Catalogue of questions - Gas

Gas – Knowledge of physics and chemistry

Examination objective 1.1: Law of ideal gases, Boyle – Mariotte - Gay-Lussac

Number	*Source*	*Correct answer*
231 01.1-01	Boyle-Mariotte law: pV=constant	C
	A quantity of nitrogen subject to an absolute pressure of 100 kPa takes up a volume of 60 m^3. At a constant temperature of 10 °C, the nitrogen is compressed to 5 bars absolute pressure. What is the resulting volume? A 1 m^3 B 11 m^3 C 12 m^3 D 20 m^3	
231 01.1-02	Boyle-Mariotte law: pV=constant	C
	Some propane vapour is in a cargo tank of 250 m^3 at ambient temperature and at 4 bars absolute pressure. Through a hole in the piping, enough propane escapes for the cargo tank to be at atmospheric pressure. What is the volume of the propane cloud if it does not mix with the air? A 250 m^3 B 500 m^3 C 750 m^3 D 1,000 m^3	
231 01.1-03	Boyle-Mariotte law: pV=constant	B
	A given quantity of nitrogen has a volume of 50 m^3 at an overpressure of 0.6 bar. The nitrogen is compressed to a volume of 20 m^3. The temperature remains constant. What is the resulting pressure of the nitrogen? A 1.5 bars absolute pressure B 3.0 bars absolute pressure C 4.0 bars absolute pressure D 5.0 bars absolute pressure	

Number	*Source*	*Correct answer*
231 01.1-04	Boyle-Mariotte law: pV=constant	A
	There is nitrogen in a cargo tank of 250 m^3. The pressure gauge indicates a pressure of 1.2 bars. What amount of nitrogen is required to bring the pressure in the tank to 3 bars? A 450 m^3 B 700 m^3 C 950 m^3 D 1,200 m^3	
231 01.1-05	Boyle-Mariotte law: pV=constant	B
	A quantity of nitrogen takes up a volume of 50 m^3 at 3.2 bars absolute pressure. At a constant temperature, the volume is reduced to 10 m^3. What is the resulting pressure of the nitrogen? A 11 bars absolute pressure B 16 bars absolute pressure C 20 bars absolute pressure D 21 bars absolute pressure	
231 01.1-06	Gay-Lussac law: p/T=constant	C
	In a closed tank there is propane vapour at 1.2 bars absolute pressure and at a temperature of +10 °C. With the volume of the tank remaining constant, the temperature is increased until the pressure reaches 1.4 bars absolute pressure. What is the resulting temperature of the gas? A 12 °C B 20 °C C 57 °C D 293 °C	
231 01.1-07	Gay-Lussac law: p/T=constant	D
	A cargo tank contains propane gas at 5.0 bars absolute pressure and a temperature of 40 °C. The propane gas cools to 10 °C. What is the pressure in the cargo tank? A 1.0 bar absolute pressure B 1.2 bars absolute pressure C 3.6 bars absolute pressure D 4.5 bars absolute pressure	

Number	*Source*	*Correct answer*
231 01.1-08	Gay-Lussac law: p/T=constant	D
	A cargo tank contains nitrogen at 1.5 bars absolute pressure and at -10 °C. The temperature of the nitrogen increases to +30 °C. What is the resulting pressure? A 1.8 bars absolute pressure B 2.9 bars absolute pressure C 4.5 bars absolute pressure D 7.5 bars absolute pressure	
231 01.1-09	Gay-Lussac law: p/T=constant	B
	A drum of 10 m^3 filled with nitrogen is under 10 bars absolute pressure at a temperature of 100 °C. With the drum volume remaining constant, the drum and its contents are cooled to -10° C. What is the resulting pressure? A 1 bar absolute pressure B 6 bars absolute pressure C 7 bars absolute pressure D 8 bars absolute pressure	
231 01.1-10	Gay-Lussac law: p/T=constant	B
	In a cargo tank there is nitrogen at a temperature of 40 °C. The pressure, 5 bars absolute pressure, has to be reduced to 4 bars absolute pressure. The nitrogen must be cooled to what temperature? A -22.6 °C B -12.2 °C C +33.3 °C D +32 °C	

Gas – Knowledge of physics and chemistry

Number	*Source*	*Correct answer*
231 01.2-01	Fundamental law of gases: pV/T=constant	A
	The temperature of a volume of gas of 40 m^3 at 1 bar absolute pressure is increased from 20 °C to 50 °C. The pressure increases to 2 bars absolute pressure. What is the resulting volume? A 22 m^3 B 29 m^3 C 33 m^3 D 50 m^3	
231 01.2-02	Fundamental law of gases: pV/T=constant	B
	A gas takes up a volume of 9 m^3 at 1 bar absolute pressure and a temperature of 10 °C. The temperature is increased to 50 °C and at the same time the volume is reduced to 1 m^3. What is the resulting pressure? A 9.3 bars absolute pressure B 10.3 bars absolute pressure C 11.3 bars absolute pressure D 20.5 bars absolute pressure	
231 01.2-03	Fundamental law of gases: pV/T=constant	D
	A gas takes up a volume of 40 m^3 at a temperature of 50 °C and at 2 bars absolute pressure. With the temperature reduced to 10 °C, the gas is at 1 bar absolute pressure. What is the resulting volume? A 12 m^3 B 16 m^3 C 52 m^3 D 70 m^3	
231 01.2-04	Fundamental law of gases: pV/T=constant	C
	A gas takes up a volume of 20 m^3 at a temperature of 50 °C and at 2 bars absolute pressure. The temperature of the gas is reduced to 20 °C and the volume is increased to 40 m^3. What is the resulting pressure of the gas? A 0.4 bar absolute pressure B 0.6 bar absolute pressure C 0.9 bar absolute pressure D 1.4 bars absolute pressure	

Number	*Source*	*Correct answer*
231 01.2-05	Fundamental law of gases: pV/T=constant	D
	A gas takes up a volume of 10 m^3 at 3.0° C and at 1.0 bar absolute pressure. To what temperature must the gas be brought so that at 1.1 bars absolute pressure it takes up a volume of 11 m^3? A 3.5 °C B 3.6 °C C 46 °C D 61 °C	
231 01.2-06	Fundamental law of gases: pV/T=constant	B
	A gas takes up a volume of 20 m^3 at a temperature of 77 °C and 1 bar absolute pressure. To what temperature should the gas be cooled so that it occupies a volume of 8 m^3 at 2 bars absolute pressure? A -63 °C B 7 °C C 46 °C D 62 °C	
231 01.2-07	Fundamental law of gases: pV/T=constant	A
	At a temperature of 10 °C and 1 bar absolute pressure, a gas occupies a volume of 70 m^3. What is the volume when the pressure is brought to 2 bars absolute pressure and the temperature to 50 °C? A 40 m^3 B 53 m^3 C 117 m^3 D 175 m^3	
231 01.2-08	Fundamental law of gases: pV/T=constant	B
	At a temperature of 10 °C and 1 bar absolute pressure, a gas takes up 5 m^3. What is the volume when the pressure is brought to 2 bars absolute pressure and the temperature is 170 °C? A 2.0 m^3 B 3.9 m^3 C 5.3 m^3 D 42.5 m^3	
231 01.2-09	Fundamental law of gases: pV/T=constant	A
	A gas takes up 8 m^3 at a temperature of 7 °C and at 2 bars absolute pressure. What is the pressure when the volume is brought to 20 m^3 and the temperature to 77 °C? A 1.0 bar absolute pressure B 1.5 bars absolute pressure C 8.8 bars absolute pressure D 13.2 bars absolute pressure	

Number	*Source*	*Correct answer*
231 01.2-10	Fundamental law of gases: pV/T=constant	C
	A gas takes up 8 m^3 at a temperature of 7 °C and at 2 bars absolute pressure. What should the temperature be for the gas to take up a volume of 20 m^3 at 1 bar absolute pressure? A 9 °C B 12 °C C 77 °C D 194 °C	

Knowledge of physics and chemistry

Examination objective 2.1: Gases: partial pressures and mixtures
Definitions and simple calculations

Number	*Source*	*Correct answer*
231 02.1-01	Partial pressure – definitions	B
	What is the definition of the partial pressure of a gas in a gas mixture contained in a cargo tank? A The pressure indicated on the pressure gauge B The pressure the gas would have if that gas alone were contained in the cargo tank C The volume that gas alone would occupy D The difference between the pressure of that gas and the atmospheric pressure	
231 02.1-02	Partial pressure – definitions	C
	What is the definition of the partial pressure of a gas in a gas mixture contained in a cargo tank? A The gauge pressure +1 bar B The volume of that gas at atmospheric pressure C The pressure the gas would have if that gas alone were contained in the cargo tank D The difference between the pressure in the cargo tank and the atmospheric pressure	
231 02.1-03	$p_{tot} = \sum p_i$ and Vol.-% $= p_i \times 100 / p_{tot}$	D
	A cargo tank contains a mixture of nitrogen and propane. The volume per cent of nitrogen is 20 and the volume per cent of propane is 80. The total absolute pressure in the cargo tank is 5.0 bar (absolute). What is the partial pressure of the propane? A 0.2 bar (absolute) B 0.8 bar (absolute) C 3.2 bar (absolute) D 4.0 bar (absolute)	
231 02.1-04	$p_{tot} = \sum p_i$ and Vol.-% $= p_i \times 100 / p_{tot}$	C
	A cargo tank contains a mixture of nitrogen and propane. The nitrogen has a partial pressure of 1.0 bar (absolute) and its volume per cent is 20. What is the partial pressure of the propane? A 0.8 bar (absolute) B 3.2 bar (absolute) C 4.0 bar (absolute) D 5.0 bar (absolute)	

Number	*Source*	*Correct answer*
231 02.1-05	$p_{tot} = \sum p_i$ and Vol.-% $= p_i \times 100 / p_{tot}$	B
	A gas mixture composed of 70 volume per cent propane and 30 volume per cent butane is contained in a cargo tank, at a gauge overpressure of 9 bar (gauge). What is the partial pressure of the butane? A 2.7 bar (absolute) B 3.0 bar (absolute) C 6.3 bar (absolute) D 7.0 bar (absolute)	
231 02.1-06	deleted	
231 02.1-07	$p_{tot} = \sum p_i$ and Vol.-% $= p_i \times 100 / p_{tot}$	B
	A gas mixture composed of propane and butane is contained in a cargo tank, at an overpressure of 9 bar (gauge). The partial pressure of the propane is 7.0 bar (absolute). What is the volume per cent of the butane? A 20 volume per cent B 30 volume per cent C 40 volume per cent D 60 volume per cent	
231 02.1-08	$p_{tot} = \sum p_i$ and Vol.-% $= p_i \times 100 / p_{tot}$	C
	A gas mixture composed of propane, butane and isobutane is contained in a cargo tank, at an absolute pressure of 10 bar (absolute). The partial pressures of the butane and isobutane are 2 bar (absolute) and 3 bar (absolute) respectively. What is the volume per cent of the propane? A 30 volume per cent B 40 volume per cent C 50 volume per cent D 60 volume per cent	
231 02.1-09	$p_{tot} = \sum p_i$ and Vol.-% $= p_i \times 100 / p_{tot}$	D
	In a nitrogen/oxygen mixture at an absolute pressure of 20 bar (absolute), the partial pressure of the oxygen is 1 bar (absolute). What is the volume per cent of the nitrogen? A 86 volume per cent B 90 volume per cent C 90.5 volume per cent D 95 volume per cent	

Knowledge of physics and chemistry

Examination objective 2.2: Gases: partial pressures and mixtures
Pressure increase and gas release from cargo tanks

Number	*Source*	*Correct answer*
231 02.2-01	$p_{tot} = \sum p_i$ and Vol.-% $= p_i \times 100 / p_{tot}$ and $p * V$ = constant	B
	A cargo tank contains a gas mixture composed of 80 volume per cent propane and 20 volume per cent butane at an absolute pressure of 5 bar (absolute). After pressure relief of cargo tanks (gauge pressure = 0), the absolute pressure in the tank is increased to 4 bar (absolute). What is the volume per cent of the propane now? A 16 volume per cent B 20 volume per cent C 25 volume per cent D 32 volume per cent	
231 02.2-02	$p_{tot} = \sum p_i$ and Vol.-% $= p_i \times 100 / p_{tot}$ and $p * V$ = constant	D
	A cargo tank with a volume of 300 m^3 contains isobutane at an overpressure of 0.5 bar (gauge). 900 m^3 of propane is then also compressed into the tank. What is the volume per cent of the isobutane now? A 11.1 volume per cent B 14.3 volume per cent C 20.0 volume per cent D 33.3 volume per cent	
231 02.2-03	$p_{tot} = \sum p_i$ and Vol.-% $= p_i \times 100 / p_{tot}$ and $p * V$ = constant	B
	A cargo tank with a volume of 100 m^3 contains a gas mixture composed of 50 volume per cent propane and 50 volume per cent propylene, at an overpressure of 5 bar (gauge). At constant pressure, 600 m^3 of nitrogen is then also compressed into the tank at an absolute pressure of 1 bar (absolute). What is the volume per cent of the propane now? A 23 volume per cent B 25 volume per cent C 27 volume per cent D 30 volume per cent	

