

Operative level

03 – Navigational devices

Questions		Correct answer
Ite	B/D	Module 1
Module 1 – Basic navigational equipment		
1.	○	A free gyroscope is: a) a gyroscope with three degrees of rotational freedom b) a gyroscope in a resting state c) a gyroscope under influence of a force moment
2.	○	Under influence of a force moment, a gyroscope: a) is showing no reaction b) is rotating in relation to an axis which meets the direction of the given force moment c) is rotating in relation to an axis perpendicular to the direction of the force moment
3.	○	In order to determine the course using a gyrocompass, the following is used: a) a constant component of the Earth's magnetic field b) Earth's rotational movement c) movement of the polar star
4.	○	A gyroscope placed inside a floating sphere: a) indicates unstable equilibrium b) has a constant position in relation to the Earth c) gains three degrees of rotational freedom
5.	○	In order to determine the course using a gyrocompass, the following is used: a) Earth's rotational movement b) Earth's gravity c) Earth's rotational movement and gravity
6.	○	A gyroscope with a lowered centre of gravity: a) is in a non-stable state b) performs undamped swings c) aligns its axis along a meridian
7.	○	An axis of a free gyroscope with a lowered centre of gravity and an oil damper: a) aligns itself along a meridian b) aligns itself along a parallel c) does not reach a stable state

8.	<input type="radio"/>	Gyrocompasses have the following errors: a) speed latitude error and ballistic error b) intensive deviation c) step deviation	A
9.	<input type="radio"/>	Speed latitude error does <u>not</u> depend on: a) ship speed and course b) geographic latitude c) geographic longitude	C
10.	<input type="radio"/>	Ballistic deviation <u>does not</u> occur during: a) change of the ship speed b) change of the ship course c) ship movement at a constant speed and course	C
11.	<input type="radio"/>	Gyropilot is a device that: a) ensures that a ship stays on the set course b) allows the ship to be automatically introduced to a port c) releases the watch officer from the need to carry our observations	A
12.	<input type="radio"/>	The use of a gyropilot causes: a) a reduction of average ship speed b) savings in ship's operation c) a significant increase in number of rudder movements	B
13.	<input type="radio"/>	A directionally stable ship is one that: a) does not change the course despite the presence of interference caused by the impact of wave motion and wind b) when a rudder is in midship, after the ship deviates from the course due to external conditions, it continues movement along a new course c) does not change the course, even when the rudder moves	B
14.	<input type="radio"/>	As a result of wind impact from the right side, the ship alternates its course: a) always to the port side b) always to the starboard side c) to the left or to the right, depending, for instance, from the type and construction of the ship	C
15.	<input type="radio"/>	A proportional component in a PID regulator takes into account: a) speed of ship deviation from the course (angular velocity) b) ship deviation from the course (course misalignment) c) the Coriolis force	B
16.	<input type="radio"/>	A differential component in a PID regulator takes into account: a) speed of ship deviation from the course (angular velocity) b) the magnitude of factors which are the cause of constant ship deviation off course c) impact of the Coriolis force	A

17.	<input type="radio"/>	An integrating component in a PID regulator takes into account: a) speed of ship deviation from the course (angular velocity) b) ship deviation from the course (course misalignment) c) the magnitude of factors which are the cause of constant ship deviation off course	C
18.	<input type="radio"/>	Change of sensitivity setpoint (<i>yaw</i>): a) impacts the value of the maximum angle of a rudder b) impacts the scope of a constant, automatic rudder angle c) causes the change of the regulator dead zone range related with ship yaw	C
19.	<input type="radio"/>	Change of the gain coefficient setpoint (<i>rudder</i>) impacts: a) rudder angle value and time the rudder is left at an extreme angle b) the value of the maximum rudder angle c) the scope of a constant, automatic rudder angle	A
20.	<input type="radio"/>	Change of the integral coefficient setpoint (<i>trim</i>) impacts: a) rudder angle value and time the rudder is left at an extreme angle b) the value of the maximum rudder angle c) the scope of a constant, automatic rudder angle	C
Item	B/D	Module 2 – Satellite navigation systems	
1.	<input type="radio"/>	Number of users that simultaneously use the GPS system is: a) limited and depends on the number of visible satellites b) unlimited c) limited and depends on the distance from a reference station	B
2.	<input type="radio"/>	The space segment of a GPS system is a constellation made up from at least: a) 24 main satellites and reserve ones b) 12 main satellites and reserve ones c) 48 main satellites and reserve ones	A
3.	<input type="radio"/>	The signal received from the GPS system satellite may include: a) position of the receiver antenna on the ship b) satellite position c) differential correction	B
4.	<input type="radio"/>	Number of orbits in the space segment of the GPS system equals: a) 3 b) 4 c) 6	C
5.	<input type="radio"/>	Orbits of GPS system satellites are: a) circumpolar b) geostationary c) approximately circular	C

