

### Examination questions for the course in “Ergonomics and safe ship operation”

Operational level			
Ergonomics and safe ship operation			
Questions			
O/T – specifies the nature of the question (obligatory, time demanding)			
No.	O/T	Question	Correct answer
1.	O	<p>Ergonomics deals with:</p> <ul style="list-style-type: none"> <li>A. issues related to adapting equipment and working environment to the requirements and capabilities of the human organism – to make it possible to achieve the highest efficiency of the human-machine system possible, and to arrange for healthy working conditions,</li> <li>B. investigating the build, the size, and the proportions of the human body,</li> <li>C. human relations,</li> <li>D. issues related to economic effectiveness of enterprises.</li> </ul>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> A </div>
2.	O	<p>Corrective ergonomics deals with:</p> <ul style="list-style-type: none"> <li>A. human posture correction,</li> <li>B. process error correction,</li> <li>C. analysing the already existing workstations from the point of view of their suitability for the anatomical, physiological, and mental qualities of their users,</li> <li>D. implementation of the principles of ergonomics during concept development and design.</li> </ul>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> C </div>
3.	O	<p>Conceptual ergonomics deals with:</p> <ul style="list-style-type: none"> <li>A. human posture correction,</li> <li>B. process error correction,</li> <li>C. analysing the already existing workstations from the point of view of their suitability for the anatomical, physiological, and mental qualities of their users,</li> <li>D. implementation of the principles of ergonomics during concept development and design.</li> </ul>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> D </div>
4.	O	Fig. 1 shows a reliability system that is:	

		A. series, B. parallel, C. series-parallel, D. of the "k out of n" type.	<div> <div></div> <div>B</div> <div></div> <div></div> </div>
5.	O	Fig. 2 shows a reliability system that is: A. series, B. parallel, C. series-parallel, D. of the "k out of n" type.	<div> <div>A</div> <div></div> <div></div> <div></div> </div>
6.	O	The equation below $R(t) = Pr\{t \geq \tau\}$ describes: A. object reliability, B. object durability, C. object distribution function, D. object readiness.	<div> <div>A</div> <div></div> <div></div> <div></div> </div>
7.	O	An object's loss of capability to meet the expected requirements is: A. a loss of trust in the object, B. a damage of the object, C. a decrease in the object's readiness, D. a decrease in the object's efficiency,	<div> <div></div> <div>B</div> <div></div> <div></div> </div>
8.	O	The effects of the nervous system being affected by stress impact the ability to perform a task depending on the level of emotional arousal (the Yerkes-Dodson law), and lead to: A. a drop in the level of engagement in tasks in a situation of a 'hyperarousal', B. an increase in the level of engagement in tasks in a situation of a 'hyperarousal', C. a drop in the level of engagement in tasks in a situation of little arousal, D. a drop in the level of engagement in tasks regardless of the level of arousal.	<div> <div>A</div> <div></div> <div></div> <div></div> </div>
9.	O	A stress-induced 'hyperarousal':	<div> <div>A</div> </div>

		<p>A. increases the likelihood of committing a mistake, and has an impact on the increase in the number of accidents,</p> <p>B. has not impact on the likelihood of committing a mistake and on the number of accidents,</p> <p>C. decreases the likelihood of committing a mistake and the number of accidents,</p> <p>D. improves the employee's physical and mental state and self-esteem.</p>	<div></div> <div></div> <div></div>
10.	O	<p>Physical stimuli occurring in a ship's engine room, such as noise, vibration, bad lighting, too high or too low temperature level, dust:</p> <p>A. do not affect the physical and mental state of the machine crew,</p> <p>B. can be a source of stress at work,</p> <p>C. do not affect the level of stress,</p> <p>D. improve the human psycho-physical state.</p>	<div></div> <div>B</div> <div></div> <div></div>
11.	O	<p>When the air temperature level rises above the thermal comfort limit, the human psycho-physical state:</p> <p>A. is optimal and makes it possible to utilize one's full working capacity,</p> <p>B. improves and increases one's working capacity,</p> <p>C. remains unchanged and doesn't affect one's working capacity,</p> <p>D. worsens and reduces one's working capacity.</p>	<div></div> <div></div> <div></div> <div>D</div>
12.	O	<p>Depending on human age, the need for lighting:</p> <p>A. does not change,</p> <p>B. decreases with age,</p> <p>C. grows with age,</p> <p>D. is difficult to determine.</p>	<div></div> <div></div> <div></div> <div>C</div>
13.	O	<p>The amount of air consumed by a human:</p> <p>A. does not decrease even if the working conditions become worse,</p> <p>B. decreases as the working conditions become worse,</p> <p>C. increases as the working conditions become worse,</p> <p>D. is difficult to determine.</p>	<div></div> <div></div> <div></div> <div>C</div>
14.		<p>The lowest acceptable illuminance level (in lx) ensuring an acceptable range of vision in confined spaces should be:</p> <p>A. 10 lx,</p> <p>B. 50 lx,</p> <p>C. 100 lx,</p> <p>D. 200 lx.</p>	<div>A</div> <div></div> <div></div> <div></div>