Number	*Source*	*Correct answer*
231 02.2-04	$p_{tot} = \sum p_i$ and Vol.-% = p_i x 100/ p_{tot} and $p * V$ = constant	D
	In a cargo tank filled with air (20 volume per cent oxygen), the gauge pressure of 0.20 bar is increased, using nitrogen, to a gauge pressure of 5.0 bar. What is the partial pressure of the oxygen in the cargo tank? A 0.001 bar (absolute) B 0.040 bar (absolute) C 0.048 bar (absolute) D 0.240 bar (absolute)	
231 02.2-05	$p_{tot} = \sum p_i$ and Vol.-% = p_i x 100/ p_{tot} and $p * V$ = constant	A
	In a cargo tank filled with nitrogen there is low absolute pressure of 0.5 bar (absolute). An orifice is opened, and outside air containing 20 per cent oxygen enters. What is the partial pressure of the oxygen in the cargo tank? A 0.1 bar (absolute) B 0.2 bar (absolute) C 0.4 bar (absolute) D 1.0 bar (absolute)	
231 02.2-06	$p_{tot} = \sum p_i$ and Vol.-% = p_i x 100/ p_{tot} and $p * V$ = constant	C
	A cargo tank contains propane at an overpressure of 0.5 bar (gauge). Using nitrogen, the pressure in the cargo tank is increased to 5 bar (gauge). What is the volume per cent of the propane? A 8 volume per cent B 10 volume per cent C 25 volume per cent D 30 volume per cent	
231 02.2-07	$p_{tot} = \sum p_i$ and Vol.-% = p_i x 100/ p_{tot} and $p * V$ = constant	C
	A cargo tank with a volume of 100 m^3 contains propane at an overpressure of 0.5 bar (gauge). Using 450 m^3 of nitrogen, pressure is increased to an overpressure of 1 bar (gauge). What is the volume per cent of the propane? A 8 volume per cent B 10 volume per cent C 25 volume per cent D 30 volume per cent	

Knowledge of physics and chemistry

Examination objective 3.1: Avogadro's number and calculation of masses of ideal gas kmol, kg and pressure at 15 °C

Number	*Source*	*Correct answer*
231 03.1-01	1 kmol ideal gas = M kg = 24 m^3 at 1 bar and 15 °C	B
	A cargo tank has a volume of 72 m^3. The tank contains 12 kmol of an ideal gas at a temperature of 15 °C. What is the pressure? A 3 bar (absolute) B 4 bar (absolute) C 5 bar (absolute) D 6 bar (absolute)	
231 03.1-02	1 kmol ideal gas = M kg = 24 m^3 at 1 bar and 15 °C	A
	A cargo tank has a volume of 120 m^3. The tank contains 10 kmol of an ideal gas at a temperature of 15 °C. What is the pressure? A 2 bar (absolute) B 4 bar (absolute) C 5 bar (absolute) D 12 bar (absolute)	
231 03.1-03	1 kmol ideal gas = M kg = 24 m^3 at 1 bar and 15 °C	B
	A cargo tank has a volume of 120 m^3. The tank contains a certain quantity of an ideal gas at a temperature of 15 °C and at an absolute pressure of 3 bar (absolute). What is the quantity of gas? A 5 kmol B 15 kmol C 20 kmol D 30 kmol	
231 03.1-04	1 kmol ideal gas = M kg = 24 m^3 at 1 bar and 15 °C	A
	In a cargo tank, there is a leakage of 120 m^3 of gas UN No. 1978 PROPANE (M=44) at a pressure of 1 bar and at a temperature of 15 °C. How many kg of propane gas leak into the atmosphere? A 220 kg B 440 kg C 2,880 kg D 5,280 kg	

Number	*Source*	*Correct answer*
231 03.1-05	1 kmol ideal gas = M kg = 24 m^3 at 1 bar and 15 °C	B
	A cargo tank has a volume of 240 m^3. How much gas UN No. 1969 ISOBUTANE (M=58) is there in the cargo tank when the temperature is 15 °C and the absolute pressure is 2 bar (absolute)? A 580 kg B 1,160 kg C 1,740 kg D 4,640 kg	
231 03.1-06	1 kmol ideal gas = M kg = 24 m^3 at 1 bar and 15 °C	C
	A cargo tank has a volume of 240 m^3. How much gas UN No. 1978 PROPANE (M=42) is there in the cargo tank when the temperature is 15 °C and the absolute pressure is 3 bar (absolute)? A 210 kg B 420 kg C 630 kg D 840 kg	
231 03.1-07	1 kmol ideal gas = M kg = 24 m^3 at 1 bar and 15 °C	B
	A cargo tank has a volume of 120 m^3. The tank contains 440 kg of gas UN No 1978 PROPANE (M=44) at a temperature of 15 °C. What is the pressure? A 1 bar (absolute) B 2 bar (absolute) C 11 bar (absolute) D 12 bar (absolute)	
231 03.1-08	1 kmol ideal gas = M kg = 24 m^3 at 1 bar and 15 °C	D
	A cargo tank with a volume of 100 m3 contains 30 kmol of gas UN No. 1978 PROPANE at a temperature of 15 °C. What is the maximum quantity (m^3) of propane gas at an absolute pressure of 1 bar (absolute) that could leak? A 180 m^3 B 380 m^3 C 420 m^3 D 620 m^3	

Number	*Source*	*Correct answer*
231 03.1-09	1 kmol ideal gas = M kg = 24 m^3 at 1 bar and 15 °C	C
	A cargo tank contains 10 kmol of an ideal gas at a temperature of 15 °C and an absolute pressure of 5 bar (absolute). What is the volume of the cargo tank? A 12 m^3 B 40 m^3 C 48 m^3 D 60 m^3	
231 03.1-10	1 kmol ideal gas = M kg = 24 m^3 at 1 bar and 15 °C	C
	A cargo tank has a volume of 288 m^3. The tank contains an ideal gas at an absolute pressure of 4 bar (absolute). What is the quantity of gas in the cargo tank? A 24 kmol B 36 kmol C 48 kmol D 60 kmol	

Knowledge of physics and chemistry

Examination objective 3.2: Avogadro's number and calculation of masses of ideal gas Application of the mass formula

Number	*Source*	*Correct answer*
231 03.2-01	$m = 12 * p * M * V / T$	B
	A cargo tank has a volume of 200 m^3. What quantity (kg) of UN No. 1005 AMMONIA, ANHYDROUS (M=17) is in the tank when the temperature is 40 °C and the absolute pressure is 3 bar (absolute)? A 261 kg B 391 kg C 2,040 kg D 3,060 kg	
231 03.2-02	$m = 12 * p * M * V / T$	A
	A cargo tank has a volume of 100 m^3. What quantity (kg) of UN No. 1010 BUTADIENES-1-2, STABILIZED (M=54) is in the tank when the temperature is 30 °C and the absolute pressure is 2 bar (bar absolute)? A 428 kg B 642 kg C 4,320 kg D 6,480 kg	
231 03.2-03	$m = 12 * p * M * V / T$	B
	A cargo tank has a volume of 100 m^3. What quantity (kg) of UN 1978 PROPANE (M=44) is in the tank when the temperature is 20° C and the absolute pressure is 3 bar (absolute)? A 360 kg B 541 kg C 5,280 kg D 7,920 kg	
231 03.2-04	$m = 12 * p * M * V / T$	C
	A cargo tank has a volume of 200 m^3. What quantity (kg) of UN 1077 PROPYLENE (M=42) is in the tank when the temperature is -5 °C and the absolute pressure is 2 bar (absolute)? A 376 kg B 725 kg C 752 kg D 1,128 kg	

Number	*Source*	*Correct answer*
231 03.2-05	$m = 12 * p * M * V / T$	A
	A cargo tank has a volume of 200 m^3. What quantity (kg) of UN 1969 ISOBUTANE (M=56) is in the tank when the temperature is 40 °C and the absolute pressure is 4 bar (absolute)? A 1,718 kg B 2,147 kg C 10,080 kg D 12,600 kg	
231 03.2-06	$m = 12 * p * M * V / T$ or $p = m * T / (12 * M * V)$	D
	A cargo tank has a volume of 300 m^3. The tank contains 2,640 kg of gas UN No. 1978 PROPANE (M=44) at a temperature of 7 °C. What is the pressure in the cargo tank? A 0.1 bar (absolute) B 1.1 bar (absolute) C 3.0 bar (absolute) D 4.0 bar (absolute)	
231 03.2-07	$m = 12 * p * M * V / T$ or $p = m * T / (12 * M * V)$	D
	A cargo tank has a volume of 100 m^3. The tank contains 1,176 kg of gas UN No. 1077 PROPYLENE (M=42) at a temperature of 27 °C. What is the pressure in the cargo tank? A 0.6 bar (absolute) B 1.9 bar (absolute) C 6.0 bar (absolute) D 7.0 bar (absolute)	
231 03.2-08	$m = 12 * p * M * V / T$ or $p = m * T / (12 * M * V)$	C
	A cargo tank has a volume of 450 m^3. The tank contains 1,700 kg of gas UN No. 1005 AMMONIA (M=17) at a temperature of 27 °C. What is the pressure in the cargo tank? A 0.5 bar (absolute) B 1.5 bar (absolute) C 5.6 bar (absolute) D 6.6 bar (bar absolute)	

Number	*Source*	*Correct answer*
231 03.2-09	$m = 12 * p * M * V / T$ or $p = m * T / (12 * M * V)$	D
	A cargo tank has a volume of 250 m^3. The tank contains 1,160 kg of gas UN No. 1011 BUTANE (M=58) at a temperature of 27 °C. What is the pressure in the cargo tank? A 0.2 bar (absolute) B 1.0 bar (absolute) C 1.2 bar (absolute) D 2.0 bar (absolute)	
231 03.2-10	$m = 12 * p * M * V / T$ or $p = m * T / (12 * M * V)$	D
	A cargo tank has a volume of 200 m^3. The tank contains 2,000 kg of gas UN No. 1068 VINYL CHLORIDE (M=62.5) at a temperature of 27 °C. What is the pressure in the cargo tank? A 0.4 bar (absolute) B 1.4 bar (absolute) C 3.0 bar (absolute) D 4.0 bar (absolute)	

Knowledge of physics and chemistry

Examination objective 4.1: Density and volume of liquids
Density and volume under changes in temperature

Number	*Source*	*Correct answer*
231 04.1-01	$m = \rho_{t1} . V_{t1} = \rho_{t2} . V_{t2}$ (with tables)	C
	A cargo tank contains 100 m^3 of UN No. 1978 PROPANE liquefied at a temperature of -5 °C. The contents are brought to a temperature of 20 °C. The substance then takes up what volume (rounded to the nearest m^3)? Use the tables A 91 m^3 B 93 m^3 C 107 m^3 D 109 m^3	
231 04.1-02	$m = \rho_{t1} . V_{t1} = \rho_{t2} . V_{t2}$ (with tables)	B
	A cargo tank contains 100 m^3 of UN No. 1978 PROPANE liquefied at a temperature of 20 °C. The contents are brought to a temperature of -5 °C. The substance then takes up what volume (rounded to the nearest m^3)? Use the tables A 91 m^3 B 93 m^3 C 107 m^3 D 109 m^3	
231 04.1-03	$m = \rho_{t1} . V_{t1} = \rho_{t2} . V_{t2}$ (with tables)	C
	A cargo tank contains 100 m^3 of UN No. 1010 BUTADIENE-1-3, STABILIZED liquefied at a temperature of -10 °C. The contents are brought to a temperature of 20 °C. The substance then takes up what volume (rounded to the nearest m^3)? Use the tables A 90 m^3 B 95 m^3 C 106 m^3 D 111 m^3	

