RAIM (Receiver Autonomous Integrity Monitoring)

Question 16 (Multiple Choice)

With regard to PBN concept, "continuity" can be understood as:

the ability of a system to provide timely warnings to users when the system should not be used for navigation.

the capability of the total system to perform its function without non-scheduled interruptions during the intended operation.

the degree of conformance between the estimated, measured or desired position.

as the portion of time (percentage annually) during which reliable navigation information is presented to the crew.

Question 18 (Multiple Choice)

According ICAO Doc 9613, the components for the application of PBN include:

navaid infrastructure, navigation specification, navigation application

airspace concept, navigation infrastructure, navigation application

lateral performance, vertical performance, ATS and ATM and Communication

navaid performance, navigation specification, aircraft type

Question 19 (Multiple Choice)

With regard to PBN, the term "Offset flight path" is defined as:

a path with a lateral offset from a defined route, to be intercepted with an angle of 45 degrees or more.

a path with a lateral offset from a defined route, to be flown in opposite direction of the cleared direction.

a path with a lateral offset from a defined route, specified in increments of 1 NM up to 20 NM.

a path with a lateral offset from a defined route, specified in increments of 5 NM up to 20 NM.

In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP "X", a message with aural warning appears saying:

"NAV ACCUR DOWNGRAD".

This means:

- RAIM function is activated to re-acquire the prescribed navigation accuracy required by the procedure. ✖
- Navigational sources have been lost, leaving Estimated Position Error (EPE) undefined. ✖
- The current navigation accuracy is less than the that required by the RNP. ✓
- AAIM function is activated to re-acquire the prescribed navigation accuracy required by the procedure. ✖

Question 24 (Multiple Choice)

With regard to PBN concept, "integrity" can be understood as:

the capability of the total system to perform its function without non-scheduled interruptions during the intended operation.

as the portion of time (percentage annually) during which reliable navigation information is presented to the crew.

the degree of conformance between the estimated, measured or desired position.

the ability of a system to provide timely warnings to users when the system should not be used for navigation.

In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP 1, with the Navigation Display (ND) displaying:

"RNP 1.00 / ANP 1.23" in amber colour.

This means:

Required Navigation performance is satisfied, because the aircraft is less than 1 NM off-track. 

Amber colour signals that the actual navigation performance is within the required limits. 

The current (actual) navigation performance is better than the required performance by a factor of 1.23. 

The current (actual) navigation performance with 1.23 is lower than the required performance 1.00. 

Question 27 (Multiple Choice)

Related to the RNP specification for terminal and en-route applications, navigation aspects include...

Vertical linear navigation.



Lateral navigation.



Lateral and vertical navigation.



Vertical angular navigation.



ATC informs to expect RNP Approach (RNP APCH) Runway 09. In case one waypoint of the RNP APCH is missing in the navigation database, the recommended action should be:

- to continue approach procedure, because RNP APCH waypoints may be omitted in accordance with ATC clearance. X
- to create a new RNP APCH to the on-board navigation database taking into account all waypoints from the charted procedure. X
- manually update the RNP APCH route retrieved from the on-board navigation database to conform to the charted procedure. X
- to request a different approach procedure from ATC, because a RNP APCH requires to be retrievable from the on-board navigation database and to conform to the charted procedure. ✓

 Question 1 (Multiple Choice)

Regarding determining GNSS position:

There is no advantage in combining GPS and INS.



The clock error of the satellite clock is important for accurate position fixing



The DOP has to be more than 6 for position fixing in en-route navigation



GPS can be used only for approach guidance, but not for enroute navigation



 Question 3 (Multiple Choice)

Data from GBAS defining the Final Approach Segment (FAS) is transmitted on (1) ___ including position correction and (2) ___.

(1) VHF, (2) integrity information about each satellite 

(1) UHF, (2) information about dilution of precision (DOP) 

(1) SHF, (2) correction information about ionospheric errors. 

(1) UHF, (2) clock error correction information. 

