Pharmacy calculations: 20 practice questions with answers

Twenty calculation questions covering the nine main types in MPharm calculation tests and Part 1 of the GPhC Common Registration Assessment. Medly wrote these questions for practice. They are not GPhC questions. They are numbered 10 to 29, following on from the nine worked examples in the article. Try each one on paper, then check the answers at the end.

Questions

Question 10: (1 mark)

A child weighing 22 kg is prescribed a drug at 7.5 mg/kg twice daily. You have an oral suspension of 125 mg/5 mL. What volume should be given for each dose, in mL?

Question 11: (1 mark)

500 mL of glucose 5% is to be given over 6 hours using a giving set that delivers 20 drops/mL. What is the rate in drops per minute, to the nearest whole number?

Question 12: (1 mark)

A vial contains 1 g of powder with a displacement value of 0.7 mL per 1 g. What volume of water for injections should you add to make 200 mg/mL?

Question 13: (1 mark)

How many milligrams of active drug are in a 30 g tube of a 0.1% w/w cream?

Question 14: (1 mark)

A woman aged 82 weighs 52 kg. Her serum creatinine is 95 micromol/L. Estimate her creatinine clearance using Cockcroft-Gault, in mL/min to the nearest whole number.

Question 15: (1 mark)

A patient weighing 68 kg is prescribed a drug at 1.5 mg/kg once daily. The injection contains 40 mg/mL. What volume is needed, in mL to 2 decimal places?

Question 16: (1 mark)

A patient takes one tablet three times a day for 14 days, then one tablet twice a day for 7 days. How many tablets should you supply?

Question 17: (1 mark)

A patient takes 10 mL of an oral solution four times a day for 7 days. It comes in 100 mL bottles. How many bottles should you supply?

Question 18: (1 mark)

A patient is prescribed 0.25 mg of a drug. You have 62.5 microgram tablets. How many tablets make one dose?

Question 19: (1 mark)

A patch releases 25 micrograms of drug per hour and is worn for 72 hours. How many milligrams are released in total?

Question 20: (1 mark)

A patient weighing 80 kg needs a drug at 3 micrograms/kg/minute. The syringe contains 200 mg in 50 mL. What rate should the pump be set to, in mL/hour?

Question 21: (1 mark)

An infusion of 500 mL is started at 08:00 and runs at 80 mL/hour. At what time will it finish?

Question 22: (1 mark)

A vial contains 600 mg of powder with a displacement value of 0.5 mL per 600 mg. It is reconstituted with 9.5 mL of water. What volume contains a 450 mg dose?

Question 23: (1 mark)

What volume of a 20% w/v stock solution do you need to make 250 mL of a 4% w/v solution?

Question 24: (1 mark)

10 mL of a 1 in 1000 solution is diluted to 100 mL. Express the final concentration as a ratio (1 in x).

Question 25: (1 mark)

How many micrograms of adrenaline are in 10 mL of adrenaline 1 in 10,000?

Question 26: (1 mark)

Lidocaine 1% w/v is used and the maximum dose for the procedure is 200 mg. What is the maximum volume, in mL?

Question 27: (1 mark)

How many millimoles of sodium are in 500 mL of sodium chloride 0.9% w/v? The molecular mass of sodium chloride is 58.5. Give your answer to the nearest whole number.

Question 28: (1 mark)

How many millimoles of potassium are in a 10 mL ampoule of potassium chloride 15% w/v? The molecular mass of potassium chloride is 74.5. Give your answer to the nearest whole number.

Question 29: (1 mark)

A man aged 65 weighs 90 kg. His serum creatinine is 180 micromol/L. Estimate his creatinine clearance using Cockcroft-Gault, in mL/min to the nearest whole number.

Answers

Question 10: 7.5 × 22 = 165 mg. 125 mg ÷ 5 mL = 25 mg/mL. 165 ÷ 25 = **6.6 mL**.

Question 11: 500 × 20 = 10,000 drops. 6 × 60 = 360 minutes. 10,000 ÷ 360 = 27.78, so **28 drops/minute**.

Question 12: Final volume = 1,000 mg ÷ 200 mg/mL = 5 mL. Water = 5 0.7 = **4.3 mL**.

Question 13: 0.1 g in 100 g, so 0.03 g in 30 g = **30 mg**.

Question 14: (140 82) × 52 × 1.23 = 3,709.68. × 0.85 = 3,153.23. ÷ 95 = 33.19, so **33 mL/min**.

Question 15: 1.5 × 68 = 102 mg. 102 ÷ 40 = **2.55 mL**.

Question 16: 3 × 14 = 42. 2 × 7 = 14. 42 + 14 = **56 tablets**.

Question 17: 10 × 4 × 7 = 280 mL. 280 ÷ 100 = 2.8, so **3 bottles**.

Question 18: 0.25 mg = 250 micrograms. 250 ÷ 62.5 = **4 tablets**.

Question 19: 25 × 72 = 1,800 micrograms = **1.8 mg**.

Question 20: 3 × 80 = 240 micrograms/minute. × 60 = 14,400 micrograms/hour = 14.4 mg/hour. 200 mg ÷ 50 mL = 4 mg/mL. 14.4 ÷ 4 = **3.6 mL/hour**.

Question 21: 500 ÷ 80 = 6.25 hours = 6 hours 15 minutes. 08:00 + 6 hours 15 minutes = **14:15**.

Question 22: Final volume = 9.5 + 0.5 = 10 mL. 600 mg ÷ 10 mL = 60 mg/mL. 450 ÷ 60 = **7.5 mL**.

Question 23: C1 × V1 = C2 × V2. 20 × V1 = 4 × 250 = 1,000. V1 = **50 mL**.

Question 24: 1 in 1000 = 1 mg/mL, so 10 mL holds 10 mg. 10 mg in 100 mL = 0.1 mg/mL = 1 g in 10,000 mL, so **1 in 10,000**.

Question 25: 1 in 10,000 = 0.1 mg/mL. 10 mL × 0.1 = 1 mg = **1,000 micrograms**.

Question 26: 1% w/v = 1 g in 100 mL = 10 mg/mL. 200 ÷ 10 = **20 mL**.

Question 27: 0.9 g in 100 mL, so 4.5 g in 500 mL = 4,500 mg. 4,500 ÷ 58.5 = 76.92, so **77 mmol**.

Question 28: 15 g in 100 mL, so 1.5 g in 10 mL = 1,500 mg. 1,500 ÷ 74.5 = 20.13, so **20 mmol**.

Question 29: (140 65) × 90 × 1.23 = 8,302.5. ÷ 180 = 46.13, so **46 mL/min**.

Checks before you submit an answer

- Is the answer in the unit the question asks for?
- Did you answer one dose or a day, water added or final volume?
- Did you round only at the last step, to the precision asked for?
- Does the number make sense for this patient?

Cockcroft-Gault: CrCl (mL/min) = (140 age) × weight in kg × 1.23 ÷ serum creatinine in micromol/L. Multiply by 0.85 for women.