Number	*Source*	*Correct answer*
231 04.1-04	$m = \rho_{t1} . V_{t1} = \rho_{t2} . V_{t2}$ (with tables)	B
	A cargo tank contains 100 m^3 of UN No. 1011 BUTANE liquefied at a temperature of 20 °C. The contents are brought to a temperature of -10 °C. The substance then takes up what volume (rounded to the nearest m^3)? Use the tables A 90 m^3 B 95 m^3 C 106 m^3 D 111 m^3	
231 04.1-05	$m = \rho_{t1} . V_{t1} = \rho_{t2} . V_{t2}$ (with tables)	B
	A quantity of liquefied UN No. 1010 BUTADIENE-1-3, STABILIZED takes up a volume of 100 m^3 at a temperature of 25 °C. What volume does the substance take up at a temperature of 5° C (rounded to the nearest m^3)? Use the tables A 93 m^3 B 96 m^3 C 104 m^3 D 107 m^3	
231 04.1-06	$m = \rho_{t1} . V_{t1} = \rho_{t2} . V_{t2}$ (with tables)	C
	A quantity of liquefied UN No. 1010 BUTADIENE-1-3, STABILIZED takes up a volume of 100 m^3 at a temperature of 5 °C. What volume does the substance take up at a temperature of 25 °C (rounded to the nearest m^3)? Use the tables A 93 m^3 B 96 m^3 C 104 m^3 D 107 m^3	
231 04.1-07	$m = \rho_{t1} . V_{t1} = \rho_{t2} . V_{t2}$ (with tables)	C
	A quantity of liquefied UN No. 1969 ISOBUTANE takes up a volume of 100 m^3 at a temperature of -10 °C. What volume does the substance take up at a temperature of 30 °C (rounded to the nearest m^3)? Use the tables A 87 m^3 B 92 m^3 C 109 m^3 D 115 m^3	

Number	*Source*	*Correct answer*
231 04.1-08	$m = \rho_{t1} . V_{t1} = \rho_{t2} . V_{t2}$ (with tables)	B
	A quantity of liquefied UN No. 1969 ISOBUTANE takes up a volume of 100 m^3 at a temperature of 30 °C. What volume does the substance take up at a temperature of -10 °C (rounded to the nearest m^3)? Use the tables A 87 m^3 B 92 m^3 C 108 m^3 D 115 m^3	
231 04.1-09	$m = \rho_{t1} . V_{t1} = \rho_{t2} . V_{t2}$ (with tables)	C
	A quantity of liquefied UN No. 1077 PROPYLENE takes up a volume of 100 m^3 at a temperature of -10 °C. What volume does the substance take up at a temperature of 25 °C (rounded to the nearest m^3)? Use the tables A 88 m^3 B 90 m^3 C 111 m^3 D 113 m^3	
231 04.1-10	$m = \rho_{t1} . V_{t1} = \rho_{t2} . V_{t2}$ (with tables)	B
	A quantity of liquefied UN No. 1077 PROPYLENE takes up a volume of 100 m^3 at a temperature of 25 °C. What volume does the substance take up at a temperature of -10 °C (rounded to the nearest m^3)? Use the tables A 88 m^3 B 90 m^3 C 111 m^3 D 113 m^3	

Knowledge of physics and chemistry

Examination objective 4.2: Density and volume of liquids

Number	*Source*	*Correct answer*
231 04.2-01	Deleted (2011)	
231 04.2-02	Deleted (2011)	
231 04.2-03	Deleted (2011)	
231 04.2-04	Deleted (2011)	
231 04.2-05	Deleted (2011)	
231 04.2-06	Deleted (2011)	
231 04.2-07	Deleted (2011)	
231 04.2-08	Deleted (2011) ~~$VG_{max} = 91 . \rho_{15} / \rho_{temp.\ of\ load}$ (with tables)~~ ~~What is the maximum authorized degree of filling of UN No. 1011 BUTANE at a temperature of 25° C?~~ ~~A 89.4%~~ ~~B 91.0%~~ ~~C 92.8%~~ ~~D 93.1%~~	~~C~~
231 04.2-09	Deleted (2011) ~~$VG_{max} = 91 . \rho_{15} / \rho_{temp.\ of\ load}$ (with tables)~~ ~~What is the maximum authorized degree of filling of UN No. 1005 AMMONIA, ANHYDROUS at a temperature of -10° C?~~ ~~A 86.1%~~ ~~B 87.0%~~ ~~C 87.2%~~ ~~D 87.7%~~	~~A~~
231 04.2-10	Deleted (2011) ~~$VG_{max} = 91 . \rho_{15} / \rho_{temp.\ of\ load}$ (with tables)~~ ~~What is the maximum authorized degree of filling of UN No. 1055 ISOBUTYLENE at a temperature of 10° C?~~ ~~A 89.9%~~ ~~B 90.1%~~ ~~C 90.8%~~ ~~D 91.0%~~	~~B~~

Knowledge of physics and chemistry

Examination objective 5: Critical pressure and temperature

Number	*Source*	*Correct answer*
231 05.0-01	Critical pressure and temperature	A
	PROPANE (UN No. 1978) has a critical temperature of 97 °C, a boiling point of -42 °C and a critical pressure of 42 bar. Which is the only case in which it is possible to liquefy the propane by increasing the pressure? A A temperature under 97 °C B A temperature over -42 °C C A pressure over 42 bar D A pressure greater than atmospheric pressure	
231 05.0-02	Critical pressure and temperature	C
	VINYL CHLORIDE, STABILIZED (UN No. 1086) has a critical pressure of 44 bar, a boiling point of -14 °C and a critical temperature of 158.4 °C. Which of the following is correct: A Vinyl chloride may be transported at ambient temperature in liquid state in pressure tanks B Vinyl chloride can be liquefied only at ambient temperature and a pressure over 44 bar C Vinyl chloride may be transported at atmospheric pressure in the liquid state at the boiling point D Vinyl chloride can be liquefied only at a temperature over 158.4 °C	
231 05.0-03	Critical pressure and temperature	B
	BUTANE (UN No. 1011) has a boiling point of 0 °C, a critical temperature of 153 °C and a critical pressure of 37 bar. Which of the following is correct: A Butane must not be transported in the liquid state at a temperature over 153 °C B Butane may be liquefied by increasing the pressure at a temperature under 153 °C C Butane can be liquefied only at a pressure over 37 bar D Butane cannot be liquefied by refrigeration	
231 05.0-04	Critical pressure and temperature	A
	AMMONIA, ANHYDROUS (UN No. 1005) has a critical temperature of 132 °C, a critical pressure of 115 bar and a boiling point of -33 °C. In which of the following conditions is the only one in which it is possible to liquefy the ammonia? A Increase of pressure at a temperature under 132 °C B Increase of pressure at a temperature over 132 °C C Pressure over 115 bar D Pressure over 1 bar	

Knowledge of physics and chemistry

Examination objective 6.1: Polymerization
Theoretical questions

Number	*Source*	*Correct answer*
231 06.0-01	Polymerization	C
	What is polymerization? A A chemical reaction during which a substance burns in the air, releasing heat B A chemical reaction during which a chemical bond spontaneously decomposes, producing gas C A chemical reaction during which a substance's molecules bind, releasing heat D A chemical reaction during which a substance reacts with water while producing heat	
231 06.0-02	Polymerization	A
	How is polymerization triggered? A By the presence of oxygen or another generator of radicals B By too high pressure C By the presence of water in the substance subject to polymerization D By high-speed pumping of the substance subject to polymerization in the cargo tank	
231 06.0-03	Polymerization	B
	What is a characteristic of spontaneous polymerization? A Formation of vapour B Temperature increase of the liquid C Temperature decrease of the liquid D Falling pressure of the gaseous phase	
231 06.0-04	Polymerization	B
	What is the characteristic hazard of uncontrolled polymerization of a liquid? A Freezing of the level indicator float B Thermal explosion C Cracks forming in the walls of the cargo tank D Depression in the cargo tanks	
231 06.0-05	Polymerization	D
	Spontaneous, uncontrolled polymerization of a liquid in a cargo tank can lead to what? A Deflagration B Detonation C Explosive combustion D Thermal explosion	

Knowledge of physics and chemistry

Examination objective 6.2: Polymerization
Practical questions, conditions of carriage

Number	*Source*	*Correct answer*
231 06.2-01	3.2, Table C	C
	Table C contains "N No. 1010 BUTADIENE-1-3, STABLIZED" What is the meaning of "STABILIZED"? A During transport the product should not be subject to excessive shaking B The product is stable in all circumstances C Measures have been taken to stop polymerization during transport D BUTADIENE-1-3 is a product that involves no risk	
231 06.2-02	Polymerization	C
	When UN No. 1086 VINYL CHLORIDE, STABILIZED is transported, polymerization is always a possibility. How can it be prevented? A By loading slowly B By loading the product in a pressure tank at high temperature C By adding a stabilizer and/or maintaining low oxygen content in the cargo tank D By adding a stabilizer when the oxygen content in the cargo tank is 2.0 % volume	
231 06.2-03	Polymerization	D
	Why is it sometimes necessary to transport a mixture of UN No. 1010 BUTADIENE-1-3, STABILIZED and hydrocarbons with a stabilizer? A Because of the high water content B Because of the high content of isobutane and butylene C Because of the presence of solid matter D Because of the high butadiene content	
231 06.2-04	Polymerization	A
	What is the function of a stabilizer? A Prevent polymerization B Interrupt polymerization by reducing temperature C Exclude the possibility of a deflagration D Exclude the possibility of dilation in a liquid	

Number	*Source*	*Correct answer*
231 06.2-05	3.2, Table C	A
	A substance must be transported with a stabilizer. When can such transport take place? A When there is an entry in the transport document mentioning what stabilizer has been added and at what concentration B When the right stabilizer is on board in a sufficient quantity to be added if necessary during transport C When a sufficient quantity of stabilizer has been added immediately after loading D When the cargo is sufficiently hot to absorb the stabilizer	
231 06.2-06	3.2, Table C	D
	Certain substances must be stabilized. In ADN, the requirements for stabilization appear where? A In part 2, 2.2.2, GAS B In 8.6.3, Checklist AND C In 3.2, Table A and in the explanations for this table D In 3.2, Table C and in the explanations for this table	
231 06.2-07	Polymerization	B
	What is an indication that a substance is in the process of polymerizing? A Decrease in pressure in the cargo tank B Increase in temperature of the liquid C Increase in temperature of the vapour D Decrease in temperature of the liquid	
231 06.2-08	Deleted (2007)	
231 06.2-09	Polymerization	C
	A sufficient concentration of stabilizer is diluted in a liquid prone to polymerization. Is the liquid then stabilized indefinitely? A Yes, as the stabilizer itself is stable B Yes, as there is no oxygen C No, as the stabilizer is always slowly consumed D No, as the stabilizer collects on the walls of the cargo tank and loses its effect	

Knowledge of physics and chemistry

Examination objective 7.1: Evaporation and condensation
Definitions, etc.