 Question 8 (Multiple Choice)

Almanac data stored in the receiver of the NAVSTAR/GPS system is used for the:

 correction of the receiver clock error  assignment of received PRN-codes to the respective satellite  check of Selective Availability (SA) operation  fast identification of received signals coming from visible satellites 

 Question 9 (Multiple Choice)

The influence of the ionosphere on the accuracy of the NAVSTAR/GPS system is...

minimised by computing the average accuracy of all signals.



very small and negligible for practical purposes.



significant only for satellites located at a small angle above the horizon.



reduced in Standard Positioning Service (SPS) receivers by using a model of the ionosphere transmitted by the satellites.



A fix in a Satellite-Assisted Navigation System (GNSS) is obtained by:

- measuring the time taken for all of the system's satellites' transmissions to reach an aircraft
- measuring the time taken for a minimum number of satellites' transmissions, in known positions, to reach the aircraft's receiver
- the aircraft's receiver measuring the phase angle of signals received from a number of satellites in known positions
- measuring the time taken for an aircraft's transmissions to reach all satellites of the system

Assume the case that a satellite used by a GNSS receiver is faulty and that the GDOP (Geometric Dilution Of Precision) has a relatively low value.

When the signals of 6 satellites, including the faulty one, are received, the receiver's RAIM software...

is able to detect that one of the satellites is faulty and is able to identify and isolate the faulty one.

is able to detect that one of the satellites is faulty but is unable to identify the faulty one.

will not work because the software needs at least 9 satellites to function correctly.

is unable to identify the faulty one and is also unable to detect that one satellite is faulty.

With regard to PBN concept, "continuity" can be understood as:

- the degree of conformance between the estimated, measured or desired position.
- as the portion of time (percentage annually) during which reliable navigation information is presented to the crew.
- the capability of the total system to perform its function without non-scheduled interruptions during the intended operation.
- the ability of a system to provide timely warnings to users when the system should not be used for navigation.

With regard to PBN concept, "availability" can be understood as:

the ability of a system to provide timely warnings to users when the system should not be used for navigation.



the degree of conformance between the estimated, measured or desired position.



the capability of the total system to perform its function without non-scheduled interruptions during the intended operation.



as the portion of time (percentage annually) during which reliable navigation information is presented to the crew.



ARINC 424 path terminators are described by a (1) ___, which defines a specific type of flight path along a segment of a procedure and a specific type of termination of that flight path. They are assigned to (2) ___ in an airborne navigation database.

(1) 3-letter code, (2) all RNAV, SID, STAR and approach procedure segments



(1) 2-letter code, (2) SID, STAR and approach procedure segments



(1) 2-letter code, (2) all RNAV, SID, STAR and approach procedure segments



(1) 3-letter code, (2) RNAV approach procedure segments



In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP 1, with the Navigation Display (ND) displaying:

"RNP 1.00 / ANP 1.23" in amber colour.

This means:

The current (actual) navigation performance with 1.23 is lower than the required performance 1.00.

The current (actual) navigation performance is better than the required performance by a factor of 1.23.

Amber colour signals that the actual navigation performance is within the required limits.

Required Navigation performance is satisfied, because the aircraft is less than 1 NM off-track.

With regard to PBN, RNP systems supporting "RF-leg" type provide the same ability to conform to the track-keeping accuracy during the turn as in the straight line segments by...

- commencing the turn in a pre-calculated distance from the fix to initiate the fly-by manoeuvre. ✖
- using TAS/bank angle calculations to provide the necessary level of accuracy during the turn. ✖
- using the flight director or autopilot to provide/establish the necessary level of guidance and precision during the turn. ✓
- using the displayed distance from an ARC waypoint to provide the necessary level of guidance during the turn. ✖

 Question 1 (Multiple Choice)

Which of the following is involved in the differential technique (D-GPS) of the NAVSTAR/GPS system?

The difference between signals transmitted on the L1 and L2 frequencies are checked for errors by the receiver.



Fixed ground stations compute position errors and transmit correction data to a suitable receiver on the aircraft.



Signals from satellites are received by two antennas located at a fixed distance apart. This allows an aircraft receiver to correct multipath errors.



Receivers from various manufacturers are operated in parallel to reduce the characteristic receiver noise error.



Which of the following is the reason for a measured distance between a NAVSTAR/GPS satellite and a receiver being called a pseudo-range?

The difference between GNSS receiver and satellite time references initially creates an erroneous range.

The calculated range is based on the pseudo-random noise code.

The measured range is just a vague approximation.

The calculated range is based on an idealised orbit.

