Supplementary Course in
Dispensing and Rational Prescribing

FORMAL ASSESSMENT – MODULE p10

The FORMAL ASSESSMENT of this module only has ONE part:

Part 1: A FORMATIVE COMPETENCY ASSESSMENT (FCA) QUESTION PAPER

COMPLETE THE PHARMAKO-MEDICAL CALCULATION EXERCISES IN THE QUESTIONAIRE

Part 2: PRACTICAL ASSIGNMENT

THERE IS NO PRACTICAL ASSIGNMENT FOR THIS MODULE

In the process of completing this FORMAL ASSESSMENT you are required to:

1) have the attached declaration of authenticity COUNTERSIGNED by a designated responsible person

2) go to the PEI Learning Portal, click on the “assessments” button and select the option “Click for Declaration of Authenticity for the Formal Competency Assessment”. Complete this statement of authenticity and then click the ‘SUBMIT’ Tab to submit your completed declaration online

3) return to the learning portal and download the model answers for this FCA by selecting the “Click to download formative assessment memorandum (model answers)” option. Use this model answer to mark and correct your FCA.
MODULE p10
FORMATIVE COMPETENCY ASSESSMENT

MODULE p10: PHARMACOMEDICAL CALCULATIONS
(Chapter 4: Volume 2 Course Manual)

Formative Competency Assessments (FCA’s) are presented at the end of every Course Module. When you have studied the sections of a module, and answered the online quizzes on these sections, when you get to the end of the module you are prompted to answer the final course quiz.

When you achieve a mark of 80% for this quiz you are then prompted to apply for the Formative Competency Assessment question paper (questionnaire).

The FORMATIVE COMPETENCY ASSESSMENT (FCA) for this module is set in the form of a QUESTION PAPER which tests your KNOWLEDGE, UNDERSTANDING and PRACTICAL APPLICATION of the foundational principles covered in this section of the dispensing course training material.

IMPORTANT: PLEASE TAKE NOTE OF THE FOLLOWING POINTS WITH RESPECT TO THIS FCA:-

1) Your FINAL WRITTEN ASSESSMENT PAPER will include a selection of questions on this Module which will be SIMILAR IN FORMAT AND CONTENT to those set in this FORMATIVE COMPETENCY ASSESSMENT

2) Because of the implications of Point 1 above YOU ARE STRONGLY ADVISED NOT TO TAKE SHORT CUTS IN COMPLETING THIS FCA – IF YOU DO SO YOU MAY COMPROMISE YOUR CHANCES OF PASSING THE FINAL WRITTEN ASSESSMENT.

3) In answering the questions set in this FORMATIVE COMPETENCY ASSESSMENT you are required to:-
   o Refer to the relevant sections of your training material (lecture presentations and course manuals)
   o Read each question carefully – make sure you are clear about what the question asks
   o Attempt to answer each question with DUE DILIGENCE and to the BEST OF YOUR ABILITY.
   o Use a pen with either BLACK or BLUE INK to fill in your answers in the space provided on the question paper.
   o When you have completed the FORMATIVE COMPETENCY ASSESSMENT question paper you must request the MEMORANDUM (Model Answers). You must refer to this memorandum and use it to mark your answers.
   o In places where you have answered a question incorrectly, or left information out, use a RED PEN to MARK your answers and FILL IN the correct information where necessary
PRACTITIONER DECLARATION OF AUTHENTICITY

When you have completed this Formative Competency Assessment (FCA), you must sign this declaration of authenticity.

It confirms that, after having studied the various sections contained in the module, that you have attempted to complete the assessment to the best of your ability and that it is your own attempt and that you have not copied it from someone else or allowed another learner to copy it from you.

This declaration must be signed by the learner and countersigned by a NOMINATED Verifier, Supervisor, Tutor, Assessor or Mentor.

FORMATIVE COMPETENCY ASSESSMENT MODULE p10: PHARMACO-MEDICAL CALCULATIONS

Learner Statement of Authenticity

I confirm that I have duly completed this Formative Competency Assessment to the best of my ability and that it is entirely my own work and it does not include any work completed by anyone other than myself. I have completed the Assessment in accordance with PEI’s instructions and I have not, or will not, allow another learner to copy this work from me.

Signature: __________________________ Date: ________________

Learner Name (Print): ________________________________

Statutory Body: ____________________________ Prof. Reg. No: ____________________________

(HPCSA; SANC; SAPC)

Verifier Statement of Authenticity

I confirm that, to the best of my knowledge, that the work contained in this Assignment, and completed in accordance with the Assignment brief, is the individual work and effort of __________________________(Learner Name)

Signed: __________________________ Date: ________________

Name: ______________________________________

Capacity: ______________________________________

(VERIFIER / SUPERVISOR / TUTOR / FACILITATOR / ASSESSOR)

This completed FORMAL ASSESSMENT must be included in your PORTFOLIO of PRACTICAL ASSIGNMENTS.
Those practitioners who have had the benefit of being exposed to more complex calculations in the course of their professional training will have developed their individual techniques for solving calculation problems.

They will, in some cases, be able to perform the calculation problems in this Formative Assessment with relative ease and will often use a calculation method which involves fewer steps. They may also be able to successfully perform these calculations without needing to refer to the relevant sections of the training material included in this course.