Number	*Source*	*Correct answer*
231 07.1-01	Vapour pressure	A
	The vapour pressure of a liquid is dependent on what? A Temperature of the liquid B Atmospheric pressure C Volume of the liquid D External temperature	
231 07.1-02	Vapour pressure	B
	The vapour pressure of a liquid is dependent on what? A Mass of the liquid B Temperature of the liquid C Volume of the receptacle D Vapour/liquid ratio in the receptacle	
231 07.1-03	Vapour pressure	C
	When does vapour condense? A When the vapour pressure is higher than atmospheric pressure B When the vapour pressure is lower than atmospheric pressure C When the vapour pressure is higher than the vapour saturation pressure D When the vapour pressure is lower than the vapour saturation pressure	
231 07.1-04	Vapour pressure	D
	What is a saturated vapour? A A vapour whose temperature is identical to that of the evaporating liquid B A vapour whose pressure is less than the vapour saturation pressure C A vapour whose pressure is higher than the vapour saturation pressure D A vapour whose pressure is equal to the vapour saturation pressure	
231 07.1-05	Vapour pressure	A
	When does a liquid evaporate? A When the vapour pressure is less than the vapour saturation pressure B When the vapour pressure is equal to the vapour saturation pressure C When the vapour pressure is higher than the vapour saturation pressure D When the vapour pressure is higher than atmospheric pressure	

Number	*Source*	*Correct answer*
231 07.1-06	Vapour pressure	B
	A cargo tank has for some time held propane vapour and a small quantity of liquid at the bottom of the tank. Which of the following statements is correct? A The vapour pressure is less than the propane vapour saturation pressure B The vapour pressure is equal to the propane vapour saturation pressure C The vapour pressure is higher than the propane vapour saturation pressure D The vapour pressure is equal to atmospheric pressure	
231 07.1-07	Vapour pressure	C
	Vapour is drawn from a cargo tank containing liquid propane. What happens in the cargo tank once the drawing stops? A The vapour pressure will decrease B The vapour pressure will remain constant C The vapour pressure will increase D The vapour temperature will increase	
231 07.1-08	Vapour pressure	D
	With the use of a compressor, propane vapour from cargo tank No. 3 is injected into cargo tank No. 2, containing liquid propane. What will happen in cargo tank No. 2 once the compressor stops? A The temperature of the liquid will decrease B The vapour pressure will increase C The vapour pressure will remain constant D The vapour pressure will decrease	
231 07.1-09	Vapour pressure	A
	Liquid propane is pumped out of a cargo tank. What will happen in this cargo tank after the pumping stops? A The vapour pressure will increase B The vapour pressure will remain constant C The temperature of the liquid will increase D The temperature of the liquid will remain constant	
231 07.1-10	Vapour pressure	B
	Liquid propane is pumped into a cargo tank containing nitrogen at an absolute pressure of 1 bar (absolute bar). What will happen to the liquid propane in this tank? A The temperature of the propane will increase B The temperature of the propane will decrease C The temperature of the propane will remain constant D The propane will solidify	

Knowledge of physics and chemistry

Examination objective 7.2: Evaporation and condensation
Quantitative saturation at vapour pressure

Number	*Source*	*Correct answer*
231 07.2-01	Deleted (2007)	
231 07.2-02	Deleted (2007)	
231 07.2-03	Increase in temperature in the cargo tank	C
	A cargo tank is filled to 91 % with UN No. 1010 BUTADIENE-1-3, STABILIZED, at a temperature of 15 °C. The pressure gauge indicates a pressure of 3 bar, which is above the vapour saturation pressure. Where does this pressure come from? A A stabilizer B The fact that it takes 48 hours to reach equilibrium C The presence of nitrogen D The fact that the loading took place too slowly	
231 07.2-04	Increase in temperature in the cargo tank	D
	A type G tank vessel is loaded with UN No. 1077 PROPYLENE. A quantity of 1 m^3 of liquid escapes from a pressure tank. How much propane vapour forms? A 12 m^3 B 24 m^3 C 150 m^3 D 300 m^3	
231 07.2-05	Behaviour of pressure in the cargo tank	C
	A cargo tank contains nitrogen at an absolute pressure of 1 bar (absolute bar) at a temperature of 5 °C. Without removing the nitrogen the absolute pressure in the cargo tank is brought to 3 bar (absolute bar) by adding isobutane vapour with the use of a compressor. The compressor is stopped. What happens in the cargo tank? (For information: isobutane's vapour saturation pressure at 5 °C is 1.86 bar (absolute bar)). A The pressure increases in the cargo tank B The pressure remains constant in the cargo tank C The pressure decreases in the cargo tank and liquid forms D Both the isobutane vapour and the nitrogen vapour condense	

Number	*Source*	*Correct answer*
231 07.2-06	Behaviour of pressure in the cargo tank	D
	A cargo tank contains nitrogen at an absolute pressure of 1 bar (absolute bar) and at a temperature of 20 °C. Without vapour return, the cargo tank is filled to 80 % with UN No. 1969 ISOBUTANE at 20°C. What happens with the pressure in the cargo tank? (For information: isobutane's vapour saturation pressure at 20 °C is 3.0 bar (absolute bar)) A The pressure in the cargo tank is then 5 bar (absolute bar) B The pressure in the cargo tank is then under 5 bar (absolute bar) C The pressure in the cargo tank is then 3 bar (absolute bar) because all the nitrogen dissolves in the liquid D The pressure in the cargo tank is then over 5 bar (absolute bar)	
231 07.2-07	Deleted (2007)	
231 07.2-08	Vapour saturation pressure	B
	A cargo tank contains propane vapour at an absolute pressure of 5.5 bar (absolute bar) and at a temperature of 20 °C. What temperature must the tank be brought to in order to avoid condensation? (For information: propane's vapour saturation pressure at 20 °C is 5.5 bar (absolute bar)) A -80 °C B 5 °C C 12 °C D 13 °C	
231 07.2-09	Liquefying of gas	A
	At 1 bar (absolute bar), 9,000 m^3 of vinyl chloride vapour is liquefied by compression at ambient temperature. Approximately how much liquid (in m3) will result? A. 25 m^3 B 375 m^3 C 1 000 m^3 D 3 000 m^3	

Knowledge of physics and chemistry

Examination objective 8.1: Mixtures
Vapour pressure and composition

Number	*Source*	*Correct answer*
231 08.1-01	Saturation vapour pressure, depending on composition	B
	Which of the following statements relating to the vapour pressure of a propane/butane mixture is correct? A The vapour pressure of the mixture is less than that of butane B The vapour pressure of the mixture is greater than that of butane C The vapour pressure of the mixture is equal to that of butane D The vapour pressure of the mixture is greater that that of propane	
231 08.1-02	Saturation vapour pressure, depending on composition	C
	Which of the following statements relating to the vapour pressure of a 60 % propylene and 40 % propane mixture is correct? A The vapour pressure of the mixture is greater than that of propylene B The vapour pressure of the mixture is equal to that of propylene C The vapour pressure of the mixture is less than that of propylene D The vapour pressure of the mixture is equal to that of propane	
231 08.1-03	Saturation vapour pressure, depending on composition	A
	A propylene mixture contains 7 % propane. Which of the following statements relating to the vapour pressure of this mixture is correct? A The vapour pressure of the mixture is less than that of propylene B The vapour pressure of the mixture is equal to that of propylene C The vapour pressure of the mixture is greater than that of propylene D The vapour pressure of the mixture is less than that of propane	

Number	*Source*	*Correct answer*
231 08.1-04	Deleted (2007)	
231 08.1-05	Deleted (2007)	
231 08.1-06	Deleted (2007)	

Knowledge of physics and chemistry

Examination objective 8.2: Mixtures
Hazard characteristics

Number	*Source*	*Correct answer*
231 08.2-01	Health risks	C
	Which of the following substances is comparable to a mixture of liquefied propane and butane gas from the point of view of health hazards? A UN No. 1005 AMMONIA, ANHYDROUS B UN No. 1010 BUTADIENE-1-3, STABILIZED C UN No. 1879 PROPANE D UN No. 1086 VINYL CHLORIDE, STABILIZED	
231 08.2-02	Health risks	B
	During transport of a mixture of liquefied gases composed of propane and butane, the same safety requirements must be followed as during transport of another gas. Which gas? A UN No. 1010 BUTADIENE-1-3, STABILIZED B UN No. 1969 ISOBUTANE C UN No. 1280 PROPYLENE OXIDE D UN No. 1086 VINYL CHOLORIDE, STABILIZED	
231 08.2-03	Health risks	B
	Which of the following substances is comparable to UN No. 1965 HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A) from the point of view of health hazards? A UN No. 1010 BUTADIENE-1-3, STABILIZED B UN No. 1969 ISOBUTANE C UN No. 1280 PROPYLENE OXIDE D UN No. 1086 VINYL CHOLORIDE, STABILIZED	
231 08.2-04	Health risks	C
	During transport of MIXTURE A (UN No. 1965) the same safety requirements must be followed as during transport of another gas. Which gas? A UN No. 1005 AMMONIA, ANHYDROUS B UN No. 1010 BUTADIENE-1-3, STABILIZED C UN No. 1969 ISOBUTANE D UN No. 1280 PROPYLENE OXIDE	
231 08.2-05	Health risks	A
	What hazard is characteristic of a mixture of liquefied gases composed of propane and butane? A Flammability B Toxicity C Polymerization D No danger	

Number	*Source*	*Correct answer*
231 08.2-06	Hazard characteristics	C
	What hazard is characteristic of UN No. 1965 HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S.? A No danger B Toxicity C Flammability D Polymerization	
231 08.2-07	Hazard characteristics	C
	What hazard is characteristic of a mixture of BUTANE and BUTYLENE (UN No. 1965)? A No danger B Toxicity C Flammability D Polymerization	
231 08.2-08	Hazard characteristics	C
	What hazard is characteristic of UN No. 1063 METHYL CHLORIDE? A No danger B Toxicity C Flammability D Polymerization	

Knowledge of physics and chemistry

Examination objective 9: Chemical bonds and formulae

Number	*Source*	*Correct answer*
231 09.0-01	Polymerization	A
	Which of the following substances has a risk of polymerization? A UN No. 1010 BUTADIENE-1-3, STABILIZED B UN No. 1012 BUTYLENE-1 C UN No. 1012 BUTYLENE-2 D UN No. 1969 ISOBUTANE	
231 09.0-02	Molecular mass	D
	What is the molecular mass of a substance with the formula: CH2=CCl2? (The atomic mass of carbon is 12. The atomic mass of hydrogen is 1. The atomic mass of chlorine is 35.5.) A 58 B 59 C 62.5 D 97	
231 09.0-03	Molecular mass	C
	What is the molecular mass of a substance with the formula: CH3-CO-CH3? (The atomic mass of carbon is 12. The atomic mass of hydrogen is 1. The atomic mass of oxygen is 16.) A 54 B 56 C 58 D 60	
231 09.0-04	Molecular mass	B
	What is the molecular mass of a substance with the formula: CH3Cl? (The atomic mass of carbon is 12. The atomic mass of hydrogen is 1. The atomic mass of chlorine is 35.5.) A 28.0 B 50.5 C 52.5 D 54.5	

Number	*Source*	*Correct answer*
231 09.0-05	Molecular mass	A
	What is the molecular mass of a substance with the formula: CH2=C(CH3)-CH=CH2? (The atomic mass of carbon is 12. The atomic mass of hydrogen is 1.) A 68 B 71 C 88 D 91	
231 09.0-06	Deleted (2007)	
231 09.0-07	Deleted -(2007)	
231 09.0-08	Molecular mass	A
	What is the molecular mass of a substance with the formula: CH3-CH(CH3)-CH3? (The atomic mass of carbon is 12. The atomic mass of hydrogen is 1.) A 58 B 66 C 68 D 74	

Practice

Examination objective 1.1: Flushing

Flushing in the event of a change of cargo

Number	*Source*	*Correct answer*
232 01.1-01	Flushing in the event of a change of cargo	C
	The cargo tanks of a vessel contain propylene vapour at an overpressure of 0.2 bar (gauge) with no liquid. The vessel is to be loaded with propane. How would you begin the loading? A By flushing the cargo tanks with nitrogen until the propylene content is less than 10 % volume B By flushing the cargo tanks with propane vapour until the propylene content is less than 10 % volume C In such a way as to prevent extremely low temperatures from being reached D Very slowly to avoid low temperatures	
232 01.1-02	Flushing in the event of a change of cargo	C
	The cargo tanks of a vessel contain propylene vapour at an overpressure of 0.2 bar (gauge) with no liquid. The vessel is to be loaded with a mixture of propylene and propane. How would you begin the loading? A By flushing the cargo tanks with nitrogen until the propylene content is less than 10 % volume B By flushing the cargo tanks with vapour from the mixture until the propylene content is less than 10 % volume C In such a way as to prevent extremely low temperatures from being reached D Very slowly to avoid low temperatures	
232 01.1-03	Flushing in the event of a change of cargo	A
	The cargo tanks of a vessel contain butane vapour at an overpressure of 0.2 bar (gauge) with no liquid. The vessel is to be loaded with UN No. 1010 1,3-BUTADIENE, STABILIZED. How would you begin the loading? A By flushing the cargo tanks with nitrogen until the butane content corresponds to the filler's instructions B By flushing the cargo tanks with butadiene vapour until the butane content corresponds to the filler's instructions C By filling a cargo tank with butadiene until an overpressure of approximately 2 bar (gauge) is obtained in the tank D By directly loading the cargo tanks with liquid butadiene	

