Examination questions for the course in “Electronic navigation equipment”

Operational level			
Electronic navigation equipment			
Questions O/T – specifies the nature of the question (obligatory, time demanding)			
No.	**O/T**	**Question**	**Correct answer**
1.	O	According to the SOLAS Convention, gyrocompasses should be featured: a. on every sea-going ship, b. on ships of tonnage of above 10,000 BRT, c. on ships of tonnage of above 500 BRT, d. on sea-going ships not equipped with a GPS system.	C
2.	O	A gyrocompass should be activated: a. at the last moment before the ship leaves the port, b. by the manufacturer’s service staff, c. occasionally, in special navigation circumstances, d. for one to several hours, according to the manufacturer’s instructions.	D
3.	O	The alarm system of a gyrocompass with the gyrosphere immersed in electrolyte becomes activated when: a. the ship goes off course, b. the acceptable temperature level of the supporting fluid is exceeded, c. the outside air temperature is too high, d. A gyrocompass does not feature such a system.	B
4.	O	A gyrocompass emulation system: e. increases the accuracy of the gyrocompass, f. is used in the event of the gyrocompass’ failure, g. makes it possible to transmit information about the set course from the main gyrocompass to all receivers of this information, h. is used sporadically on ships.	C
5.	O	What ships, according to the requirements of the SOLAS convention, should feature a log?	

		a. On ships of tonnage of above 300 BRT, b. On ships of tonnage of above 10,000 BRT, c. On every sea-going ship, d. On a ship not equipped with a GPS system.	A
6.	O	What physical phenomenon is used to measure the ship's speed in Doppler hydroacoustic logs? a. The phenomenon of magnetic induction, b. The phenomenon of measurement wave diffraction, c. The Faraday effect, d. The phenomenon of the frequency difference between the signal sent by the transmitter of the log and the echo received for a moving ship.	D
7.	O	An adaptive autopilot is a device formed on the basis of: a. An analogue system with an increased number of settings available to the navigator, b. A system being a combination of an analogue autopilot with a navigation GPS receiver, c. A digital system utilizing a mathematical model of the ship's movement, i.e. a so-called "virtual ship", d. It is a feature of an electronic map.	C
8.	O	Automatic Identification System is: a. a ship transponder operating in the UKF band, b. an element of the INMARSAT–C system, c. a system notifying of pirate attacks on the ship, d. a system .	A
9.	O	A TMC/THD (TMC – Transmitting Magnetic Compass System, THD – Transmitting Heading Device) system functions based on: a. a synchronous link, b. fibre optic coupling, c. a magnetometer, d. capacitive coupling.	C

10.	O	Changing the operating frequency of an echo sounder from 50 kHz to 200 kHz: a. will increase the range of the echo sounder, b. will decrease the range of the echo sounder, c. will not affect the range of the echo sounder, d. will increase the chart speed of the echogram.	B
11.	O	An echo sounder converter may be placed: a. on the navigation deck, b. on the bridge, c. at the bottom of a basin, d. at the bottom of the ship's hull.	D
12.	O	Increasing the chart speed of an echogram will: a. change the horizontal scale of the echogram, b. change the vertical scale of the echogram, c. change the operating frequency of the echo sounder, d. increase the power of the pulse sent by the echo sounder,	A
13.	O	The navigation parameter measured in GPS is: a. Direction (bearing) on the satellite, b. Elevation (topocentric altitude), c. Pseudo-distance between the receiver and the satellite, d. Altitude of the orbit where the satellite is found.	C
14.	O	In a three-dimensional space, the navigation parameter measured in GPS forms: a. a sphere, b. a straight line, c. an ellipsoid, d. a section of an arc.	A

15.	O	Setting the navigation parameter in GPS is done by means of: a. a laser range finder measurement, b. calculations taking the position of the satellite and the receiver into consideration, c. a comparison of shifts among pseudo-random sequences included in the navigation messages transmitted by the satellite and generated in the receiver, d. a comparison of shifts among pseudo-random sequences included in the navigation messages transmitted by the satellite and earth stations.	C
16.	O	The GPS navigation parameter is pseudo-distance because: a. pseudo-sequences are used to determine it, b. there occurs the Doppler effect caused by the satellite's movement, c. the altitude of the GPS receiver's antenna above the reference ellipsoid is not known, d. the measurement of the signal propagation time is encumbered with errors caused by e.g. a lack of synchronization between the receiver's clock and the GPS system's clock.	D
17.	O	Ionospheric delay in dual-frequency receivers: a. is determined on the basis of a ionosphere model, b. is determined on the basis of the phenomenon of ionospheric refraction, dependent on the signal frequency, c. is given in navigation messages transmitted within the PPS service, d. is insignificant for an electromagnetic wave of an L-band frequency.	B
18.	O	The nominal GPS constellation is: a. 12 satellites arranged in 4 orbital planes, b. 18 satellites arranged in 6 orbital planes, c. 24 satellites arranged in 4 orbital planes, d. 24 satellites arranged in 6 orbital planes.	D
19.	O	Differential versions of satellite navigation systems take advantage of: a. the fact that the errors in indicating the position in two receivers are correlated up to a certain distance, b. information about the system state, transmitted by the control station, c. the phenomenon of electromagnetic wave dispersion, d. data made available by coast stations to generate corrections.	A