 Question 6 (Multiple Choice)

With regard to GNSS receivers, the accuracy resulting from geometric dilution of precision (GDOP)...

is poor when receiving signals from satellites in approximately the same direction with small angle of intersection of the signal paths.



is good when receiving signals from satellites in approximately the same direction with small angle of intersection of the signal paths.



is good when receiving signals from satellites visible close to the horizon.



is poor when receiving signals from satellites visible in a tetrahedron pattern.



 Question 12 (Multiple Choice)

With regard to GNSS receivers, the remaining error after corrections for the known, most significant errors, is referred to as:

 Ionospheric Propagation Delay (IPD)  Geometric Dilution of Precision (GDOP)  User Equivalent Range Error (UERE)  Satellite Orbital Variations Error 

Which of the following statements is correct about the C/A code transmitted by NAVSTAR/GPS satellites?

The coarse acquisition (C/A) code is...

a PRN code transmitted on the L1 frequency.



transmitted by the GPS satellites and referenced to GMT.



transmitted on the L1 and L2 GPS frequencies.



only used for the Precise Positioning Service (PPS).



 Question 14 (Multiple Choice)

Which characteristic do GPS, GLONASS, GALILEO and BEIDOU have in common?

All four systems are based on the WGS 84 ellipsoid for position fixing.



They are all less accurate near the equator and more accurate near the pole.



They all use the same frequencies so a single receiver can work all systems.



All four systems use time measurement to determine a position.



062 PT2 062.06

Toolbar...

0:25:20



Question 15 (Multiple Choice)

A Ground-Based Augmentation System (GBAS) station has a typical coverage of plus/minus 35° up to (1) ____, and plus/minus 10° up to (2) ____ either side of the final approach path.

(1) 15 NM, (2) 20 NM



(1) 5 NM, (2) 15 NM



(1) 28 NM, (2) 37 NM



(1) 10 NM, (2) 20 NM



With regard to PBN, the term "Offset flight path" is defined as:

a path with a lateral offset from a defined route, to be intercepted with an angle of 45 degrees or more. ✖

a path with a lateral offset from a defined route, specified in increments of 5 NM up to 20 NM. ✖

a path with a lateral offset from a defined route, specified in increments of 1 NM up to 20 NM. ✓

a path with a lateral offset from a defined route, to be flown in opposite direction of the cleared direction. ✖

 Question 18 (Multiple Choice)

Select the correct way a pilot can retrieve RNAV / RNP1 / RNP2 SID or STAR:

Using individual route waypoints according to the charted route. 

Referring to the route number according to NOTAM. 

Using a route name conforming to the charted route. 

Using the company route database. 

ATC informs to expect RNP Approach (RNP APCH) Runway 09. In case one waypoint of the RNP APCH is missing in the navigation database, the recommended action should be:

manually update the RNP APCH route retrieved from the on-board navigation database to conform to the charted procedure.



to continue approach procedure, because RNP APCH waypoints may be omitted in accordance with ATC clearance.



to create a new RNP APCH to the on-board navigation database taking into account all waypoints from the charted procedure.



to request a different approach procedure from ATC, because a RNP APCH requires to be retrievable from the on-board navigation database and to conform to the charted procedure.



In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP 1, with the Navigation Display (ND) displaying:

"RNP 1.00 / ANP 0.10" in green colour.

This means:

Required Navigation performance is satisfied, because the aircraft is less than 0.10 NM off-track.



Green colour signals that the actual navigation performance is less the required limits.



The current (actual) navigation performance is better than the required performance by a factor of 0.05.



The current (actual) navigation performance with 0.10 is better than the required performance 1.00.



With regard to RNAV or RNP operations, which of the following statements is correct?

1. RNAV specifications include the requirement for ground-based performance monitoring and alerting.
2. RNP specifications include the requirement for on-board performance monitoring and alerting.

1 is incorrect, 2 is incorrect.



1 is correct, 2 is correct.



1 is incorrect, 2 is correct.



1 is correct, 2 is incorrect.



Question 2 (Multiple Choice)

With regard to GNSS receivers, the remaining error after corrections for the known, most significant errors, is referred to as:

 Geometric Dilution of Precision (GDOP) Satellite Orbital Variations Error User Equivalent Range Error (UERE) Ionospheric Propagation Delay (IPD)



Question 4 (Multiple Choice)

Assume the case that a satellite used by a GNSS receiver is faulty.