Number	*Source*	*Correct answer*
232 01.1-04	Flushing in the event of a change of cargo	A
	The cargo tanks of a vessel contain butane vapour at an overpressure of 0.2 bar (gauge) with no liquid. The vessel is to be loaded with UN No. 1086 VINYL CHLORIDE, STABILIZED. How would you begin the loading? A By deep cleaning the cargo tanks B By flushing the cargo tanks with vinyl chloride vapour until the butane content is 0 % volume (no longer detectable) C By filling a cargo tank with vinyl chloride until an overpressure of approximately 3 bar (gauge) is obtained in the tank D By directly loading the cargo tanks with vinyl chloride liquid	
232 01.1-05	Flushing in the event of a change of cargo	D
	The cargo tanks of a vessel contain propane vapour at an overpressure of 0.2 bar (gauge) with no liquid. The vessel is to be loaded with butane. How would you begin the loading? A By flushing the cargo tanks with nitrogen until the propane content is less than 10 % volume B By flushing the cargo tanks with butane vapour until the propane content is less than 10 % volume C By filling one cargo tank with butane vapour until an overpressure of approximately 2 bar (gauge) is obtained in the tank D By directly loading the cargo tanks with liquid butane	

Practice

Examination objective 1.2: Flushing
Addition of air to the cargo

Number	*Source*	*Correct answer*
232 01.2-01	Addition of air to the cargo	D
	A vessel is to be loaded with UN No. 1978 PROPANE. The cargo tanks contain air. How would you begin the loading? A By directly filling the cargo tanks with propane vapour B By removing air from the cargo tanks by means of propane vapour C By reducing the oxygen content in the cargo tank to 16 % volume by flushing with nitrogen D By reducing the oxygen content in the cargo tank to the level corresponding to the filler's instructions by flushing with nitrogen	
232 01.2-02	Addition of air to the cargo	C
	A vessel is to be loaded with UN No. 1077 PROPYLENE. The cargo tanks contain air. How would you begin the loading? A By directly filling the cargo tanks with propylene vapour B By removing air from the cargo tanks by means of propylene vapour C By reducing the oxygen content in the cargo tank to the level corresponding to the filler's instructions by flushing with nitrogen D By reducing the oxygen content in the cargo tank to 16 % volume by flushing with nitrogen	
232 01.2-03	Addition of air to the cargo	B
	A vessel has just left the shipyard. The cargo tanks have been open. The valves are closed. The vessel is to be loaded with UN No. 1011 BUTANE. How would you begin the loading? A By flushing the cargo tanks with nitrogen until the condensation point is below the required value B By flushing the cargo tanks with nitrogen until the oxygen content in the cargo tanks has been reduced to the value required by the filler C By flushing the cargo tanks with nitrogen until the oxygen content in the cargo tanks has been reduced to 16 % volume D By directly introducing butane vapour into the cargo tanks	

Number	*Source*	*Correct answer*
232 01.2-04	Addition of air to the cargo	B
	A vessel has just left the shipyard. The cargo tanks have been open. The valves are closed. The vessel is to be loaded with UN No. 1077 PROPYLENE. How would you begin the loading? A By directly loading the cargo tanks with propylene B By flushing the cargo tanks with nitrogen until the oxygen content in the cargo tanks has been reduced to the value required by the filler C By flushing the cargo tanks with nitrogen until the oxygen content in the cargo tanks has been reduced to 16 % volume D By directly introducing propylene vapour into the cargo tanks	
232 01.2-05	Addition of air to the cargo	C
	A vessel is to be loaded with UN No. 1969 ISOBUTANE. The cargo tanks contain completely dry air at an overpressure of 0.1 bar (gauge). How would you begin the loading? A By introducing isobutane into the cargo tanks until the overpressure reaches 2 bar (gauge) B By removing air from the cargo tanks by means of longitudinal flushing with isobutane vapour C By flushing the cargo tanks with nitrogen until the oxygen content in the cargo tanks has been reduced to the value required by the filler D By flushing the cargo tanks with nitrogen until the oxygen content in the cargo tanks has been reduced to 16 % volume	

Practice

Examination objective 1.3: Flushing

Methods for flushing (degassing) before entering cargo tanks

Number	*Source*	*Correct answer*
232 01.3-01	Methods for flushing (degassing)	D
	A cargo tank contains propane vapour, with no liquid, and the cargo tank is not under pressure. Which of the following methods for flushing under pressure results in the lowest final concentration? A Setting the overpressure to 7 bar (gauge) once, then releasing the pressure B Setting the overpressure to 3 bar (gauge) twice, then releasing the pressure C Setting the overpressure to 2 bar (gauge) three times, then releasing the pressure D Setting the overpressure to 1 bar (gauge) five times, then releasing the pressure	
232 01.3-02	Methods for flushing (degassing)	D
	A cargo tank contains propane vapour, with no liquid, and the cargo tank is not under pressure. You wish to obtain a propane concentration of less than 0.5 % volume. Which of the following methods for flushing uses the least nitrogen? A Setting the overpressure to 5 bar (gauge) three times, then releasing the pressure B Setting the overpressure to 3 bar (gauge) four times, then releasing the pressure C Setting the overpressure to 2 bar (gauge) five times, then releasing the pressure D Setting the overpressure to 1 bar (gauge) eight times, then releasing the pressure	
232 01.3-03	Methods for flushing (degassing)	C
	What is meant by longitudinal flushing? A Raising the pressure in a cargo tank, then releasing the pressure B Simultaneously raising the pressure in several cargo tanks with nitrogen C Continually adding nitrogen to the cargo tank(s) and simultaneously releasing the overpressure D Simultaneously raising the pressure with nitrogen in the port and starboard cargo tanks	

Number	*Source*	*Correct answer*
232 01.3-04	Methods for flushing (degassing)	A
	What is meant by flushing under pressure? A A repeated raising of pressure in one or more cargo tanks with nitrogen, followed by a release of pressure B An uninterrupted flow of nitrogen through several cargo tanks in a line C An interrupted flow of nitrogen through a cargo tank D An interrupted flow of nitrogen at high pressure through one or more cargo tanks	
232 01.3-05	Flushing (degassing) at the same time as repairs	B
	A vessel has just transported propane and has to go to the yard for repairs to the cargo tanks. With what do the cargo tanks have to be flushed? A With nitrogen only B First with nitrogen and then with air C With air only D No flushing is necessary	
232 01.3-06	Flushing (degassing) in connection with repair work	C
	A vessel has previously carried propane and is headed for the shipyard for soldering work on its cargo tanks. With what must the cargo tanks and piping be flushed? A No flushing is required B First with air and then with nitrogen C First with nitrogen and then with air D Only with nitrogen	
232 01.3-07	Flushing (degassing) in connection with entry into the cargo tanks	B
	A vessel has carried butane. The cargo tanks are to be entered. How should the cargo tanks be flushed? A With nitrogen until the concentration of butane is no more than 1 % volume B First with nitrogen, then with air until there is no longer any oxygen deficiency C First with nitrogen, then with air, until the oxygen content reaches 6 % volume D Directly with air until the oxygen content reaches 21 % volume	

Number	*Source*	*Correct answer*
232 01.3-08	Longitudinal flushing	C
	Why is longitudinal flushing the most efficient method for flushing cargo tanks? A Because with a relatively weak flow of nitrogen, the heavier gas of the chemical to be vented is completely flushed out by the nitrogen and only a volume of nitrogen equal to the volume of the tank is thus used B Because with a relatively large flow of nitrogen, the gas and the nitrogen are completely mixed so that a considerable quantity of nitrogen is used, but the task is quickly done C Because the substituting of the gas with nitrogen in the initial stage and the mixing of the two gases in the final stage means less nitrogen is used than when flushing under pressure D Because it allows for advance calculation of the final concentration in the cargo tank of the gas to be vented, after a specific time period	
232 01.3-09	Deleted (2007)	

Practice

Examination objective 2: Sampling

Number	*Source*	*Correct answer*
232 02.0-05	Deleted (2010)	
232 02.0-02	Deleted (2010)	
232 02.0-03	Flushing/rinsing of test tubes	D
	What should be done with a test tube before a representative sample of liquid may be taken? A The test tube should be rinsed with water B The test tube should be flushed with dry air C The test tube should be flushed 10 times with gas then plunged into water D The test tube should be rinsed with the liquid to be sampled	
232 02.0-04	Flushing/rinsing of test tubes	A
	What should be done with a test tube before a representative sample may be taken of the gaseous phase? A The test tube should be flushed with the gas to be sampled B The test tube should first be filled with the liquid form of the chemical C The test tube should be rinsed with a liquid D The test tube should be rinsed with water	
232 02.0-05	Sampling during longitudinal flushing	~~A~~C
	A tank vessel was previously loaded with UN No. 1011 BUTANE. The cargo tanks are empty and have not been cleaned. They are flushed using the longitudinal flushing method. Where is the highest concentration of butane measured during the flushing? A High up in the cargo tank B Halfway up the cargo tank C At the bottom of the cargo tank D In the gas piping	
232 02.0-06	Deleted (2007)	
232 02.0-07	Storage of samples in test tubes	A
	Where should a test tube used to sample a liquid be stored? A In a protected location above deck in the cargo area B In a cool location outside the cargo area C In a cofferdam D In the wheelhouse	

Number	*Source*	*Correct answer*
232 02.0-08	Flushing of the cargo tanks	C
	Why is the gas concentration periodically measured while the cargo tanks are being flushed with nitrogen? A In order to determine whether the shore facility is effectively supplying nitrogen B In order to determine the oxygen content of the nitrogen C In order to monitor the progression of the flushing D In order to determine at what point the mixture of gases should be burnt off	
232 02.0-09	Deleted (2007)	
232 02.0-10	Taking of samples	B
	After loading with UN No. 1077 PROPYLENE, a sample of liquid is taken at 50 % of the fill height. Why? A For no reason B In order to assess the quality of the cargo C In order to measure the temperature of the liquid D In order to determine whether the shore facility has in fact delivered propane	

Practice

Examination objective 3: Dangers of explosion

Number	*Source*	*Correct answer*
232 03.0-01	Definition of explosive limit	A
	The concentration of gases in a mixture composed of flammable gas and air is below the lower explosive limit. What are the properties of this mixture? A It cannot ignite B It can burn, but not explode C It can explode but not burn D It can burn or explode	
232 03.0-02	Definition of explosive limit	C
	The concentration of gases in a mixture composed of flammable gas and air is higher than the upper explosive limit. What are the properties of this mixture? A It cannot burn B It cannot dissipate C With the addition of air it can form an explosive mixture D It can explode	
232 03.0-03	Definition of explosive limit	
	A mixture of gases is composed of 6 volume per cent propane, 4 volume per cent oxygen and 90 volume per cent nitrogen. How explosive is this mixture considered to be? A Unsafe, since the concentration of propane is above the lower explosive limit B Unsafe, since the concentration of propane is higher than the upper explosive limit C Safe, since the concentration of propane is below the lower explosive limit D Safe, since the concentration of oxygen is too weak to ignite the mixture	D
232 03.0-04	Definition of explosive limit	D
	A cargo tank contains 20 volume per cent air and 80 volume per cent nitrogen. What forms in the cargo tank when it is loaded with isobutane? A A flammable mixture which could explode B An explosive mixture, since the oxygen content is sufficiently high C An explosive mixture D A mixture that is not explosive	

Number	*Source*	*Correct answer*
232 03.0-05	Definition of explosive limit	A
	A mixture of gases is composed of 10 volume per cent propylene, 18 volume per cent oxygen and 72 volume per cent nitrogen. How explosive is this mixture considered to be? A Unsafe, since the concentration of propylene is within the explosive range and the concentration of oxygen is sufficiently high B Unsafe, since the concentration of propylene is above the upper explosive limit C Safe, since the concentration of oxygen is less than 21 volume per cent D Safe, since the concentration of propylene is below the lower explosive limit	
232 03.0-06	Critical dilution rate	B
	A cargo tank contains a mixture of gases composed of 5 volume per cent propane, 5 volume per cent oxygen and 90 volume per cent nitrogen. Should this cargo tank be flushed with air? A No, since the concentration of propane is within the explosive range B No, since the concentration of oxygen will increase and the mixture will become explosive C Yes, since the oxygen content in the cargo tank is less than 10 volume per cent D Yes, since there is sufficient nitrogen in the cargo tank	
232 03.0-07	Critical dilution rate	C
	A cargo tank contains a mixture of gases composed of less than 2 volume per cent butane, 3 volume per cent oxygen and more than 95 volume per cent nitrogen. Should this cargo tank be flushed with air? A No, since the concentration of butane is within the explosive range B No, since, when diluted with air, the concentration of oxygen will increase and the mixture will become explosive C Yes, since the concentrations of butane and oxygen are so low that if diluted with air, a non-explosive mixture is formed D Yes, since the concentration of butane is below the lower explosive limit	