6.	<input type="radio"/>	Orbital radius of GPS system satellites equals approx.: a) 26600 m b) 20200 km c) 16500 NM	A
7.	<input type="radio"/>	GPS satellite time of passage around the Earth equals approx.: a) 12 hours b) 24 hours c) 1 year	A
8.	<input type="radio"/>	The control segment of the GPS system includes control stations located: a) everywhere around the Earth b) only in North America c) only in Europe	A
9.	<input type="radio"/>	The user segment of GPS includes: a) only civilian receivers b) all receivers c) civilian and military transmitters	B
10.	<input type="radio"/>	The number of satellites in the space segment of the EGNOS system equals: a) 3 b) 10 c) 24	A
11.	<input type="radio"/>	Orbits of EGNOS system satellites are: a) circumpolar b) geostationary c) hyperbolic	B
12.	<input type="radio"/>	The GALILEO system includes: a) 30 satellites in 6 orbits b) 30 satellites in 5 orbits c) 30 satellites in 3 orbits	C
13.	<input type="radio"/>	The Russian satellite navigation system (counterpart of the GPS system) is: a) GLONASS b) WAAS c) RIMS	A
14.	<input type="radio"/>	The GLONASS system includes: a) 24 satellites in 6 orbits b) 24 satellites in 4 orbits c) 24 satellites in 3 orbits	C

15.	<input type="radio"/>	Which physical phenomenon was used for measurement of ship speed in hydroacoustic Doppler logs: a) Acoustic wave deflection phenomenon b) Magnetic induction phenomenon c) The phenomenon of the difference of frequency between a signal sent by the log transmitter and the echo received for a moving ship.	C
16.	<input type="radio"/>	Adaptative gyropilot is a device built based on: a) an analog assembly with an increased number of setpoints available to the navigator b) a system which merges gyropilot with a GPS receiver c) a digital system that uses a mathematical ship model, a so-called "virtual ship".	B
17.	<input type="radio"/>	A navigational parameter measured by a GPS receiver is: a) a direction to a satellite b) a pseudorange between a satellite and a receiver antenna c) a satellite height above the horizon	B
18.	<input type="radio"/>	: a) A number of pulses broadcast in a group b) carrier frequency c) both a and b are correct	A
19.	<input type="radio"/>	Automatic ship identification system is: a) a component of the INMARSAT-C system b) a system for notification about pirate attack on a ship c) a ship transponder operating in the UKF marine mobile band.	C
20.	<input type="radio"/>	A system for long range identification is required on cargo ships on international cruises, of the following tonnage: a) all, regardless of tonnage b) 300 gross tonnage and more c) 500 gross tonnage and more	B
Item	B/D	Module 3 – Radiolocation – use of radar devices – Course 1.07 (operative level)	
1.	<input type="radio"/>	Wavelength for a radar working in the S band is approx.: a) 2 cm b) 3 cm c) 10 cm	C
2.	<input type="radio"/>	Main elements of a pulsed magnetron radar transmitter are: a) timer, modulator, N/O switch b) timer, modulator, magnetron c) trigger pulse generator, mixer, magnetron	B