When the signals of 5 satellites, including the faulty one, are received, the receiver's RAIM software...

is able to detect one faulty signal and is able to identify the faulty one.



is able to detect one faulty signal but is unable to identify which is the faulty one.



will not work because the software needs at least 24 satellites to function correctly.



is unable to identify the faulty one and is also unable to detect that one satellite is faulty.



Question 8 (Multiple Choice)

The influence of the ionosphere on the accuracy of the NAVSTAR/GPS system is...

significant only for satellites located at a small angle above the horizon.



very small and negligible for practical purposes.



minimised by computing the average accuracy of all signals.



reduced in Standard Positioning Service (SPS) receivers by using a model of the ionosphere transmitted by the satellites.



Question 9 (Multiple Choice)

For a GNSS receiver's RAIM function to operate properly, ...

the position calculations from 2 measurements each using 4 different satellites have to be averaged.

the consistency of range measurements of at least 6 satellites has to be checked for Fault Detection and Exclusion (FDE).

the range measurements of at least 4 satellites has to be crosschecked by position measurements from other board systems.

the consistency of range measurements of at least 5 satellites has to be checked for Fault Detection and Exclusion (FDE).

Question 10 (Multiple Choice)

For differential GPS positioning error correction with GBAS, the (1) ___ uses signals from at least (2) ___ satellites to acquire the position error correction, which is relayed to (3) ___.

(1) ground-based receiver, (2) five, (3) the aircraft's GPS receiver



(1) the aircraft's GPS receiver, (2) four, (3) ground-based receiver



(1) the aircraft's GPS receiver, (2) five, (3) ground-based receiver



(1) ground-based receiver, (2) four, (3) the aircraft's GPS receiver



Question 11 (Multiple Choice)

Typical coverage for a GBAS station is projecting out (1) ____ either side of the final approach path to 28 km (15 NM) and (2) ____ either side of the final approach path to 37 km (20 NM).

(1) plus/minus 35°, (2) plus/minus 10°

(1) plus/minus 10°, (2) plus/minus 35°

(1) plus/minus 10°, (2) plus/minus 20°

(1) plus/minus 5°, (2) plus/minus 10°

Question 12 (Multiple Choice)

The European Geostationary Navigation Overlay System (EGNOS) is a form of:

Local Area Augmentation System (LAAS)



Ground-Based Augmentation System (GBAS)



Wide Area Differential GPS (WADGPS)



Local Area Differential System (LADGPS)



Question 14 (Multiple Choice)

A GPS-based SBAS (Satellite-Based Augmentation System) uses satellites to transmit corrections to users' receivers.

Which of the following statements about these satellites is true?

Pseudo-range measurements to these satellites can be made as they are GPS satellites which are part of the GPS satellite constellation.

Pseudo-range measurements to these geostationary satellites cannot be made as they do not transmit a valid GPS navigation message.

Pseudo-range measurements to these geostationary satellites cannot be made as they do not transmit on a GPS frequency.

Pseudo-range measurements to these geostationary satellites can be made as they also transmit a valid GPS navigation message on the GPS frequency.



Question 15 (Multiple Choice)

Aircraft Autonomous Integrity Monitoring (AAIM) is a type of Airborne Based Augmentation System which ...

relies on GNSS information as well as information from additional on-board sensors.

only relies on GNSS information.

is self-contained and works without any equipment located outside the aircraft.

only relies on information from additional on-board sensors.

Question 16 (Multiple Choice)

A certain number of independent and serviceable Long Range Navigation Systems (LRNSs) are required for operation in the RNAV 10 airspace.

The minimum number of equipment required includes:

two LRNSs such as INS, IRS FMS or GNSS.



one LRNS such as INS, an IRS FMS or a GNSS.



two LRNSs using input from VOR/DME or DME/DME RNAV.



one LRNS using input from VOR/DME or DME/DME RNAV.



In case an aeroplane following a procedure requiring (any) navigation accuracy of RNP 1, with the Navigation Display (ND) displaying:

"RNP 1.00 / ANP 1.23" in amber colour.