Number	*Source*	*Correct answer*
232 03.0-08	Risk of explosion	B
	Propane gas is under pressure in a closed system. The propane escapes through a small leak to the outside. What will happen to the propane gas? A It will spontaneously combust B It will mix with the air and form an explosive mixture C Being a heavy gas, a high concentration will remain near the source D It will not mix with the air but will rise unmixed	
232 03.0-09	Explosive limit and static electricity	D
	An area contains air with 5 volume per cent propane gas. A spark occurs as a result of a discharge of static electricity. Will the spark cause the propane/air mixture to ignite? A No, since the ignition energy of the spark is too weak B No, since the concentration of propane is too low C No, since the concentration of propane is too high D Yes, since the ignition energy of the spark is sufficient and the concentration of propane is within the explosive range	

Practice

Examination objective 4: Health risks

Number	*Source*	*Correct answer*
232 04.0-01	Imminent hazards	A
	Which of the following substances is toxic and corrosive and poses an imminent inhalation hazard? A UN No. 1005 AMMONIA, ANHYDROUS B UN No. 1010 1,2-BUTADIENE, STABILIZED C UN No. 1969 ISOBUTANE D UN No. 1978 PROPANE	
232 04.0-02	Delayed effect	B
	Which of the following substances is carcinogenic? A UN No. 1005 AMMONIA, ANHYDROUS B UN No. 1010 1,2-BUTADIENE, STABILIZED C UN No. 1962 ETHYLENE D UN No. 1969 ISOBUTANE	
232 04.0-03	Anaesthetizing effect	D
	Which of the following gases has an immediate effect via inhalation on the central nervous system and an anaesthetizing effect with prolonged exposure or at a high concentration? A UN No. 1011 BUTANE B UN No. 1969 ISOBUTANE C UN No. 1077 PROPYLENE D UN No. 1086 VINYL CHLORIDE, STABILIZED	
232 04.0-04	Definition of the maximum workplace concentration	C
	What is meant by the maximum workplace concentration of a substance? A The maximum acceptable concentration for an unspecified period of exposure B The maximum acceptable concentration to safeguard health C The maximum permissible concentration of the substance in air at which even an exposure of eight hours per day and a maximum of 40 hours per week does not have adverse effects on health D The acceptable average minimum concentration of the substance in air	

Number	*Source*	*Correct answer*
232 04.0-05	Definition of the maximum workplace concentration	C
	What is meant by the maximum workplace concentration of a substance? A The average maximum acceptable gas concentration over time of the substance in air for 15 minutes and for not more than eight hours per day B The average maximum acceptable gas concentration over time of the substance in air for one hour and not more than eight hours per day C The maximum permissible concentration of the substance in air at which exposure for 8 hours per day and a maximum of 40 hours per week does not have adverse effects on health D The average maximum acceptable concentration over time of the substance in air for one hour and not more than eight hours per week	
232 04.0-06	Exceeding the maximum workplace concentration	B
	A substance has a maximum workplace concentration of 1 ppm. What is the maximum amount of time a person can remain in an area where the concentration of the substance is 150 ppm? A One minute B The area should not be entered C One hour D Eight hours	
232 04.0-07	Maximum workplace concentration – odour threshold	A
	A substance has a maximum workplace concentration of 100 ppm and an odour threshold of 200 ppm. If the substance's odour cannot be detected in an area, what can be concluded with regard to health risks? A It could be hazardous, since the maximum workplace concentration may be exceeded B There is no risk, since the concentration is less than the maximum workplace concentration C There is no risk, since the concentration is higher than 200 ppm. D It is hazardous, since the concentration is higher than 200 ppm	
232 04.0-08	Deleted (2007)	

Number	*Source*	*Correct answer*
232 04.0-09	Asphyxiation	C
	Following a leak, a large cloud of propane gas forms above deck. Irrespective of the combustion hazard, is it dangerous to go above deck without a self-contained breathing apparatus? A No, since propane is not a toxic gas B No, since propane is not harmful to the lungs C Yes, since propane displaces air and can also have an asphyxiating effect D Yes, since propane is a toxic gas.	

Practice

Examination objective 5.1: Measuring gas concentration
Measuring devices

Number	*Source*	*Correct answer*
232 05.1-01	Measuring gas concentration	D
	Which device may be used to measure hydrocarbons in nitrogen? A A flammable gas detector B An oxygen meter C A combined flammable gas detector/oxygen meter D An infrared detector	
232 05.1-02	Measuring gas concentration	A
	Which device should be used to measure small concentrations of toxic gases in nitrogen? A A taximeter B A flammable gas detector C. An oxygen meter D An infrared detector	
232 05.1-03	Measuring gas concentration	B
	Which device should be used to measure small concentrations of toxic gases in air? A An infrared detector B A taximeter C A flammable gas detector D A combined flammable gas detector/oxygen meter	
232 05.1-04	Measuring gas concentration	C
	Which device is used to determine the oxygen content in a mixture of gases? A A taximeter B A flammable gas detector C An oxygen meter D An infrared detector	
232 05.1-05	Measuring gas concentration	D
	How is it determined whether a mixture of gases contains nitrogen? A With an infrared detector B With a flammable gas detector C With a taximeter D With none of the measuring devices mentioned above	

Number	*Source*	*Correct answer*
232 05.1-06	Measuring gas concentration	A
	With which device is it possible to establish beyond any doubt that a mixture of hydrocarbons and air is not explosive? A With a combined flammable gas detector/oxygen meter B With a flammable gas detector C With a taximeter D With an infrared detector	
232 05.1-07	Measuring gas concentration	B
	Which device should be used to determine the concentration of a flammable gas in air? A An oxygen meter B A flammable gas detector C None of the devices mentioned enable this to be determined D A toximeter	
232 05.1-08	Measuring gas concentration	C
	Which device should be used to measure the concentration of a gas known to be non-flammable but toxic? A A flammable gas detector B A combined flammable gas detector/oxygen meter C A taximeter D None of the devices mentioned above	
232 05.1-09	Measuring gas concentration	B
	An area filled with inert gas probably still contains residues of propane gas. How can this be established? A With an oxygen meter B With an infrared detector C With a combined flammable gas detector/oxygen meter D With a flammable gas detector	
232 05.1-10	Measuring gas concentration	D
	You only have a toximeter at your disposal. You wish to enter an area. First you must measure the concentration in the area. For which of the following gases is the toximeter appropriate? A For UN No. 1010 1,2-BUTADIENE, STABILIZED B For UN No. 1086 VINYL CHOLORIDE C For UN No. 1280 PROPYLENE OXIDE D For none of these substances	

Practice

Examination objective 5.2: Measuring gas concentration
Use of measuring devices

Number	*Source*	*Correct answer*
232 05.2-01	Measuring gas concentration	
	To measure the concentration of a toxic substance in an area, you use a test tube suitable for the purpose. After correctly making the measurements, you observe no discoloration of the contents. Which of the following statements is true? A The test tube should not be used for any other measurements B The test tube may immediately be reused for a second measurement in another area C The test tube may eventually be reused provided it is kept in a refrigerator D The test tube may eventually be reused provided it is closed with its original rubber stopper	A
232 05.2-02	Measuring gas concentration	D
	May a suitable test tube be used to measure the concentration of a toxic substance in an area if its use-by date has expired? A Yes B Yes, but only to obtain a preliminary result for the substance C Yes, but only provided the correction factor contained in the instructions for use is applied D No	
232 05.2-03	Measuring gas concentration	A
	You use a test tube to measure low concentrations of gas. The test tube is graduated. After a set number of pumpings, the length of the coloured traces is noted. The test tube is graduated from 10 to 100 ppm; the number of pumpings is n=10. After five pumpings you observe that the discolouration indicates exactly 100 ppm. What do you conclude? A The result is invalid and a test tube with a different range of concentrations should be used B The concentration of gas is less than 100ppm C The concentration of gas is above 100ppm D The test tube is saturated, but the concentration is correctly indicated	

Number	*Source*	*Correct answer*
232 05.2-04	Measuring gas concentration	D
	You use a test tube to measure low concentrations of gas. The test tube is graduated. After a set number of pumpings the length of the coloured traces is noted. The test tube is graduated from 10 to 100 ppm; the number of pumpings is n=10. After 10 pumpings, you observe no discolouration. What do you conclude? A The result is invalid and a test tube with a different range of concentrations should be used B The instructions for use relating to application of a special correction factor should be consulted C The concentration of gas is higher than 100 ppm D The concentration of gas is less than 100 ppm	
232 05.2-05	Measuring gas concentration	A
	How do you establish that the bellows pump is airtight? A By inserting a closed test tube into the nozzle-tip after compressing the bellows B By inserting an open test tube into the nozzle-tip after compressing the bellows C By inserting a used test tube into the nozzle-tip and pumping 10 times D By inserting an upside-down test tube into the nozzle-tip and compressing the bellows	
232 05.2-06	Measuring gas concentration	D
	A combined flammable gas detector/oxygen meter gives the following results: oxygen 18 %, "explosion" 50 %. How do you interpret these results? A The “explosion” reading cannot be relied upon since the oxygen content is too low for combustion B The concentration of flammable gases is 50 volume per cent, i.e. above the lower explosive limit C The concentration of flammable gases is 50% of the lower explosive limit, but since the oxygen content is too low, the results are not clear D The concentration of flammable gases is 50 % of the lower explosive limit. For a measurement made with a combined device, there is sufficient oxygen. The mixture is therefore not explosive, since the lower explosive limit has not been reached	

Number	*Source*	*Correct answer*
232 05.2-07	Measuring gas concentration	A
	A combined flammable gas detector/oxygen meter gives the following results: oxygen 8 %, "explosion" 0 %. How do you interpret these results? A The “explosion” reading cannot be relied upon since the oxygen content is too low for combustion B Since there is insufficient oxygen for combustion, the gas concentration reading of 0% is above the lower explosive limit C The concentration of flammable gases is 0 volume per cent, therefore the mixture is not explosive D The measuring device is defective	
232 05.2-08	Measuring gas concentration	A
	After determining the oxygen concentration, a reading of 50 % is obtained with a flammable gas detector. What does this mean? A The concentration of flammable gases is 50 % of the lower explosive limit B The concentration of flammable gases is 50 % of the upper explosive limit C The concentration of flammable gases is 50 volume per cent D The concentration of oxygen is 50 %	
232 05.2-09	Measuring gas concentration	B
	You have a flammable gas detector which operates in accordance with the principle of catalytic combustion. For which of the following substances should the device not be used in order not to damage the measuring apparatus? A UN No. 1005 AMMONIA, ANHYDROUS B UN No. 1063 METHYL CHLORIDE C UN No. 1077 PROPYLENE D. UN No. 1280 PROPYLENE OXIDE	
232 05.2-10	Deleted (2007)	

Practice

Examination objective 6: Monitoring of closed spaces and entry to these spaces

Number	*Source*	*Correct answer*
232 06.0-01	Measuring gas concentration	B
	Before entering a hold space gas concentrations must be measured. How are the measurements taken? A A person enters the hold space and takes measurements at all possible locations B Measurements are taken with a flexible tube from top to bottom at various heights C A measurement is taken with a flexible tube just below the hatch D A measurement is taken with a flexible tube at half the height of the hold space	
232 06.0-02	Measuring gas concentration	A
	A vessel is loaded with UN No. 1978 PROPANE. After careful measurement it is ascertained that a hold space contains enough oxygen and less than 5 % of the lower explosive limit of propane. Which of the following statements is correct? A The hold space may be entered by a person without protection B The hold space may be entered only if the person in question is wearing a protective suit C The hold space may be entered by a person without protection only if a certificate for degassing has been issued D The hold space may not be entered	
232 06.0-03	Deleted (2007)	
232 06.0-04	Measuring gas concentration	C
	A combined flammable gas detector/oxygen meter produces the following reading after measuring the atmosphere in an enclosed space: 16 % oxygen by volume and 9 % of the lower explosive limit. Which of the following statements is correct? A The space is safe neither for people nor against the risk of explosion B The space is safe for people but not against the risk of explosion C The space is safe against the risk of explosion but not safe for people D The space is safe against the risk of explosion and also safe for people	

