

**Paper 1 July 2021      Time allowed 1 hour 45 min      Answer all questions**

Q1      a) When tested an aqueous solution of sodium hydroxide was found to cause irreversible damage of intact skin after an exposure time of 20 minutes and an observation of 3 hours. What class and packing group should be assigned to this material? Show how you arrive at your answer.

It satisfies the criteria for Class 8, packing group II as it caused irreversible damage to healthy skin in an exposure time between 3 and 60 minutes (20 min) and an observation time of < 14 days (3 hours).

b)      A diluted version of this solution did not cause irreversible damage to healthy skin but did corrode aluminium at a rate of 8 mm per year. What class and packing group applies to this solution?

As it does not cause irreversible damage to skin but corrodes aluminium at > 6.25 mm per year it should be classified as Class 8, Packing group III.

c)      Select a UN number and proper shipping name for the diluted solution?

UN 1824 SODIUM HYDROXIDE SOLUTION as there is a specific named entry in the dangerous goods list for sodium hydroxide solutions at both the packing group II and III degrees of danger

Ref: ADR Table 2.2.8.1.5.3, 3.2.2 Table B, 3.2.1 Table A Columns 1, 2, 4

Q2      a) Tetrabromomethane is to be packed in fibreboard boxes each containing 4 x 1L bottles. Can these boxes be shipped as limited quantity packages? Justify your answer.

Yes, the 1 L bottles fall within the inner packaging limit of 5 L for LQ packages of tetrabromomethane and at a total of 4 L approximately equal to 4 kg the total weight of boxes will be well within the limit of 30 kg for a combination LQ package.

b)      What labels and marks should be applied to the package?

No labels are required. The package should be marked with the Limited Quantity mark and orientation arrows on two opposite sides as there are liquids in a combination package.

Ref: ADR 3.2.2 Table B, 3.2.1 Table A columns 1, 7a, 3.4.1, 3.4.7.1, 5.2.1.10.1

Q3 Can sodium hydrosulphide with 10% water of crystallization be packed together with Phenetidines, and if so, under what conditions?

Sodium hydrosulphide with 10% water of crystallization = UN 2318 Class 4.2 - MP 14 applies

Phenetidines = UN2311, Class 6.1 – MP 19 applies

Yes, MP 14 allows Sodium hydrosulphide to be packed with other classes when it is in inner packagings of not more than 6 kg and MP 19 allows Phenetidines to be packaged with other classes when packaged in inner packaging of not more than 5 L, provided they do not react dangerously with each other.

Ref: ADR 3.2.2 Table B, 3.2.1 Table A columns 1, 3a, 9b, 4.1.10

Q4      a) Lithium ion batteries with a Watt hour rating of 5.5 Wh are packed in blister packs containing 4 batteries per blister pack. The blister packs are then placed 10 to a box for distribution to retail outlets. What marks and labels are required to be displayed on the boxes. Provide all relevant details.

Lithium ion batteries are assigned to UN 3480. They will qualify for the exemptions provided for in special provision 188 as the Watt hour is less than 100 Wh. As batteries on their own, the boxes will have to display the Lithium battery handling mark showing the UN number UN 3480 and a telephone number for additional information. No labels are required

b) What other conditions apply to the packages?

They must be capable of passing a 1.2 m drop test and each package can not weight more than 30kg.

Ref ADR 3.2.2 Table B, 3.2.1 Table A columns 1, 6, 3.3 SP188 b, d, f, g, h, 5.2.1.9

Q5 A chemical distributor in Italy is shipping Chloroacetonitrile to a customer in Hungary. The goods are packaged in combination packages which are then placed on a pallet and covered with black shrink wrap. The UN number and a no 6.1 label is displayed on the outside of the shrink wrap.

a) Is this sufficient?

No, the shrink wrap must also bear a no 3 label, orientation arrows on two opposite sides (liquids in combination packaging), and the word OVERPACK in letters 12 mm high

b) What languages are required for the marking?

The word overpack must be in Italian as the language of the consignor and one of English, French or German

Ref: ADR 3.2.2 Table B, 3.2.1 Table A columns 1, 3b, 5, 5.1.2.1, 2.2.61.1.2, 5.2.1.10.1

Q6 Can Cyclopropane be transported in cylinders and pressure drums?

Yes, Packaging instruction P200 applies to cyclopropane and per Table 2 of that instruction both cylinders and pressure drums are allowed.

Ref ADR 3.2.2 Table B, 3.2.1 Table A columns 1, 8, 4.1.4.1, P200 Table 2

Q7 a) State two of the subjects that must be covered in a specialization training for drivers of tank vehicles

Behaviour of vehicles on the road

Knowledge of various discharge systems

b) What is the period of validity of a driver's certificate?

5 years

Ref ADR 8.2.2.3.3, 8.2.2.8.2

Q8 A doctor wishes to send a blood sample from a patient who they suspect has contracted Hepatitis B to a lab for confirmation. What UN number and packing instruction apply to this sample

UN 3373 (it is not a culture, which is assigned to UN 2814)

Packing Instruction P650

Ref ADR 2.2.62.1.4.1 Table, 2.2.62.1.4.2, 3.2.1 Table A Columns 1, 8

Q9 a) When preparing to set out on his journey a driver of a dangerous goods vehicle is asked by a friend coming off night shift if he can have a lift home as he will be passing his home on his way. Is this permitted?

No passengers are not allowed

b) The driver was a smoker but has now switched to E-cigarettes. Can he vape while driving?

No, no smoking or use of e-cigarettes inside the vehicle

Ref ADR 8.3.1, 8.3.5