3.	<input type="radio"/>	Trigger pulse generator controls the operation of: a) a modulator, a time base generator and an RGC system b) a modulator, a time base generator and a differentiator system c) a N/O switch	A
4.	<input type="radio"/>	Modulator of a pulsed magnetron radar transmitter: a) stabilises supply voltage b) generates low power rectangular pulses c) generates very high power rectangular pulses	C
5.	<input type="radio"/>	Lowering the reflected pulse frequency (echo) takes place in a: a) N/O switch b) mixer c) local oscillator	B
6.	<input type="radio"/>	Radial resolution is the radar's capacity to display separately two echoes from objects: a) located in the same bearing and within a close distance b) located within the same distance and in close bearings c) within a close distance	A
7.	<input type="radio"/>	Angular resolution is the radar's capacity to display separately two echoes from objects: a) located in the same bearing and within a close distance b) located within the same distance and in close bearings c) within a close distance	B
8.	<input type="radio"/>	In accordance with technical and maintenance requirements included in a relevant IMO resolution, the ranges required in radar devices are: a) multiples of 3 NM b) e.g.: 2 NM, 6 NM, 12 NM c) e.g.: 1.5 NM, 3 NM, 12 NM	C
9.	<input type="radio"/>	Display of movement where echoes move in the screen respectively to the motion parameters of the given objects is: a) RM – <i>relative motion</i> b) CD – <i>constant display</i> c) TM – <i>true motion</i>	C
10.	<input type="radio"/>	Display of motion where echoes move in the screen in accordance with relative vectors is: a) RM – <i>relative motion</i> b) CD – <i>constant display</i> c) TM – <i>true motion</i>	A
11.	<input type="radio"/>	Display of motion where echoes move in the screen in accordance with relative vectors and the afterglow corresponds to the actual unit movement parameters is: a) RM – <i>relative motion</i> b) CD – <i>constant display</i> c) TM – <i>true motion</i> .	B

12.	<input type="radio"/>	A device that uses multiple radio wave reflections from perpendicular surfaces in order to increase the size of radar reflection is: a) a RACON b) a radar reflector c) a SART radar transponder	B
13.	<input type="radio"/>	Head-up display is a display: a) which should be used on open waters far from land b) where the lubber line indicates north c) where zero on the external bearing scale indicates the ship nose	C
14.	<input type="radio"/>	North-up display is a display where: a) the lubber line indicates the true course b) the lubber line indicates north c) zero on the external bearing scale indicates the ship nose	A
15.	<input type="radio"/>	Measurement markers in modern radars are: a) IR, AC SEA, AC RAIN b) GAIN, TUNE, BRILL c) VRM, PI, EBL	C
16.	<input type="radio"/>	Radar distance measurement accuracies required by a relevant IMO resolution equal: a) 50 m or 1% of range b) 30 m or 1% of range c) 50 m or 1.5% of range	B
17.	<input type="radio"/>	Direction measurement accuracies using a radar, required by a relevant IMO resolution are equal to: a) 0.5° b) half of the antenna horizontal characteristics c) 1°	C
18.	<input type="radio"/>	Display of relative motion is characterised by the fact that: a) the position of own ship moves in the screen proportionally to the actual speed of own ship and all objects move in the screen in accordance with their own courses and proportionally to their speeds b) own ship position remains still in the screen and all objects move with a motion which is a result of their true motions and the true motion of own ship c) the position of own ship remains still in the screen and all objects move in the screen in accordance with their own courses and proportionally to their speeds	B
19.	<input type="radio"/>	The phenomenon of illusiveness of relative motion involves the impossibility to: a) precisely determine a manoeuvre of the observed unit based on the change of its relative motion parameters b) assess unit's actual movement of the unit on the basis of performed relative plotting c) determination of current parameters based on observation of the object echo in relative motion	A

20.	<input type="radio"/>	Radar distance to the point echo are measured up to: a) the external edge of echo b) the centre of echo c) the internal edge of echo	C
21.	<input type="radio"/>	Display of true motion is characterised by the fact that: a) the position of own ship moves in the screen in the direction compliant with the own ship direction and proportionally to the true speed of own ship and all objects move in the screen in the direction in accordance with their courses and proportionally to their speeds b) own ship position remains still in the screen and all objects move with a motion which is a result of their true motions and the true motion of own ship c) position of own ship and all echoes coming from solid objects are immobile in the radar screen	A
22.	<input type="radio"/>	Presence of afterglow for echoes of solid objects observed in true motion display indicates: a) the presence of the phenomenon of intermediate echoes b) presence of ship drift c) that a RACON was mounted on the solid object	B
23.	<input type="radio"/>	RAMARK is a device that: a) automatically and in a constant manner emits signals which may be received by radars of ships present nearby b) emits signals in an interrupted manner after excitation by a ship radar c) operates independently from ship radars, causing the increase of the object reflection area	A
24.	<input type="radio"/>	Lack of afterglow for the observed object echoes in the display of relative motion (object's relative speed is equal to zero) indicates that they are echoes of: a) solid objects b) ships sailing at the same course and at the same speed as the own ship c) ships sailing at an opposite course, but with the same speed as the own ship	B
25.	<input type="radio"/>	When performing relative plotting, incorrect drawing of the ship speed vector length will result in occurrence of errors in determining the values of: a) course and relative speed of the object b) course and true speed of the object c) the minimum passing distance and the time of its occurrence	B
26.	<input type="radio"/>	RACON is a radio navigational aid that: a) facilitates the location of a place of disaster (SAR) b) facilitates the identification of echoes of navigational aids in the screen c) indicates the direction of movement of a tracked object	B
27.	<input type="radio"/>	In the case the actual values of the minimum passing distance and the time of its presence calculated for the given object are lower than the limits determined by the operator, the following alarm is generated: a) <i>New Target Warning</i> b) <i>Lost Target Warning</i> c) <i>CPA/TCPA Warning</i>	C