This means:

The current (actual) navigation performance with 1.23 is lower than the required performance 1.00.

Amber colour signals that the actual navigation performance is within the required limits.

The current (actual) navigation performance is better than the required performance by a factor of 1.23.

Required Navigation performance is satisfied, because the aircraft is less than 1 NM off-track.



Question 20 (Multiple Choice)

Navigation specifications covered by A-RNP include:

RNAV 5, RNAV 1, RNP 1 / RNP 2 and RNP APCH.



RNAV 5, RNAV 1, RNAV APCH and RNP APCH.



RNAV APCH, RNAV 1, RNP 1 / RNP 2 and RNP APCH.



RNAV 5, RNAV 1, RNP 1 / RNP 2 and RNAV APCH.



Question 21 (Multiple Choice)

Related to the RNP specification for terminal and en-route applications, navigation aspects include...

Lateral navigation.



Lateral and vertical navigation.



Vertical angular navigation.



Vertical linear navigation.



For an aircraft flying an RNAV approach, which situations below would the contingency procedure of discontinuing the RNAV approach and reverting to a conventional arrival route apply? In case of:

1. Integrity monitoring loss
2. TCAS advisory message
3. CDI indication more than half scale displacement
4. Communications failure
5. Receiver failing to engage correct approach mode

2, 3 and 5



1, 3 and 5



2, 4 and 5



1, 2 and 4





Question 25 (Multiple Choice)

With regard to PBN, RNP systems supporting "RF-leg" type provide the same ability to conform to the track-keeping accuracy during the turn as in the straight line segments by...

commencing the turn in a pre-calculated distance from the fix to initiate the fly-by manoeuvre.



using TAS/bank angle calculations to provide the necessary level of accuracy during the turn.



using the displayed distance from an ARC waypoint to provide the necessary level of guidance during the turn.



using the flight director or autopilot to provide/establish the necessary level of guidance and precision during the turn.



 Question 26 (Multiple Choice)

According ICAO Doc 9613, the difference between the on-board navigation specifications "RNP" and "RNAV" is:

Performance-monitoring and alerting function is required for "RNAV" operations only.



Alerting function is required for "RNAV" operations only.



Performance-monitoring function is required for "RNAV" operations only.



Performance-monitoring and alerting function is required for "RNP" operations only.



Question 27 (Multiple Choice)

With regard to PBN navigation, an advanced navigation system like a FMS will evaluate an internal "Flight Management (FM) position" and an "Estimated Position Error (EPE)".

This is done by...

In case of single FMS operation, comparing of calculated positions is not possible, thus making evaluation of EPE impossible.



FMS position is adjusted to the IRS position, with the difference resulting in the EPE.



In case of dual FMS operation, FMS positions will be compared, with the difference resulting in the EPE.



several sources will be used by FMS, and, depending on their expected accuracies, these position data are compared with the FM position.



Question 29 (Multiple Choice)

The "AR" in "RNP AR APCH" means that:

it must be flown with "augmented reality" equipment

this approach "requires authorization".

there exist "approach restrictions".

the approach is flown "all in radar" contact.

Question 2 (Multiple Choice)

With regard to GNSS receivers, the remaining error after corrections for the known, most significant errors, is referred to as:

 Satellite Orbital Variations Error Geometric Dilution of Precision (GDOP) User Equivalent Range Error (UERE) Ionospheric Propagation Delay (IPD)

Which statement about Local Area Augmentation System (LAAS) of the NAVSTAR/GPS system is correct?

GBAS based on GPS is sometimes called local area augmentation system (LAAS). 

The accuracy of position fixes is independent of the distance between the aircraft receiver and the LAAS ground reference station. 

A LAAS utilises a geostationary satellite instead of a ground station to correct the position of the aircraft. 

The further away the receiver is from a LAAS ground reference station, the more accurate is the aircraft position fix. 

Question 10 (Multiple Choice)

Which of the following statements is true about the data in the navigation message of the GPS?

The data contained in the navigation message are valid for a period of 28 days.

The navigation data are uploaded to the satellites by the GPS control segment.

The navigation data are checked and, if necessary, corrected by the satellite itself.

The data of a satellite are checked and, if necessary, corrected by other satellites in the constellation.

The parameters of the model of the ionosphere are contained in the navigation message of a NAVSTAR/GPS satellite.

