

Pre-Registration Pharmacists Calculations Training 2020

Pre-Course Work

Guidance

This pre-course work for the calculations training should be completed prior to attending your online tutorials.

For each question you need to decide whether each statement is TRUE or FALSE.

Resources

Some of these questions will require reference to current editions of the BNF and/or BNF for Children.

A calculator can be used to complete these questions.

Please note you should bring your own copy of the BNF and BNF for Children to your training events as well as a calculator.

Pre-Course Work Questions (SET ONE)

Question 1

You are working as a pharmacist in a GP practice and have been asked to help reduce expenditure on medicines. As a result, you are reviewing the use of doxazosin 4 mg XL tablets, as these cost more than doxazosin 2 mg IR tablets at an equivalent dose.

Costs are shown below:

Doxazosin XL 4 mg tablets	£5 per 28 tablets
Doxazosin IR 2 mg tablets	86p per 28 tablets

You have reviewed nine patients who are prescribed doxazosin 4 mg XL tablets daily on repeat prescription and have identified that seven of them could potentially switch to using the doxazosin 2 mg IR tablets at a dose of one tablet daily. The practice has a repeat prescribing policy of 56 days treatment on a prescription. The total saving for the practice for six issues assuming all seven suitable patients switch to using the doxazosin 2 mg tablets is £347.76.

Question 2

75 mL of Pholcodine Linctus, BP and 125 mL of Pholcodine Linctus, Strong, BP contain the same amount of pholcodine.

Question 3

A father collects five 150 mL bottles of furosemide 20 mg/5 mL sugar-free oral solution for his 25 kg daughter who is going abroad for four weeks in the summer. She currently takes 2 mg/kg 3 times a day. Assuming there are no spillages or other reasons for loss of medication, this quantity will provide enough of the medication for the entire trip abroad.

Question 4

A patient weighing 80 kg is prescribed drug P to maintain sedation during surgery. The IV infusion is to be delivered at a dose and rate of 2.25 mg/kg/hour. Drug P is available to the Anaesthetist as a 50 mL bottle of 1% injection. He will dilute this to 5 mg/mL using glucose 5% prior to administration. It is appropriate for him to administer the diluted drug P at a flow rate of 0.6 mL/minute.

Question 5

In your pharmacy, you have a stock solution of drug T with a concentration of 80% w/v. Drug T is used as a skin disinfectant at a concentration of 0.25% w/v. You are requested to supply 40 mL of a solution of intermediate strength, such that the patient will dilute it 1 in 10 immediately prior to use to produce the skin disinfectant at the correct concentration. The concentration of the intermediate solution should be 4% w/v.

Question 6

This is an excerpt from a legally written prescription:

Chlordiazepoxide hydrochloride 5 mg Capsules

15 mg QDS on day 1

10 mg QDS on day 2

10 mg TDS on day 3

5 mg TDS on day 4

5 mg BD on day 5

5 mg nocte on day 6

Please supply enough for 6 days of therapy

It is correct to supply 40 chlordiazepoxide hydrochloride 5 mg capsules against this prescription.

Question 7

You are completing an accuracy check of an extemporaneously prepared cream. Below is an excerpt from the extemporaneous record book for the manufacture of this cream.

Ingredient	Amount used
Aqueous calamine cream	150 g
Zinc oxide	1500 mg

The zinc oxide content in the manufactured cream is 3.96% w/w.

Question 8

25 g of potassium chloride is needed to produce 250 mL of a solution such that, when 10 mL of this solution is diluted to 2 L a 1 in 2000 solution is produced.

Question 9

You have to supply a patient with 200 mL of 20 vols hydrogen peroxide solution. To prepare this solution you have to dilute 30% v/v hydrogen peroxide solution. It would be appropriate for you to use 40 mL of 30% v/v hydrogen peroxide solution.

Question 10

A 55 year old woman has a percutaneous endoscopic gastronomy (PEG) tube *in situ*. She requires 1800 kcal per 24 hours from her enteral feed, and has been instructed to use Resource Energy. She would like to feed for 12 hours overnight. It is appropriate to deliver this feed at a rate of 100 mL/hour.

Pre-Course Work Questions (SET TWO)

Question 1

Mrs D, who is 72 years old, has advanced B-cell chronic lymphocytic leukaemia. Her oncologist has decided to prescribe fludarabine as monotherapy for her and asks you to advise him on a suitable starting dose. On checking Mrs D's medical notes you note that her serum creatinine is 0.12 micromole/mL, has an ideal body weight and her height is 1.39 m. It is appropriate for you to suggest a starting dose of 60 mg daily for 5 days after using the Cockcroft and Gault formula.

$$\text{Body Surface Area (m}^2\text{)} = \sqrt{\{\text{weight (kg)} \times \text{height (cm)} \div 3600\}}$$

Question 2

Two litres of a solution of drug A is to be given to a patient over a 12 hour period. If 12 drops equal 0.8 mL the solution should be given at a rate of 100 drops per minute.