Number	*Source*	*Correct answer*
232 06.0-05	Measuring gas concentration	A
	A combined flammable gas detector/oxygen meter produces the following reading after measuring the atmosphere in an enclosed space: 16 % oxygen by volume and 60 % of the lower explosive limit. Which of the following statements is correct? A The space is safe neither for people nor against the risk of explosion B The space is safe for people but not against the risk of explosion C The space is safe against the risk of explosion but not safe for people D The space is safe against the risk of explosion and also safe for people	
232 06.0-06	7.2.3.1.6	D
	A vessel is carrying UN No. 1010 BUTADIENE-1-3, STABILIZED. After measurement of the atmosphere in a hold space, it is ascertained that it contains 20 % oxygen by volume and 100 ppm butadiene. A person who enters the hold space must wear a protective suit and a self-contained breathing apparatus. What additional measures must be taken? A You have to give the person in question a portable radiotelephone and post a person by the access hatch B At the access hatch you post a person who is in direct contact with the master in the wheelhouse C You secure the person with a line and post a person at the access hatch to ensure supervision, who can communicate with the master in the wheelhouse D You secure the person with a line and post a person to supervise entry; that person must have the same safety equipment at the access hatch, and you must ensure that two other persons are within calling distance of that person	
232 06.0-07	Measuring gas concentration	D
	A vessel is carrying UN No. 1010 BUTADIENE-1-3, STABILIZED. A hold space is inspected, with the following result: the oxygen meter reads 21 % volume, the flammable gas detector indicates 10 % of the lower explosive limit and the toximeter reads 10 ppm of butadiene. What conclusions can be drawn from these measurements? A The space is safe against explosions and safe for people B The space is safe for people C The space is safe against explosions D The measurements do not make sense	

Number	*Source*	*Correct answer*
232 06.0-08	7.2.3.1.6	C
	A vessel is carrying UN No. 1033 DIMETHYL ETHER. Measurement of the atmosphere in a hold space shows that it contains 20% oxygen by volume and 500 ppm of dimethyl ether. A person must enter this hold space. The person is equipped with a protective suit, a self-contained breathing apparatus and emergency equipment. There is already a person supervising near the access hatch. What additional measures must be taken? A You give the person entering the hold space and the one on deck portable radiotelephones so that they can communicate with two other people on deck B You make sure that there are two people within calling distance of the person near the access hatch C You make the same safety equipment available to the person at the access hatch and you make sure that there are two people within calling distance of that person D None	
232 06.0-09	Measuring gas concentration	C
	What action must be carried out before entering a hold space? A Put on a self-contained breathing apparatus B It is enough to measure the concentration of gas in the hold space C Measure the oxygen and gas concentrations in the hold space D It is enough to measure the concentration of oxygen in the hold space	

Practice

Examination objective 7: Certificates for degassing and permitted work

Number	*Source*	*Correct answer*
232 07.0-01	Measuring gas concentration	B
	Measurements indicate that a hold space is free of gas and the oxygen concentration is sufficient. What activities may be carried out in this hold space? A Only visual checks may be carried out B Visual checks may be carried out, and light maintenance work not requiring a flame and not producing sparks may be done C The hold space may be cleaned and the rust scraped away D A hole in a wall may be welded closed	
232 07.0-02	Measuring gas concentration	B
	Measurements indicate that a hold space is free of gas and the oxygen concentration is sufficient. What activities may be carried out in this hold space? A Only visual checks may be carried out B The hold space may be cleaned C The hold space may be cleaned and the rust scraped away D A hole in a wall may be welded closed	
232 07.0-03	8.3.5	C
	Your vessel is loaded with UN No. 1978 PROPANE. You have to weld a reinforcing support onto the radar mast. Is this permitted during navigation? A Yes, as this is a minor task carried out away from the cargo area B Yes, provided during the welding the gas concentration is regularly measured on site C No, unless this is done with the agreement of the competent authority D No, it is only allowed at a shipyard	

Number	*Source*	*Correct answer*
232 07.0-04	8.3.5	A
	Your vessel is loaded with UN No. 1011 BUTANE. During navigation you would like to carry out some minor repairs in the engine room, and they are likely to produce sparks. Is this allowed? A Yes, provided you do not weld the fuel tank, and provided doors and other openings are closed B Yes, you may weld anywhere C No, a degassing certificate is required D No, it is only allowed at a shipyard	
232 07.0-05	8.3.5	D
	You rinse your cargo tanks with nitrogen and evacuate the gases (last cargo: UN No. 1978 PROPANE). During the rinsing you would like to carry out some minor repairs in the engine room, and they are likely to produce sparks. Is this allowed? A Yes, provided you receive authorization from the person responsible for trans-shipment at the shore installation B Yes, provided you close doors and other openings C No, authorization from a classification society is required D No, it is not allowed during loading, unloading and degassing	
232 07.0-06	8.3.5	A
	Your vessel is loaded with UN No. 1978 PROPANE. You have to weld a new fire extinguisher pipe on the deck. Is this allowed? A No B No, for this a degassing certificate is required C Yes, as you are not welding the piping containing the product D Yes, provided the gas concentrations are regularly measured	
232 07.0-07	7.2.3.1.5	A
	Your vessel is loaded with UN No. 1969 ISOBUTANE. Is a person allowed to enter the hold space without any protective equipment to carry out a check? A Yes, this is allowed during loading once it is ascertained that the hold space is free of gas and there is no lack of oxygen B No, only with the agreement of the competent authority C No, only with the agreement of the person responsible for trans-shipment at the shore installation D No, only with a certificate of degassing	

Number	*Source*	*Correct answer*
232 07.0-08	8.3.5	A
	Your vessel is moored at a shore installation and is ready to load a product. You want to carry out minor repairs in the accommodation, and they are liable to produce sparks. Is this allowed? A No B Yes, provided the accommodation doors and other openings are closed C Yes, provided during the work the gas concentration is regularly measured on site D Yes, provided you have the agreement of the shore facility	
232 07.0-09	8.3.5	C
	Your vessel is loaded with UN No. 1011 BUTANE. During navigation you would like to carry out minor repairs in the engine room, and they are likely to produce sparks. Is this allowed? A Yes, as it is minor work outside the cargo area. Such work can be carried out without any other measures B Yes, provided during the work the gas concentration is regularly measured on site C Yes, provided the engine room doors and other openings are closed D No, it is not allowed without the agreement of the competent authority	
232 07.0-10	8.3.5	D
	Your vessel is being loaded with UN No. 1280 PROPYLENE OXIDE and you have to carry out minor welding work in the accommodation. Is this allowed? A Yes, as it is minor work outside of the cargo area B Yes, provided during the welding work the gas concentration is regularly measured on site C Yes, with the agreement of the shore installation D No	

Practice

Examination objective 8: Degree of filling and over-filling

Number	*Source*	*Correct answer*
232 08.0-01	1.2.1	C
	The maximum permissible degree of filling of cargo tanks for a substance as set out in ADN relates to a given reference temperature. What is this temperature? A 15 °C B 20 °C C The temperature during loading D The highest temperature likely to be encountered during transport	
232 08.0-02	Degree of filling	D
	You load in cargo tanks 1, 3 and 6 propane from shore tank A and in cargo tanks 2, 4 and 5 propane from shore tank B. The temperatures in the cargo tanks are not the same. What is the maximum degree of filling that you must observe? A A single degree of filling for all the cargo tanks corresponding to the average temperature of the propane B A single degree of filling for all the cargo tanks corresponding to the lowest temperature of the propane C A single degree of filling for all the cargo tanks corresponding to the highest temperature of the propane D 91 % for each cargo tank	
232 08.0-03	Degree of filling	C
	Why should a certain degree of filling of a cargo tank not be exceeded? A Because the vessel would be overloaded B To avoid “waves” in the cargo tanks and thus avoid damaging the tanks C To prevent the liquid from reaching the safety valve if it heats up D To ensure the stability of the vessel	
232 08.0-04	Degree of filling	A
	UN No. 1978 PROPANE is loaded at a temperature over 15 °C. You can load up to what filling level? A 91 % B More than 91 % C Less than 91 % D 95 %	

Number	*Source*	*Correct answer*
232 08.0-05	Degree of filling	B
	What correction has to be applied to determine the permissible degree of filling? A Content correction B Trim correction C Pressure correction D Vapour pressure correction	
232 08.0-06	Degree of filling	A
	What correction has to be applied to determine the permissible degree of filling? A Density correction B Content correction C Pressure correction D Vapour pressure correction	
232 08.0-07	Overfilling	C
	What risk is there in the event of overfilling? A That the vessel's load is not balanced B That the vessel is overloaded C That the cargo may leak D That there may be a backflow into the cargo tank	
232 08.0-08	9.3.1.21.1	D
	According to ADN, what degree of filling should actuate the automatic high-level sensor against overfilling? A 86 % maximum B 91 % maximum C 95 % maximum D 97.5 % maximum	
232 08.0-09	9.3.1.21.1	A
	According to ADN, what degree of filling should actuate the level alarm device? A 86 % B 91 % C 95 % D 97.5 %	
232 08.0-10	Degree of filling	B
	What should you do when the level device is activated? A Immediately stop the loading B If necessary, reduce the flow of loading C Activate the quick-action stop valve D Transfer some of the product into another cargo tank	

Practice

Examination objective 9: Safety installations

Number	*Source*	*Correct answer*
232 09.0-01	Safety against bursts in the piping	A
	What is the function of a safety device against bursts in the piping? A Prevent leaks of large quantities of product in the event of a burst in the piping B Limit the load flow C Prevent depression in the cargo tanks D Prevent excessive pressure build-up	
232 09.0-02	Safety against bursts in the piping	C
	Where are safety devices against bursts in the piping placed? A In the piping under pressure, near the pump B In the suction pipes, near the pump C In the cargo tank, in the pipes for loading and unloading D On the deck, in the loading and unloading piping	
232 09.0-03	Safety against bursts in the piping	D
	What is a device against bursts in the piping? A A remote-controlled valve that can be closed if needed B A valve with a hand-operated control that can be closed in an emergency C A narrow section in the line to limit the flow D A self-closing stop-valve requiring no command	
232 09.0-04	Safety against bursts in the piping	B
	When must a device against bursts in the piping be activated? A When the flow speed is lower than the calculated speed B When the flow speed is greater than the calculated speed C When a rapid blocking valve has been installed before the device against bursts in the piping D When a narrow section has been installed before the device against bursts in the piping	
232 09.0-05	Safety against bursts in the piping	A
	The device against bursts in the piping is a spring valve set into the piping. When must the valve close on its own? A When the flow speed is so high that the depression over the valve exceeds the tensile force of the spring B When the flow speed is so high that the depression over the valve is less than the tensile force of the spring C When the flow speed is so high that the depression before the valve exceeds the depression corresponding to the tensile force of the spring D When the flow speed is so high that the overpressurization behind the valve exceeds the depression corresponding to the tensile force of the spring	

Number	*Source*	*Correct answer*
232 09.0-06	9.3.1.21.9	A
	During loading and unloading the quick-action stop valves must be able to be closed by a switch so that, in an emergency, the loading or unloading can be stopped. Where must these switches be located? A At two locations on the vessel (fore and aft) and at two locations on shore B At the shore installation and at the shore connection of the pipes for loading and unloading C In the wheelhouse, at the shore connection of the pipes for loading and unloading and at the shore installation D At two locations on shore (directly at the access to the vessel and at a sufficient distance) and in the wheelhouse	
232 09.0-07	7.2.2.21	B
	What is the function of rapid closing devices? A Automatic closure of valves in the connecting pipes between the shore installation and the vessel during gas release B Possibility of closing the quick-action stop valves located in the connecting pipes between the shore installation and the vessel C Automatic stopping of the unloading pumps if there is a gas release D Possibility of quickly shutting off unloading pumps if there is a gas release	
232 09.0-08	7.2.2.21	C
	A vessel is connected by a loading facility with liquid and gas lines of a shore facility. A switch for the rapid closing devices is activated, thus stopping the loading. What happens after that? A Only the unloading pumps and the compressors are shut off B Only the shore facility’s rapid blocking valve is closed C The quick-action stop valves are closed and the unloading pumps and compressors are shut off D The quick-action stop valves are closed and the loading installation is uncoupled from the breakage link	
232 09.0-09	Rapid closing system	D
	Which of the following equipment is not among the rapid closing devices? A Breakage cable B Safety system against overflowing C Quick-action stop valves in the loading installation D Breakage link in the loading installation	

Number	*Source*	*Correct answer*
232 09.0-10	Rapid closing system	A
	In which case will the rapid closing safety system linked to the shore facility not work? A When the level gauge is activated B When the safety system against overflowing is activated C When a switch of the rapid closing system is activated D When the boat is adrift	