This enables...

the receiver to select the satellites with the best geometric dilution of precision.

the receiver to calculate the delay of signals passing through the ionosphere.

the authorised users to work on the frequencies L1 and L2.

the receiver to use data from all satellites in the constellation simultaneously.

With regard to PBN concept, "continuity" can be understood as:

- the degree of conformance between the estimated, measured or desired position.
- the capability of the total system to perform its function without non-scheduled interruptions during the intended operation.
- as the portion of time (percentage annually) during which reliable navigation information is presented to the crew.
- the ability of a system to provide timely warnings to users when the system should not be used for navigation.

ARINC 424 path terminators are described by a (1) ___, which defines a specific type of flight path along a segment of a procedure and a specific type of termination of that flight path. They are assigned to (2) ___ in an airborne navigation database.

(1) 3-letter code, (2) RNAV approach procedure segments



(1) 3-letter code, (2) all RNAV, SID, STAR and approach procedure segments



(1) 2-letter code, (2) SID, STAR and approach procedure segments



(1) 2-letter code, (2) all RNAV, SID, STAR and approach procedure segments



062 PT3 062.07

Toolbar...

0:34:26



Question 25 (Multiple Choice)

Select the correct way a pilot can retrieve RNAV / RNP1 / RNP2 SID or STAR:

Referring to the route number according to NOTAM.

Using individual route waypoints according to the charted route.

Using a route name conforming to the charted route.

Using the company route database.

Question 3 (Multiple Choice)

Which statement is correct about the L1 and L2 NAVSTAR/GPS transmission frequencies and codes?

The lower frequency is used to transmit both the C/A and P codes.

C/A and P codes are transmitted at different times on both frequencies.

The higher frequency is used to transmit both the C/A and P codes.

C/A and P codes are transmitted simultaneously on both frequencies.

Question 4 (Multiple Choice)

Almanac data stored in the receiver of the NAVSTAR/GPS system is used for the:

- check of Selective Availability (SA) operation
- correction of the receiver clock error
- assignment of received PRN-codes to the respective satellite
- fast identification of received signals coming from visible satellites

The main task of the user segment of the NAVSTAR/GPS system is to calculate receiver position by...

selecting appropriate satellites automatically, tracking the signals and measuring the time taken for signals from the satellites to reach the receiver.



requesting position information from the associated ground stations and sending the data to the satellites.



transmitting signals to the ground station as well as to the satellites automatically, and measuring the time taken for signals to reach the receiver.



monitoring the status of the satellites, determining their positions and measuring the time interval between signals.



ATC informs to expect RNP Approach (RNP APCH) Runway 09. In case one waypoint of the RNP APCH is missing in the navigation database, the recommended action should be:

to create a new RNP APCH to the on-board navigation database taking into account all waypoints from the charted procedure.



manually update the RNP APCH route retrieved from the on-board navigation database to conform to the charted procedure.



to request a different approach procedure from ATC, because a RNP APCH requires to be retrievable from the on-board navigation database and to conform to the charted procedure.



to continue approach procedure, because RNP APCH waypoints may be omitted in accordance with ATC clearance.