15.	O	Short-term presence in corridors and on stairs, combined with performing simple tasks, requires a minimum acceptable illuminance level of: A. 10 lx, B. 20 lx, C. 50 lx, D. 100 lx.	<div> <div></div> <div></div> <div>C</div> <div></div> </div>
16.	O	The colour contrast ensuring the best message readability is: A. green lettering, white background, B. black lettering, yellow background, C. blue lettering, white background, D. white lettering, blue background.	<div> <div></div> <div>B</div> <div></div> <div></div> </div>
17.	O	Hearing damage among people working in ship engine rooms for many years: A. does not occur, B. is caused by the process of ageing, C. is caused only by a prolonged exposure to noise, D. is a result of a combination of work-induced ailments and hearing loss caused by the process of ageing,	<div> <div></div> <div></div> <div></div> <div>D</div> </div>
18.	O	Vibration in the work environment may have the following effect on humans: A. a clear improvement of one's psycho-physical state, B. an improvement of the condition of one's cardiovascular system and innervation, C. negative impact on human health, including vibration white finger, D. an increased sharpness of one's sight.	<div> <div></div> <div></div> <div>C</div> <div></div> </div>
19.	O	The highest safe voltage in conditions of an increased risk of electric shock is: A. 12 V, B. 25 V, C. 50 V, D. 75 V.	<div> <div></div> <div>B</div> <div></div> <div></div> </div>
20.	O	The highest safe voltage in conditions of a standard risk of electric shock is: A. 25 V, B. 50V, C. 75 V, D. 230 V.	<div> <div></div> <div>B</div> <div></div> <div></div> </div>
21.	O	The threshold value of perceived current (for alternating current), independent of time, is: A. 0.01 mA, B. 0.1 mA,	<div> <div></div> <div></div> </div>

		C. 0.5 mA, D. 10 mA.	<table><tr><td>C</td></tr><tr><td></td></tr></table>	C			
C							
22.	O	The current threshold value at which it is still possible for the person exposed to electric shock to release their grip (the let-go threshold for alternating current) according to IEC is: A. 1 mA, B. 5 mA, C. 10 mA, D. 30 mA.	<table><tr><td></td></tr><tr><td></td></tr><tr><td>C</td></tr><tr><td></td></tr></table>			C	
C							
23.	O	What value of alternating touch current is considered the onset of paralysis of the respiratory tract: A. 30 mA, B. 50 mA, C. 75 mA, D. 100 mA.	<table><tr><td>A</td></tr><tr><td></td></tr><tr><td></td></tr><tr><td></td></tr></table>	A			
A							
24.	O	Combined electric shocks occur mainly: A. in low voltage switchboards, B. below high voltage lines, C. in low voltage transformer stations, D. in high voltage switchboards.	<table><tr><td></td></tr><tr><td></td></tr><tr><td></td></tr><tr><td>D</td></tr></table>				D
D							
25.	O	A system with an isolated neutral point is called: A. TN-C, B. TN-S, C. IT, D. TI.	<table><tr><td></td></tr><tr><td></td></tr><tr><td>C</td></tr><tr><td></td></tr></table>			C	
C							
26.	O	In the case of shipboard systems with an isolated neutral point, it is necessary to earth: A. neutral conductors, B. all available conductive parts, C. neutral points of machines and three-phase devices connected in a star configuration, D. electric equipment housings made of dielectric materials,	<table><tr><td></td></tr><tr><td>B</td></tr><tr><td></td></tr><tr><td></td></tr></table>		B		
B							
27.	O	Operation of an insulation condition monitoring device involves: A. a continuous monitoring of resistance of the ship system relative to the hull and activation of alert signalling, B. measuring alternating earth leakage current flowing to the hull and activation of alert signalling, C. a continuous monitoring of resistance of the ship system in a voltage free state relative to the hull and activation of alert signalling, D. measuring losses occurring with earth leakage current flowing to the hull and activation of alert signalling.	<table><tr><td>A</td></tr><tr><td></td></tr><tr><td></td></tr><tr><td></td></tr></table>	A			
A							

