



Economic and Social Council

Distr.: General
15 June 2009
English
Original: French

Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Dangerous Goods

Joint Meeting of Experts on the Regulations annexed to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) (ADN Safety Committee)

Fifteenth session

Geneva, 24-28 August 2009

Item 5 of the provisional agenda

Catalogue of questions

Gas - Knowledge of physics and chemistry, objectives 4.1, 4.2, 5, 6.1, 6.2, 7.1, 7.2, 8.1, 8.2, 9

Transmitted by the Central Commission for the Navigation of the Rhine (CCNR)¹

1. At its fourteenth session, the ADN Safety Committee, recalling that, under 8.2.2.7.2.3 of the Regulations annexed to ADN, the ADN Administrative Committee was required to prepare a catalogue of questions for the ADN examinations, decided that the item should be put on the agenda for future sessions, in order to enable lists of questions to be translated and adopted progressively (ECE/TRANS/WP.15/AC.2/30, paras. 38 and 40).

2. This document contains the lists of questions proposed by CCNR in respect of dry cargo vessels and the following objectives:

- Examination objective 4.1: Density and volume of liquids – Density and volume under changes in temperature
- Examination objective 4.2: Density and volume of liquids – Maximum authorized degree of filling
- Examination objective 5: Critical pressure and temperature
- Examination objective 6.1: Polymerization – Theoretical questions

¹ Distributed in German by the Central Commission for the Navigation of the Rhine under the symbol CCNR/ZKR/ADN/WP.15/AC.2/2009/35.

- Examination objective 6.2: Polymerization – Practical questions, conditions of carriage
- Examination objective 7.1: Evaporation and condensation
- Examination objective 7.2: Evaporation and condensation – Qualitative saturation at vapour pressure
- Examination objective 8.1: Mixtures: Vapour pressure and composition
- Examination objective 8.2: Mixtures: Hazard characteristics
- Examination objective 9: Chemical bonds and formulae

Knowledge of physics and chemistry

Examination objective 4.1: Density and volume of liquids

Density and volume under changes in temperature

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 4101	$m = \rho_{t1} \cdot V_{t1} = \rho_{t2} \cdot V_{t2}$ (with tables) 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	C
G 4102	$m = \rho_{t1} \cdot V_{t1} = \rho_{t2} \cdot V_{t2}$ (with tables) 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	B
G 4103	$m = \rho_{t1} \cdot V_{t1} = \rho_{t2} \cdot V_{t2}$ (with tables) 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	C
G 4104	$m = \rho_{t1} \cdot V_{t1} = \rho_{t2} \cdot V_{t2}$ (with tables) 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	B

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
	A 90 m ³	
	B 95 m ³	
	C 106 m ³	
	D 111 m ³	
G 4105	$m = \rho_{i1} \cdot V_{i1} = \rho_{i2} \cdot V_{i2}$ (with tables) 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	B
	A 93 m ³	
	B 96 m ³	
	C 104 m ³	
	D 107 m ³	
G 4106	$m = \rho_{i1} \cdot V_{i1} = \rho_{i2} \cdot V_{i2}$ (with tables) 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	C
	A 93 m ³	
	B 96 m ³	
	C 104 m ³	
	D 107 m ³	
G 4107	$m = \rho_{i1} \cdot V_{i1} = \rho_{i2} \cdot V_{i2}$ (with tables) 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	C
	A 87 m ³	
	B 92 m ³	
	C 109 m ³	
	D 115 m ³	
G 4108	$m = \rho_{i1} \cdot V_{i1} = \rho_{i2} \cdot V_{i2}$ (with tables) 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	B
	A 87 m ³	

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
	B 92 m ³	
	C 108 m ³	
	D 115 m ³	
G 4109	$m = \rho_{l1} \cdot V_{l1} = \rho_{l2} \cdot V_{l2}$ (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	
G 4110	$m = \rho_{l1} \cdot V_{l1} = \rho_{l2} \cdot V_{l2}$ (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

Maximum authorized degree of filling

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 4201	$VG_{max} = 91 \cdot \rho_{15} / \rho_{temp. \text{ of load}}$ (with tables) The maximum authorized degree of filling of a cargo tank is 91% at a substance temperature of 15° C. What is the degree of filling allowed for UN No. 1011 BUTANE at a temperature of 5° C? A 89.3% B 90.0% C 91.0% D 92.6%	C
G 4202	$VG_{max} = 91 \cdot \rho_{15} / \rho_{temp. \text{ of load}}$ (with tables) What is the maximum authorized degree of filling of UN No. 1012 BUTYLENE-1 at a temperature of 5° C? A 89.2% B 90.2% C 93.8% D 94.2%	A
G 4203	$VG_{max} = 91 \cdot \rho_{15} / \rho_{temp. \text{ of load}}$ (with tables) What is the maximum authorized degree of filling of UN No. 1086 VINYL CHLORIDE, STABILIZED at a temperature of -5° C? A 87.9% B 88.1% C 88.6% D 88.9%	B
G 4204	$VG_{max} = 91 \cdot \rho_{15} / \rho_{temp. \text{ of load}}$ (with tables) What is the maximum authorized degree of filling of UN No. 1969 ISOBUTANE at a temperature of 25° C? A 89.6% B 91.0% C 92.4% D 93.0%	D