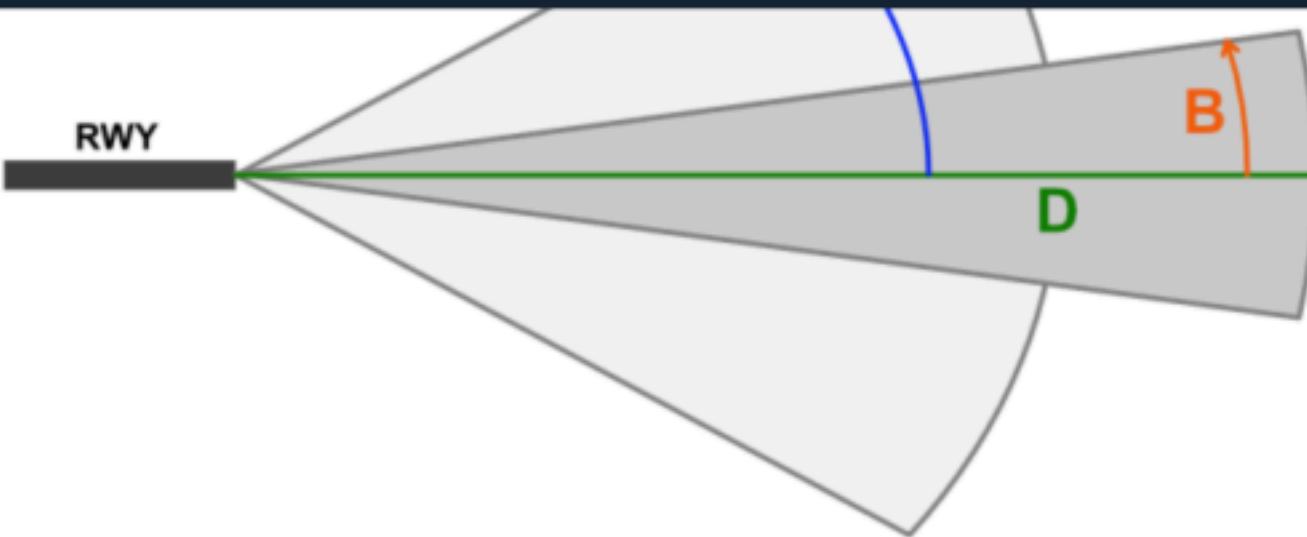
Question 1 (Multiple Choice)

Amongst others, a task of the GNSS control segment is:

- to transmit differential corrections to users.
- to control the motion of the GPS-satellites.
- to control whether the pilot flies the correct GPS track.
- to detect the malfunctioning of satellites.

Which of the following statements is correct about the Final Approach Segment (FAS) of a GBAS Precision Approach Procedure?

- The GBAS-equipped aircraft receives the approach-path guidance parameters from the GNSS space segment. ✖
- The GBAS-equipped aircraft receives the approach-path guidance parameters from the GBAS ground facility. ✓
- The GBAS reference receivers send error correction messages to the ground-based azimuth and elevation-guidance transmitters. ✖
- The GBAS ground facility sends an error correction message to the ground-based azimuth and glidepath-guidance transmitters. ✖



(See attachment IC-062-161)

The correct coverage area for a Ground-Based Augmentation System (GBAS) providing three-dimensional (3D) guidance in the final approach segment is given by the following values:

(B) 25°, (D) 10 NM



(B) 35°, (D) 15 NM



(B) 10°, (D) 20 NM



(B) 50°, (D) 35 NM



With regard to PBN concept, "integrity" can be understood as:

the ability of a system to provide timely warnings to users when the system should not be used for navigation.



as the portion of time (percentage annually) during which reliable navigation information is presented to the crew.



the degree of conformance between the estimated, measured or desired position.



the capability of the total system to perform its function without non-scheduled interruptions during the intended operation.



Question 27 (Multiple Choice)

According ICAO Doc 9613, the components for the application of PBN include:

lateral performance, vertical performance, ATS and ATM and Communication

navaid performance, navigation specification, aircraft type

navaid infrastructure, navigation specification, navigation application

airspace concept, navigation infrastructure, navigation application

 Question 8 (Multiple Choice)

When comparing a SBAS (Satellite-Based Augmentation System) with a GBAS (Ground-Based Augmentation System), it can be stated that...

the dilution of precision of an SBAS is much smaller than those of a GBAS. 

the coverage area of an SBAS is much larger than that of a GBAS. 

an SBAS enables precision approaches at a higher final approach altitude. 

an SBAS does not need ground stations for the pseudo-range corrections. 

Which of the following statements correctly describes the term Pseudo Random Noise (PRN) of the NAVSTAR/GPS system?

PRN describes the continuous electro-magnetic background noise that exists in space and can be heard when receiving signals from a satellite.



PRN means the influence of atmospheric disturbances that affect the signals transmitted by the satellites.



PRN is a code used for the identification of the satellites and the measurement of the time taken by the signal to reach the receiver.



PRN occurs in the receiver and is caused by the signal from a satellite being received from different directions.