28.	O	In the event of occurrence of an electric shock, the first and most important thing to do is: A. to break the injured person's contact with electricity quickly, B. to check if the person injured by contact with electricity is conscious or unconscious, C. to check if the person injured by contact with electricity breathes, D. to check the heartbeat and the function of the cardiovascular system of the person injured by contact with electricity.	<div style="border: 1px solid black; padding: 2px; text-align: center;">A</div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div>
29.	O	When a person injured by contact with electricity is conscious: A. it is necessary to sit them on a comfortable chair and give them water to drink, B. it is necessary to lay them on the left side (not on their back), cover with e.g. a blanket, call help, and monitor them all the time as respiratory arrest may occur, C. it is necessary to loosen the clothes around their neck, chest, and stomach, and lay them comfortably on the right side, monitor their condition, and call help, D. it is necessary to lay them on their back, loosen any tight parts of their clothing, clean their mouth from any remains of food, make sure they have access to fresh air, start artificial respiration and cardiac massage if their pulse is imperceptible, and call help.	<div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; padding: 2px; text-align: center;">C</div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div>
30.	O	The maximum time that may pass from the occurrence of an electric shock to aiding the injured person in order to prevent the effects of damage of the cerebral cortex is: A. 1 – 2 min., B. 3 – 5 min., C. 10 – 15 min., D. up to 60 min.	<div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; padding: 2px; text-align: center;">B</div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div>
31.	O	The personal protection equipment used by persons handling maintenance and repair of electric devices does not include: A. electric insulation footwear, mats, and gloves - all with a valid certificate, B. safety harness, connectors designed for working at height, C. safety glasses, face shields, safety helmets, insulation safety jacket with a hood, D. non-insulated digital multimeters, medium voltage indicators, phase sequence indicators.	<div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; padding: 2px; text-align: center;">D</div>
32.	O	In a shipboard IT type electrical network, when touching a phase conductor and an electrical part connected with the ship's hull, there occurs a flow of touch current, resulting from: A. the system's capacity relative to the hull and conductor insulation resistance, B. the resistance of conductor insulation to the hull, C. the system's capacity relative to the hull, D. inductance of the phase conductors.	<div style="border: 1px solid black; padding: 2px; text-align: center;">A</div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div>
33.	O	The rate of the risk of electric shock does not depend on: A. the probability of a human getting in contact with electricity, which results in an electric shock,	