Question 3

A patient is given an intravenous dose of drug A and his peak serum concentration is found to be 40 mg/litre. Given that 15 hours later his serum concentration is 5 mcg/mL the elimination half-life of drug A in this patient is 5 hours. (You can assume that the distribution is complete and the elimination is described by a 1st order process)

Question 4

A syringe driver contains 20 mL of diamorphine hydrochloride 4 mg/mL solution. The length of the syringe driver is 80 mm. The rate should be set at 3.75 mm/hour so that the patient receives their diamorphine hydrochloride at a rate of 5 mg/hour.

Question 5

You are presented with a legally written prescription for progesterone capsules. The patient has been prescribed the drug at a dose of 200 mg once daily from day 15 to day 26 of menstrual cycle for three cycles. It would be appropriate to supply this patient 60 Utrogestan® 100 mg capsules for the complete duration of therapy.

Question 6

A pharmacist adds 20 mL of a 50% w/v solution of sodium chloride to produce 2000 mL of sodium chloride solution. The resulting solution has a sodium chloride concentration of 1 in 200.

Question 7

Amoxicillin capsules are available as capsules containing amoxicillin trihydrate equivalent to 250 mg and 500 mg of amoxicillin. To prepare 28 amoxicillin 250 mg capsules 3.68 g of amoxicillin trihydrate is needed.
(RMM of amoxicillin = 365. RMM of amoxicillin trihydrate = 419).

Question 8

25 g of potassium permanganate is required to produce 250 mL of an intermediate solution. The strength of this intermediate solution is such that when 5 mL of it is diluted to 500 mL a 0.1% w/v solution is produced.

Question 9

A patient uses 20 mL of an antiseptic of concentration 1 in 600 nightly for 10 nights. After the 10 nights of compliant use 0.33 g of the active ingredient will have been used.

Question 10

Metformin hydrochloride suspension has been prescribed for an 11-year-old boy. You have to prepare it extemporaneously for this patient.

He is to receive a dose of 500 mg once daily for 10 days until his review. The suspension must be stored in the fridge. The formula you are going to use includes Concentrated Chloroform Water 2.5 mL per 100 mL suspension, but you only have available to you either Chloroform or Chloroform Water Double Strength. The suspension is prepared such that the daily dose is within 5 mL of the suspension.

It would be appropriate to use 10 Glucophage[®] 500 mg tablets and 25 mL of Chloroform Water Double Strength to prepare 10 days' supply of this suspension.

Question 11

50 mL of sodium chloride solution 0.9% w/v intravenous infusion contains 7.5 mmoles of sodium ions.

Question 12

The concentration of fluoride in a water supply is 0.9 ppm. 2 L of this solution would contain 9 mg of fluoride.

Question 13

A patient weighing 72 kg is prescribed drug F to be given intravenously at a dose of 50 mcg/kg/hour. If drug F is available as an IV solution at a concentration of 2 mg/mL, the flow rate required is 0.03 mL/min.

Question 14

You are required to dispense 150 g of a 0.025% w/w clobetasone butyrate ointment using Eumovate® ointment and emulsifying ointment as a diluent. You should use 112.5 g of emulsifying ointment and 37.5 g of Eumovate® ointment. (You can assume no excess is prepared.)

Question 15

While providing emergency duty cover for your hospital an emergency arises on one of the wards. A patient requires 1.8 L of 10% glucose to be administered immediately. Due to a recent wholesaler supply problem you only have 5% glucose and 50% glucose available to you. You are easily able to add and remove fluid aseptically from these bags. You would use 1600 mL of the 5% glucose and 200 mL of the 50% glucose to prepare 1.8 L of 10% glucose for the patient.

Question 16

QWE pharmaceuticals produces a batch of compressed tablets every three weeks containing 300 mg of active ingredient with a mean tablet weight of 0.4 g. 3750 kg of active ingredient is required for a total batch size of 5000 kg.

Question 17

The adult dose of a drug is 250 mg/kg. Therefore, an adult weighing 196 lb should be given 24 g of this drug.

Question 18

Rose is 9 years old, weighs 28 kg and has a height of 130 cm. She is prescribed methotrexate at a dose of 10 mg/m² weekly for 4 weeks when she will then be reviewed. Rose should be prescribed 16 methotrexate 2.5 mg tablets.
Body Surface Area (m²) = $\sqrt{\{[\text{weight (kg)} \times \text{height (cm)}] \div 3600\}}$

Question 19

You have a 5 mL vial containing 5x10⁶ units of drug T per mL. To prepare 5 mL of a solution containing 3x10⁶ units of drug T per mL solution 3 mL of the original solution should be used and the final volume made up to 5 mL with sterile water for injection. (You can assume water for injection is the recommended diluent for this drug.)

Question 20

A 45-year-old male patient weighing 72 kg requires a loading dose of gentamicin (as sulphate) to treat an infection, after which he will receive multiple daily dosing. 150 mg is a suitable intravenous loading dose of gentamicin (as sulphate) for this patient to achieve a one-hour target peak serum concentration. (Volume of distribution = 0.25 L/kg)