20.	O	A position line: a. is a set of spatial points where the observer may be positioned, b. is a set of spatial points where the value of the measured navigation parameter is the same, c. is marked by subsequent measurements of a given navigation parameter, d. is marked by subsequent positions of the observer.	C
21.	O	A ship's true course is: a. the angle between the north part of the local meridian and the section connecting the observer with the targeted object, b. the angle between the north part of the local meridian and the bow part of the ship's axis of symmetry, c. the angle between the bow part of the ship's axis of symmetry and the section connecting the observer with the targeted object, d. the angle between the north part of the local meridian and the line marked by the ship's subsequent positions.	B
22.	O	A course over ground is: a. the angle between the north part of the local meridian and the section connecting the observer with the targeted object, b. the angle between the north part of the local meridian and the bow part of the ship's axis of symmetry, c. the angle between the bow part of the ship's axis of symmetry and the section connecting the observer with the targeted object, d. the angle between the north part of the local meridian and the line marked by the ship's subsequent positions.	D
23.	O	A nautical mile: a. equals 1,825 metres, b. is the length of a meridian arc corresponding to one arcminute, c. is the length of a parallel arc corresponding to one arcminute, d. is the length of an equator arc corresponding to one arcsecond.	B

24.	O	Propagation corrections set in DGPS: a. are fixed for all satellites, b. are composed of three numbers correcting the 3-D position set in the receiver, c. are used by the receiver to correct the measured distances from satellites, d. do not compensate for errors caused by ionospheric delay.	C
25.	O	The reference stations commonly available in marine navigation transmit differential corrections: a. via a radio network utilizing the RTCM protocol, b. via a radio network utilizing the NMEA protocol, c. via wireless internet, d. via a GSM network.	A
26.	O	The European Geostationary Navigation Overlay Service (EGNOS) augmenting the transmission of differential corrections: a. takes advantage of GLONAS satellites, b. takes advantage of INMARSAT and ARTEMIS geostationary telecommunications satellites, c. takes advantage of a ground network of electric beacons transmitting data in the band of 283.5 kHz to 325 kHz, d. takes advantage of a GSM network.	B
27.	O	DGPS does not eliminate errors caused by: a. ionospheric delay, b. ephemerid inaccuracies, c. lack of synchronization between satellite clocks and the time followed by the GPS system, d. signal multipath.	D
28.	O	The maximum free-space radar range: a. depends on the transmitter's output power, the receiver's sensitivity, and the radar cross section of the target, b. depends on the transmitter's output power and the receiver's sensitivity, c. depends only on the radar cross section of the target, d. depends on the transmitter's output power, the antenna's span, and the radar cross section of the target.	A
29.	O	If we reduce the radar cross section of a target 16 times, the maximum free-space radar range: a. will decrease 16 times, b. will decrease 4 times, c. will decrease 2 times, d. Will not change.	C

30.	O	What is the distance from a target to a signal transmitter if the target echoes the sent signal back to the source after 10 μs? a. 1,500 m, b. 3,000 m, c. 4,500 m, d. 6,000 m.	A
31.	O	A modulator of a pulse radar with a magnetron transmitter: a. generates high-power rectangular pulses, b. generates low-power rectangular pulses, c. synchronizes the operation of all elements related indirectly to distance measurements, d. stabilizes the voltage of the power unit.	A
32.	O	In order to eliminate interference caused by precipitation, it is necessary to take advantage of: a. radar receiver detuning, b. a differentiator (FTC – Fast Time Control), c. gain reduction, d. time gain compensation.	B
33.	O	Precipitation: a. reduces the range of a radar operating in the X band to a greater extent, b. reduces the range of a radar operating in the S band to a greater extent, c. reduces the range of radars operating in the X and S band to the same extent, d. has no impact on radar range.	A
34.	O	The “performance monitor” feature: a. is used to check the quality of functioning of the transmitter, the transmission path, and the receiver using a transponder placed in an antenna block, b. is used to check the quality of the radar indicator, c. is used to check the antenna’s rotation speed, d. is used to check the accuracy of radar detection.	A

35.	O	ARPA is a device that: a. automatically tracks targets and analyses their movement to identify any risks of collision, b. indicates what units are present in the nearest surrounding, c. facilitates travel planning, d. informs the navigator of going off course.	A
36.	O	A Vessel Data Recorder (VDR) is a device designed for the following purpose: a. graphic recording of a vessel's route, b. collecting and storing data concerning a vessel's position, its movement, machine and helm manoeuvres, radar imaging, radio and verbal communication on the bridge, alarms - to explain the cause of accident - if one occurs, c. recording the type and amount/quantity of the carried cargo, d. recording the stopover time spent in ports at which the vessel has called.	B