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 4205	$VG_{max} = 91 \cdot \rho_{15} / \rho_{temp. \text{ of load}}$ (with tables) What is the maximum authorized degree of filling of UN No. 1012 BUTYLENE-1 at a temperature of 25° C? A 91.0% B 92.9% C 95.0% D 96.0%	D
G 4206	$VG_{max} = 91 \cdot \rho_{15} / \rho_{temp. \text{ of load}}$ (with tables) What is the maximum authorized degree of filling of UN No. 1005 AMMONIA, ANHYDROUS at a temperature of 5° C? A 87.5% B 88.3% C 88.9% D 89.3%	C
G 4207	$VG_{max} = 91 \cdot \rho_{15} / \rho_{temp. \text{ of load}}$ (with tables) What is the maximum authorized degree of filling of UN No. 1969 ISOBUTANE at a temperature of 5° C? A 88.4% B 88.9% C 89.1% D 89.3%	C
G 4208	$VG_{max} = 91 \cdot \rho_{15} / \rho_{temp. \text{ of load}}$ (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
G 4209	$VG_{max} = 91 \cdot \rho_{15} / \rho_{temp. \text{ of load}}$ (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

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 4210	$VG_{max} = 91 \cdot \rho_{15} / \rho_{temp. \text{ of load}}$ (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

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 5001		A
	<p>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?</p> <p>A A temperature under 97° C</p> <p>B A temperature over -42° C</p> <p>C A pressure over 42 bar</p> <p>D A pressure greater than atmospheric pressure</p>	
G 5002		C
	<p>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:</p> <p>A Vinyl chloride may be transported at ambient temperature in liquid state in pressure tanks</p> <p>B Vinyl chloride can be liquefied only at ambient temperature and a pressure over 44 bar</p> <p>C Vinyl chloride may be transported at atmospheric pressure in the liquid state at the boiling point</p> <p>D Vinyl chloride can be liquefied only at a temperature over 158.4° C</p>	
G 5003		B
	<p>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:</p> <p>A Butane must not be transported in the liquid state at a temperature over 153° C</p> <p>B Butane may be liquefied by increasing the pressure at a temperature under 153° C</p> <p>C Butane can be liquefied only at a pressure over 37 bar</p> <p>D Butane cannot be liquefied by refrigeration</p>	
G 5004		A
	<p>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</p>	

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
	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

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 6101		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	
G 6102		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	
G 6103		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	
G 6104		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	

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 6105	Spontaneous, uncontrolled polymerization of a liquid in a cargo tank can lead to what? A Deflagration B Detonation C Explosive combustion D Thermal explosion	D

Knowledge of physics and chemistry

Examination objective 6.2: Polymerization

Practical questions, conditions of carriage

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 6201	3.2, Table C Table C contains "UN No. 1010 BUTADIENE-1-3, STABILIZED". What is the meaning of "STABILIZED"?	C
	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	
G 6202	When UN No. 1086 VINYL CHLORIDE, STABILIZED is transported, polymerization is always a possibility. How can it be prevented?	C
	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	
G 6203	Why is it sometimes necessary to transport a mixture of UN No. 1010 BUTADIENE-1-3, STABILIZED and hydrocarbons with a stabilizer?	D
	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	
G 6204	What is the function of a stabilizer?	A
	A Prevent polymerization	
	B Interrupt polymerization by reducing temperature	

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
	C Exclude the possibility of a deflagration	
	D Exclude the possibility of dilation in a liquid	
G 6205	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	
G 6206	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 ADN	
	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	
G 6207		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	
G 6208	Deleted	
G 6209		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.

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 7101		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	
G 7102		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	
G 7103		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	
G 7104		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	

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 7105		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	
G 7106		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	
G 7107		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	
G 7108		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	
G 7109		A
	Liquid propane is pumped out of a cargo tank. What will	

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
	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	
G 7110	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	B

Knowledge of physics and chemistry

Examination objective 7.2: Evaporation and condensation

Qualitative saturation at vapour pressure

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 7201	Deleted	
G 7202	Deleted	
G 7203		C
	<p>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?</p> <p>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</p>	
G 7204		D
	<p>A type G tank vessel is loaded with UN No. 1077 PROPYLENE. A quantity of 1 m³ of liquid escapes from a pressure tank. How much propane vapour forms?</p> <p>A 12 m³ B 24 m³ C 150 m³ D 300 m³</p>	
G 7205		C
	<p>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)).</p> <p>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</p>	