		<p>B. the parameters of voltage and the touch current induced thereby,  C. the size (area) of the electrical network and the number of load points,  D. the resistance of the human body.</p>	<div> <div></div> <div></div> <div>C</div> <div></div> </div>
34.	O	<p>When proceeding with repairing an electrical device, it is necessary to:</p> <p>A. to the extent possible, turn the device off, secure it against accidental switch-on, and notify the person in charge of a given department of the intention to proceed with repair works,  B. notify the direct superior of this fact,  C. make sure that the device is safe for persons using and operating it,  D. check if the device comes with valid certificates and declarations of conformity.</p>	<div> <div>A</div> <div></div> <div></div> <div></div> </div>
35.	O	<p>When carrying out works involving handling devices of the voltage of above 1,000 V, it is necessary to:</p> <p>A. notify the person in charge of a given department of the intention to proceed with the said works to obtain a permit to proceed with the intended works, turn the device off, secure it against accidental switch-on, and energise all of the necessary earthing features,  B. isolate the site,  C. notify the person in charge of a given department of the intention to proceed with the said works to obtain a permit to proceed with the intended works, and then turn the device off,  D. check if the device comes with valid certificates and declarations of conformity.</p>	<div> <div>A</div> <div></div> <div></div> <div></div> </div>
36.	O	<p>When proceeding with works involving handling batteries, it is necessary - for safety reasons - to be equipped with the following:</p> <p>A. an insulating mat, insulation gloves, insulation footwear,  B. acid-resistant protective gloves, acid-resistant workwear or coat, safety glasses, a container with clean water,  C. an aerometer, a container with distilled water, a voltage indicator,  D. portable insulated tools of a safe voltage of up to 1,000 V, acid to replenish the electrolyte.</p>	<div> <div></div> <div>B</div> <div></div> <div></div> </div>
37.	O	<p>When proceeding with works involving use of tools sensitive to electrostatic discharge, there is no need to use:</p> <p>A. an arm band exporting the electrostatic charges to the hull,  B. an electrostatic mat,  C. a brazing torch,  D. a soldering iron with a grounded tip.</p>	

			<div> <div></div> <div></div> <div>C</div> <div></div> </div>
38.	O	<p>In order to avoid accumulation of electrostatic loads in potentially explosive areas such as containers to carry flammable materials, it is necessary to make sure that:</p> <ul style="list-style-type: none"> <li>A. elements made of conductors (metal) in such containers are interconnected and grounded to the hull,</li> <li>B. all metal elements found inside the container are well isolated from the hull,</li> <li>C. container air vents are protected with lightning arresters,</li> <li>D. elements made of conductors (metal) in such containers are interconnected to prevent a possibility of occurrence of electrostatic discharge among these elements.</li> </ul>	<div> <div>A</div> <div></div> <div></div> <div></div> </div>
39.	O	<p>The capacity of power lines found on board does not impact:</p> <ul style="list-style-type: none"> <li>A. the value of the touch current shocking humans,</li> <li>B. the sparking of loose ends shorting to the hull,</li> <li>C. the value of ground capacitive currents,</li> <li>D. the power factor.</li> </ul>	<div> <div></div> <div></div> <div></div> <div>D</div> </div>
40.	O	<p>Which methods are not effective in minimizing the impact of microwaves:</p> <ul style="list-style-type: none"> <li>A. using protective earth electrode systems with transmitter antennas,</li> <li>B. screening radiation sites,</li> <li>C. screening worksites,</li> <li>D. protective wear.</li> </ul>	<div> <div>A</div> <div></div> <div></div> <div></div> </div>
41.	O	<p>Before proceeding with works carried out in enclosed tanks in humid conditions, there is no need to:</p> <ul style="list-style-type: none"> <li>A. check the atmosphere,</li> <li>B. secure electrical devices (portable lights, flashlights, etc.) against implosion,</li> <li>C. ventilate the tank effectively,</li> <li>D. remove rust containing ferrous sulfides.</li> </ul>	<div> <div></div> <div></div> <div></div> <div>D</div> </div>



**Appendix to examination questions**  
**(course: Ergonomics and safe ship operation)**

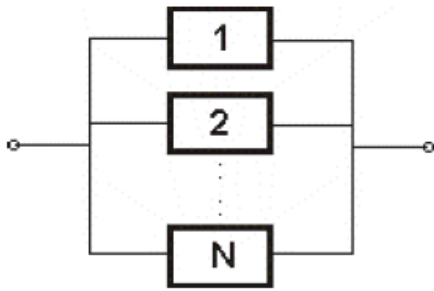


Fig. 1 (question 4)

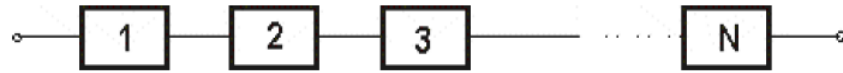


Fig. 2 (question 5)