 Question 13 (Multiple Choice)

With regard to Airborne-Based Augmentation System (ABAS), a common method of integrity monitoring that relies on information from the GNSS only is referred to as:

 Local Area Augmentation System (LAAS) AAIM (Aircraft Autonomous Integrity Monitoring.) GAIM (GNSS Autonomous Integrity Monitoring) RAIM (Receiver Autonomous Integrity Monitoring)

ATC informs to expect RNP Approach (RNP APCH) Runway 09. In case one waypoint of the RNP APCH is missing in the navigation database, the recommended action should be:

- to continue approach procedure, because RNP APCH waypoints may be omitted in accordance with ATC clearance. ✖
- manually update the RNP APCH route retrieved from the on-board navigation database to conform to the charted procedure. ✖
- to request a different approach procedure from ATC, because a RNP APCH requires to be retrievable from the on-board navigation database and to conform to the charted procedure. ✓
- to create a new RNP APCH to the on-board navigation database taking into account all waypoints from the charted procedure. ✖

 Question 19 (Multiple Choice)

With regard to PBN concept, aircraft RNAV and RNP system performance requirements are defined by:

terms of endurance, precision and continuity. 

terms of accuracy, integrity and continuity. 

terms of independence, continuity and reliability. 

terms of redundancy, integrity and endurance. 

Regarding ICAO Doc 9613 for PBN operations, which statement about use of "fly-over" and "fly-by"-waypoints is correct?

- "fly-by"-turns will only be used when there is no requirement for repeatable paths. ✖
- "fly-over"-turns can be used with RNP flight tracks, " fly-by" turn is not compatible with RNP flight tracks. ✖
- "fly-by" and "fly-over"-turns both can be used with RNP flight tracks. ✖
- "fly-by"-turns can be used with RNP flight tracks, " fly-over" turn is not compatible with RNP flight tracks. ✔

 Question 26 (Multiple Choice)

Navigation specifications covered by A-RNP include:

RNAV 5, RNAV 1, RNAV APCH and RNP APCH.



RNAV 5, RNAV 1, RNP 1 / RNP 2 and RNAV APCH.



RNAV 5, RNAV 1, RNP 1 / RNP 2 and RNP APCH.



RNAV APCH, RNAV 1, RNP 1 / RNP 2 and RNP APCH.



 Question 1 (Multiple Choice)

An Airborne Weather Radar (AWR) usually does NOT detect...

 wet snow.  clear air turbulence (CAT).  moderate precipitation.  turbulence in cloud associated with precipitation. 

 Question 2 (Multiple Choice)

During line-up on the runway for departure, with thunderstorms and strong convective clouds in the vicinity, the Weather Radar should be set up with...

"Gain" should be reduced to minimum to ensure that all possible returns are displayed. 

"Tilt" should be directed UP to check for significant precipitation in the climb-out area. 

"Ground clutter suppression" should be switched OFF to only have weather echos on the display. 

"WX+T" mode should be activated to detect Clear Air Turbulence between the clouds. 

062 PT2 062.03

Toolbar...

0:41:03



Question 3 (Multiple Choice)

When an aircraft is operating its SSR in Mode C, information about the aircraft's indicated altitude are given in increments of:

200 ft



50 ft



25 ft



100 ft



 Question 4 (Multiple Choice)

An aircraft using Mode S can be uniquely interrogated and identified by using the...

 long P2 pulse.  twelve-pulse train, giving 412 possible codes.  24-bits address code, giving more than 16 million possible codes.  SPI pulse. 

 Question 5 (Multiple Choice)

The Mode C-transponder reports the pressure altitude in ___ increments.

 50 ft  100 ft  200 ft  25 ft 

 Question 6 (Multiple Choice)

In case an ATS controller using the radar situation display should provide information about...

the current weather situation as seen from the ground base weather radar.



conflicting traffic detected by ACAS (Airborne Collision Avoidance System).



any aircraft observed on a possibly conflicting path.



performance supply information for optimum altitude and speed.



 Question 7 (Multiple Choice)

3 cm is considered to be an optimum wavelength for an airborne weather radar system because...

it enables the weather radar to detect clear air turbulence.



larger water droplets and wet hailstones are best reflected.



static interference is reduced.



greater detail can be obtained at higher distant ranges for smaller water droplets.



 Question 8 (Multiple Choice)

The term 'Pulse Recurrence Frequency (PRF)' means the...

number of cycles per minute.



ratio of pulse period to pulse width.



number of pulses per second.



delay after which the process starts again.