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 7206		D
	<p>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))</p> <p>A The pressure in the cargo tank is then 5 bar (absolute bar)</p> <p>B The pressure in the cargo tank is then under 5 bar (absolute bar)</p> <p>C The pressure in the cargo tank is then 3 bar (absolute bar) because all the nitrogen dissolves in the liquid</p> <p>D The pressure in the cargo tank is then over 5 bar (absolute bar)</p>	
G 7207	Deleted	
G 7208		B
	<p>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))</p> <p>A -80° C</p> <p>B 5° C</p> <p>C 12° C</p> <p>D 13° C</p>	
G 7209		A
	<p>At 1 bar (absolute bar), 9,000 m³ of vinyl chloride vapour is liquefied by compression at ambient temperature. Approximately how much liquid (in m³) will result?</p> <p>A. 25 m³</p> <p>B 375 m³</p> <p>C 1 000 m³</p> <p>D 3 000 m³</p>	

Knowledge of physics and chemistry

Examination objective 8.1: Mixtures

Vapour pressure and composition

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 8101	Saturation vapour pressure, depending on composition 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 than that of propane	B
G 8102	Saturation vapour pressure, depending on composition 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	C
G 8103	Saturation vapour pressure, depending on composition 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	A

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 8104	Deleted	
G 8105	Deleted	
G 8106	Deleted	

Knowledge of physics and chemistry

Examination objective 8.2: Mixtures

Hazard characteristics

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 8201	<p>Which of the following substances is comparable to a mixture of liquefied propane and butane gas from the point of view of health hazards?</p> <p>A UN No. 1005 AMMONIA, ANHYDROUS</p> <p>B UN No. 1010 BUTADIENE-1-3, STABILIZED</p> <p>C UN No. 1879 PROPANE</p> <p>D UN No. 1086 VINYL CHLORIDE, STABILIZED</p>	C
G 8202	<p>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?</p> <p>A UN No. 1010 BUTADIENE-1-3, STABILIZED</p> <p>B UN No. 1969 ISOBUTANE</p> <p>C UN No. 1280 PROPYLENE OXIDE</p> <p>D UN No. 1086 VINYL CHOLORIDE, STABILIZED</p>	B
G 8203	<p>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?</p> <p>A UN No. 1010 BUTADIENE-1-3, STABILIZED</p> <p>B UN No. 1969 ISOBUTANE</p> <p>C UN No. 1280 PROPYLENE OXIDE</p> <p>D UN No. 1086 VINYL CHOLORIDE, STABILIZED</p>	B

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 8204	<p>During transport of MIXTURE A (UN No. 1965) the same safety requirements must be followed as during transport of another gas. Which gas?</p> <p>A UN No. 1005 AMMONIA, ANHYDROUS</p> <p>B UN No. 1010 BUTADIENE-1-3, STABILIZED</p> <p>C UN No. 1969 ISOBUTANE</p> <p>D UN No. 1280 PROPYLENE OXIDE</p>	C
G 8205	<p>What hazard is characteristic of a mixture of liquefied gases composed of propane and butane?</p> <p>A Flammability</p> <p>B Toxicity</p> <p>C Polymerization</p> <p>D No danger</p>	A
G 8206	<p>What hazard is characteristic of UN No. 1965 HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S.?</p> <p>A No danger</p> <p>B Toxicity</p> <p>C Flammability</p> <p>D Polymerization</p>	C
G 8207	<p>What hazard is characteristic of a mixture of BUTANE and BUTYLENE (UN No. 1965)?</p> <p>A No danger</p> <p>B Toxicity</p> <p>C Flammability</p> <p>D Polymerization</p>	C
G 8208	<p>What hazard is characteristic of UN No. 1063 METHYL CHLORIDE?</p> <p>A No danger</p> <p>B Toxicity</p> <p>C Flammability</p> <p>D Polymerization</p>	C

Knowledge of physics and chemistry**Examination objective 9: Chemical bonds and formulae**

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 9001		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	
G 9002		D
	What is the molecular mass of a substance with the formula: $\text{CH}_2=\text{CCl}_2$? (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	
G 9003		C
	What is the molecular mass of a substance with the formula: $\text{CH}_3\text{-CO-CH}_3$? (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	
G 9004		B
	What is the molecular mass of a substance with the formula: CH_3Cl ? (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	

<i>Number</i>	<i>Source</i>	<i>Correct answer</i>
G 9005		A
	What is the molecular mass of a substance with the formula: $\text{CH}_2=\text{C}(\text{CH}_3)\text{-CH}=\text{CH}_2$? (The atomic mass of carbon is 12. The atomic mass of hydrogen is 1.)	
	A 68	
	B 71	
	C 88	
	D 91	
G 9006	Deleted	
G 9007	Deleted	
G 9008		A
	What is the molecular mass of a substance with the formula: $\text{CH}_3\text{-CH}(\text{CH}_3)\text{-CH}_3$? (The atomic mass of carbon is 12. The atomic mass of hydrogen is 1.)	
	A 58	
	B 66	
	C 68	
	D 74	