Practice

Examination objective 10: Pumps and compressors

Number	*Source*	*Correct answer*
232 10.0-01	Unloading of the cargo	C
	In which of the following cases is the residual cargo smallest? A During unloading with an evaporator installed on shore B During unloading with a compressor installed on shore C During unloading, with pressurized nitrogen from shore D During unloading with a submerged pump of the vessel	
232 10.0-02	Unloading of the cargo	D
	A vessel is equipped with two compressors and two deck pumps. Can propane be unloaded using the compressors only? A No B No, at least one pump is required C Yes, always D Yes, if the back pressure is not too great	
232 10.0-03	Unloading of the cargo	A
	A vessel is equipped with two compressors and two deck pumps. Can propane be unloaded using only deck pumps? A No B Yes, always C Yes, but it will take longer D Yes, if the gas return flow in the shore tank is ensured	
232 10.0-04	Deck pumps	B
	What safety mechanism is there on the deck pumps? A A minimum filling level switch B A motor temperature safety device C A low pressure switch D A breakage plate	
232 10.0-05	Compressors	C
	What can cause major damage to a compressor? A A closed inlet connection B A too low operating speed C Liquid intake D Lack of a pressure difference between the intake and outflow sides	

Number	*Source*	*Correct answer*
232 10.0-06	Compressors	D
	Why is a low pressure switch often installed on the intake side of a compressor? A To protect the compressor B To avoid intake of liquid C To avoid too low a temperature D To avoid a depression in the cargo tanks	
232 10.0-07	Deck pumps	A
	Why is a compressor required for the use of a deck pump? A To provide the deck pump with liquid B To empty the loading installation C To create a pressure difference in the pump D To transfer cargo into another cargo tank	
232 10.0-08	Compressors	C
	What is the purpose of a separator on the intake side of a compressor? A To lubricate the compressor B To collect liquid so that it is not lost C To avoid damaging the compressor with liquid intake D To make it possible to eliminate the liquid gathered in the container using a flexible tube	
232 10.0-09	Compressors	B
	Why is there an established maximum pressure difference between the intake and outflow sides of compressors? A To avoid too great a pressure difference in cargo tanks B To avoid overloading the compressor motor C To avoid a depression in the cargo tanks D To avoid the opening of the quick-action stop valves	

Emergency measures

Examination objective 1.1: Personal injury – Liquefied gas on skin

Number	*Source*	*Correct answer*
233 01.1-01	Liquefied gas on skin	B
	A crew member has had liquefied butane spilled on the hands. What first aid should be administered? A Briefly rinse the hands B Rinse the hands with water for at least 15 minutes C Treat the hands with an anti-burn ointment D Wrap the hands so that they are kept warm	
233 01.1-02	Liquefied gas on skin	A
	A crew member has had liquefied butane spilled on the hands. You rinse the victim's hands with water for at least 15 minutes. If after the rinsing the hands do not recover their natural colour, what else do you have to do? A Call a doctor B Call the victim's family so that they can retrieve the victim C Put the victim to bed to keep the person warm D Treat the hands with an anti-burn ointment and wrap them	
233 01.1-03	Liquefied gas on skin	C
	What do you do if a crew member has had liquefied butane spilled on his or her body? A Immediately remove the clothing and pad the body with water and sterile cotton B Immediately remove the clothing and shower the person C Put the person in a shower, then remove clothing in the shower D Have the person sit, clothed, in a warm bath for at least 15 minutes	
233 01.1-04	Liquefied gas on skin	D
	A crew member has had liquefied ammonia spilled on the hands. What is the first thing for you to do? A Call a doctor B Have the person taken as quickly as possible to a burn centre C Apply an anti-burn cream copiously on the hands D Rinse the hands with water for at least 15 minutes	

Emergency measures

Examination objective 1.2: Personal injury – Breathing in gas

Number	*Source*	*Correct answer*
233 01.2-01	Breathing in gas	C
	A member of the vessel's crew has breathed in a large quantity of propane but has not lost consciousness. What is the first thing for you to do? A Have the person breathe freely B Give the person oxygen C Bring the person away from the danger zone and keep the person under surveillance D Bring the person away from the danger zone and lie the person down in a stable position	
233 01.2-02	Breathing in gas	D
	A member of the vessel's crew has breathed in propane and has lost consciousness but is still breathing. What is the first thing for you to do? A Mouth-to-mouth resuscitation B Give the person oxygen C Bring the person away from the danger zone and keep the person under surveillance D Bring the person away from the danger zone and lie the person down in a stable position	
233 01.2-03	Breathing in gas	A
	A member of the vessel's crew has breathed in propane, has lost consciousness and is not breathing. What is the first thing for you to do? A Bring the person away from the danger zone and apply mouth-to-mouth resuscitation B Give the person oxygen C Bring the person away from the danger zone and keep the person under surveillance D Bring the person away from the danger zone and lie the person down in a stable position	

Number	*Source*	*Correct answer*
233 01.2-04	Breathing in gas	B
	A member of the vessel's crew has breathed in ammonia. The person is coughing and has trouble breathing. What is the first thing for you to do? A Give the person oxygen until there is no more coughing, then have the person lie down on a bed B Bring the person away from the danger zone, keep the person under surveillance and call a doctor C Shower the person and remove clothing D Apply mouth-to-mouth resuscitation and inform a doctor	
233 01.2-05	Breathing in gas	B
	A member of the vessel's crew has breathed in some propane gas. When do you apply mouth-to-mouth resuscitation? A If the victim has lost consciousness and is breathing B If the victim has lost consciousness and is not breathing C If the victim has not lost consciousness and is breathing D If the victim has not lost consciousness and is not breathing	

Emergency measures

Examination objective 1.3: Personal injury – Emergency assistance, general

Number	*Source*	*Correct answer*
233 01.3-01	Emergency assistance, general	A
	During an inspection, a member of the vessel's crew feels sick in a hold space. What is the first thing for you to do? A Inform the master and provide first aid B Enter the hold space and find out what happened to the victim C Immediately remove the victim from the hold space with the help of a colleague D Activate the "do not approach" signal	
233 01.3-02	Emergency assistance, general	C
	A member of the vessel's crew trips on piping and has a serious fall. What is the first thing for you to do? A Apply mouth-to-mouth resuscitation B Put the victim to bed C Check if the victim has lost consciousness D Inform a doctor	
233 01.3-03	Emergency assistance, general	C
	How do you check if a victim has lost consciousness as a result of an accident? A Check if you can feel a pulse B Check if the thorax is moving and whether the victim is breathing C Check if the victim reacts to your words or other stimuli D Check if the victim reacts to the smell of ether	
233 01.3-04	Emergency assistance, general	D
	A member of the vessel's crew has breathed in a dangerous gas and has to be transported to hospital. What is the most important information to send with the victim? A The victim's service record B The telephone number of the victim's family C The victim's passport D Information on the cargo	

Emergency measures

Examination objective 2.1: Irregularities relating to the cargo – Leak in a connection

Number	*Source*	*Correct answer*
233 02.1-01	Leak in a connection	A
	During unloading, liquid drips from a connection between the pipes for loading and unloading and the loading facility. What do you do? A Stop the pumps and close the corresponding blocking valves B Place a receptacle under the connection to collect the leak C Pump slowly D Place a wet towel around the connection and continue the unloading	
233 02.1-01	Leak in a connection	B
	During loading, a connection between the pipes for loading and unloading and the loading facility develops a leak. What do you do? A Load more slowly B Stop the loading after consultation with the loading facility C Continue to load D Place a receptacle under the connection	
233 02.1-03	Leak in a connection	C
	During navigation with a loaded vessel, a place is found in the loading and unloading piping that is not leak-proof. All shut-off valves are closed. What do you do? A Activate the "do not approach" signal, moor the vessel and alert the authorities B Activate the "do not approach" signal and continue the voyage C Depressurize the piping D Continue the voyage without taking any additional measures	

Emergency measures

Examination objective 2.2: Irregularities relating to the cargo – Fire in the engine room

Number	*Source*	*Correct answer*
233 02.2-01	Fire in the engine room	C
	During loading, a fire breaks out in the engine room. What do you do, apart from extinguishing the fire? A Continue to load, but inform the shore facility B Just inform the shore facility C Activate the rapid blocking system and inform the shore facility D Call the shipping police	
233 02.2-02	Fire in the engine room	A
	You have a cargo of UN No. 1011 BUTANE. A fire breaks out in the machine room while the vessel is under way. What do you do, apart from extinguishing the fire? A Inform the competent authority B Inform the consignee C Continue the voyage and activate the “do not approach” signal D Activate the water-spray system	
233 02.2-03	Fire in the engine room	C
	During unloading a fire breaks out in the engine room. What do you do, apart from extinguishing the fire? A Simply continue the voyage B Just inform the shore facility C Activate the rapid blocking system and inform the shore facility D Activate the "do not approach" signal	

Emergency measures

Examination objective 2.3: Irregularities relating to the cargo – Hazards in the vicinity of the vessel

Number	*Source*	*Correct answer*
233 02.3-01	Hazards in the vicinity of the vessel	B
	Your vessel is moored at a shore facility and is ready to be unloaded. A fire alarm is activated at the shore facility. On the dock and in the vicinity you see no fire. What do you do? A Disconnect the connections and depart with the vessel B Await instructions from the shore facility C Activate the water-spray system D Activate the "do not approach" signal	
233 02.3-02	Hazards in the vicinity of the vessel	A
	During unloading a fire breaks out on the dock. What do you do? A Activate the rapid blocking system, disconnect the connections and depart with the vessel B Call the shipping police C Activate the water-spray system D Await instructions from the shore facility	
233 02.3-03	Hazards in the vicinity of the vessel	B
	While propane is being unloaded, there is a gas leak at the shore facility. The alarm is activated. What do you do? A Activate the water-spray system B Await instructions from the shore facility C Continue to unload, but wear a breathing apparatus D Constantly measure the gas concentration on deck	

Emergency measures

Examination objective 2.4: Irregularities relating to the cargo – Over-filling

Number	*Source*	*Correct answer*
233 02.4-01	Over-filling	A
	During loading with propane, you regularly check the level gauges. There is a cargo tank that contains more than the amount permitted by the admissible maximum degree of filling. What do you do? A Have the loading stopped by the shore facility and pump the overflow into another cargo tank B Activate the rapid blocking system and pump the overflow into another cargo tank C Ensure that the admissible total quantity is not exceeded D During the rest of the loading, allow the overflow to flow into another cargo tank	
233 02.4-02	Over-filling	A
	During loading with butane, you regularly check the level gauges. A cargo tank contains more than the amount permitted by the admissible maximum degree of filling. What do you do? A Have the loading stopped by the shore facility and pump the overflow into another cargo tank B Separate this cargo tank and another of the cargo tanks, and using the compressor, you force liquid into the other cargo tank while continuing to load C Ensure that the admissible total quantity is not exceeded D Do nothing, as in specific circumstances you can take a little more cargo in one cargo tank	
233 02.4-03	Over-filling	D
	During loading with propane, the facility against overflowing is actuated. You are supposed to make a short voyage, in winter. How do you proceed? A You disconnect the facility against overflowing and you continue to load B You depart with the vessel, without undertaking any other action C As you are able to carry more cargo, there is no problem D You pump back some of the cargo until the admissible maximum degree of filling is reached	

Emergency measures

Examination objective 2.5: Irregularities relating to the cargo – Polymerization

Number	*Source*	*Correct answer*
233 02.5-01	Polymerization	C
	During carriage of UN No. 1010 1,2-BUTADIENE, STABILIZED, the temperature rises in one of the cargo tanks. You assume the cargo has started polymerizing. What do you do? A Activate the water-spray system to cool the cargo B Fill the hold space with water to cool the cargo C Inform the consignee of the cargo D Release vapour from time to time	
233 02.5-02	Polymerization	B
	During carriage of UN No. 1010 1,3-BUTADIENE, STABILIZED, the temperature rises in one of the cargo tanks. You assume the cargo has started polymerizing. What do you do? A Add the accompanying inhibitor B Inform the consignee of the cargo C Moor the vessel and inform the competent authority D Fill the hold space with water to cool the cargo	
233 02.5-03	Polymerization	D
	During carriage of UN No. 1010 1,3-BUTADIENE, STABILIZED, the temperature rises in one of the cargo tanks. You assume the cargo has started polymerizing. What do you do? A Release vapour from time to time to cool the cargo B Activate the water-spray system to cool the cargo C Pump the product out of the cargo tank in question and mix it with the contents of the other cargo tanks D Inform the consignee of the cargo	