28.	<input type="radio"/>	When the screen is observed, the operator may pre-select the objects before they are acquired after activating the function of: a) trial manoeuvre (<i>Trial</i>) b) artificial afterglow (<i>Trails</i>) c) <i>Relative vectors</i>	B
29.	<input type="radio"/>	According to IEC, the symbol used to mark the object that causes the activation of <i>CPA/CPA Warning alarm</i> is: a) \diamond b) ∇ c) \triangle	C
30.	<input type="radio"/>	Based on the observation of relative vectors, the operator may unambiguously determine that the traced objects are dangerous if: a) relative vectors pass within a distance to the own ship position smaller than the safe distance according to the operator b) the end of a relative vector of the object contacts the end of the actual vector of the own ship or crosses it proportionally to its length c) no such assessment may be made, as it is possible only during observations of actual vectors	A
31.	<input type="radio"/>	If the indicator display shows actual vectors, the most dangerous echoes are the ones where: a) for the selected time length the ends of actual vectors for the own ship and the object are touching b) are marked with a "Z" letter symbol c) are marked with a flashing vector of the relevant time length	A
32.	<input type="radio"/>	In order to assess the past manoeuvre of a traced unit, use the object movement history function in the following display: a) <i>True Motion</i> b) <i>Relative Motion</i> c) <i>True or Relative Motion</i> – type of display is not relevant here	A
33.	<input type="radio"/>	After selecting the BCR/BCT option, the operator can read in the radar report: a) the minimum passing distance to the selected traced object b) the distance at which the traced object sails before the nose of the own ship c) the distance at which own ship sails before the nose of the traced object	B
34.	<input type="radio"/>	Dynamic presentation of the situation when using the trial manoeuvre function is characterised by the fact that the manoeuvre characteristics of the own ship is taken into account. Parameters which make such presentation possible are: a) <i>Turn rate</i> and <i>Speed rate</i> b) <i>TTM</i> and <i>Delay</i> c) <i>BCR</i> and <i>BCT</i>	A
35.	<input type="radio"/>	Detection is a process that involves: a) initiation of the tracking process b) removal of objects from tracking c) detection of objects	C

36.	<input type="radio"/>	A trial manoeuvre function is used to: a) check the impact of the planned manoeuvre on the movement of traced units from the safety viewpoint b) determine own ship manoeuvrability in a given basin c) automatically select a new course of own ship	A
37.	<input type="radio"/>	Alert of lost tracking target (<i>LOST TARGET WARNING</i>) may be activated if: a) the trial manoeuvre function is used and object tracking was halted b) an object tracked earlier is not detected by the radar for a prolonged time c) a previously not tracked object crossed the maximum distance of the currently used radar operation scope	B
38.	<input type="radio"/>	The <i>CPA/TCPA WARNING</i> alarm is generated when: a) the CPA or TCPA value calculated for the traced object is lower than the CPA or TCPA limit set by the operator, respectively b) the CPA value calculated for the traced object is equal to 0 c) the CPA and TCPA values calculated for the traced object are lower than the CPA or TCPA limits set by the operator, respectively	C
39.	<input type="radio"/>	Acquisition is a process that involves: a) the observation of subsequent changes of object positions in order to determine parameters of their movement b) the initiation of the tracking process c) the removal of objects from tracking	B
40.	<input type="radio"/>	According to IEC, the symbol of an object that triggers the <i>NEW TARGET WARNING</i> alarm is a) ▽ b) △ c) □	A
41.	<input type="radio"/>	In accordance with the performance standards, a radar device with automatic echo tracking should ensure the presentation of object data in vector and alphanumeric forms with the accuracy required in the Resolution within a time no longer than: a) 20 rotations of a radar antenna b) 1 minute from the moment of object acquisition c) 3 minutes from the moment of object acquisition	C