However, it has been our experience that the majority of practitioners who have attended our Dispensing Courses have not been routinely exposed to the need to perform reliable and accurate medical calculations. For the benefit of practitioners that fall into this category, the calculations that have been set in this formative assessment can all be solved using the methods covered in the training material. If you are thoroughly familiar with these methods, and have invested the time to get a good understanding of the principles involved, you will manage to solve the calculations in this section by systematically applying these principles.

There are only 5 basic essentials that practitioners need to master to complete this section successfully. These essentials include knowing about:

1) The metric system and its units of measurement and the decimal system
2) How to work with a simple equation
3) The principles involved in working with ratios and proportions
4) The principles involved in performing dilution calculations
5) How to work out infusion rates of intravenously administered medications
Conversions and Calculations that Health Practitioners need to be able to perform successfully in order to dispense medicines competently include the following:

**Metric Conversions**

1) Conversion of Amounts and Units in the Metric System

**Calculation of the quantities of dosage form to supply on a prescription**

2) Calculation of the amount of medication required to be dispensed for a prescription when given a prescribed dose, dose-interval and duration of treatment

**Ratio Calculations**

3) Calculation of the dose of drug to be administered to patient based on doses stated in SAMF on either a dose per Kilogram (dose/Kg) basis or on a or dose per square metre of Body Surface Area (dose/m²)

4) Calculation of the volume of injection required to administer a prescribed dose of a parenterally administered drug

5) Calculation of the percentage concentration of a component in a given medicinal preparation

**Calculation of the Concentrations of liquids or Solids after Dilution**

6) Calculation of the amount or concentration of a given solution that is required for the preparation of a dilute solution.

**Calculating Doses and Administration Rates of Injections and I/V Solutions**

7) Calculation of the amount of an injection to administer.

8) Calculation of the rate of intravenous administration of a prescribed drug

**Calculation of Important Clinical Values**

9) Calculation of important clinical values – including, but not limited to:

   (i) Body Mass Index (BMI)

   (ii) Waist to Hip Ratio (W/H),

   (iii) Glomerular Filtration Rate (GFR),

   (iv) Body Surface Area (BSA)
SECTION 1: REVISION – FUNDAMENTALS OF ARITHMETIC

QUESTION 1: Relationship between Fraction, Ratio, decimal and Percentage

Convert the following Fractions to Ratio, Decimal and Percentage values.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Ratio</th>
<th>Decimal</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) (\frac{1}{3})</td>
<td>1 : 3</td>
<td>0.333</td>
<td>33.3%</td>
</tr>
<tr>
<td>b) (\frac{4}{5})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) (\frac{3}{8})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) (\frac{8}{10})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) (\frac{14}{16})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) (\frac{16}{20})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g) (\frac{20}{25})</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

QUESTION 2: Working with Proportion Sums

(Refer Chap 4: Sections 6 (i)–(iv); pages 118–122 Vol. 2 Course manual)

Work out the value of \(x\) in the following proportions

a) \(5 : 20 :: 2 : x\)
b) \( x : 16 :: 4 : 8 \)

---

c) \( 27 : x :: 9 : 3 \)

Use a ‘Shortcut’ to solve this problem – try the following method:

Multiply: \( 3 \times 4 = 12 \)

\[
\begin{array}{c}
2 \\
3 \\
4 \\
6
\end{array}
\]

Multiply: \( 2 \times 6 = 12 \)

Solve \( 27 : x :: 9 : 3 \) using this ‘shortcut’ method:

Multiply:

\[
\begin{array}{c}
: \\
::
\end{array}
\]

Multiply:
1) If you are given the following Equation (= Formula) in which A (the ‘subject’ of the formula) is numerically equal to the product of \((B) \times (C)\) divided by \((D)\) as shown below:

\[
A = \frac{(B) \times (C)}{(D)}
\]

How would you rearrange the equation to make \((B), (C)\) and \((D)\) the ‘subject’ of the formula?

(i) \(B = \frac{(\quad)}{(\quad)} \times \frac{(\quad)}{(\quad)}\)

(ii) \(C = \frac{(\quad)}{(\quad)} \times \frac{(\quad)}{(\quad)}\)

(iii) \(D = \frac{(\quad)}{(\quad)} \times \frac{(\quad)}{(\quad)}\)

2) Write out the formula below by rearranging them to make ‘\(N\)’ the subject of the formula. When you have completed this, work out the value on ‘\(N\)’ in each case.

(i) \(\frac{1}{N} \times 5 = 10 \Rightarrow \)

(ii) \(\frac{4}{9} \times N = 8 \Rightarrow \)

(iii) \(\frac{N}{8} \times 4 = 3 \Rightarrow \)
**SECTION 2: METRIC SYSTEM AND DECIMAL CONVERSIONS**

**QUESTION 1**

Fill in the missing figures of the metric conversions in the following table

<table>
<thead>
<tr>
<th>Abbreviations: Metric Units of Mass, Volume and Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kg = Kilogram; g = gram; mg = milligram; mcg = microgram</td>
</tr>
<tr>
<td>L = Litre; mL = millilitre; mcL = microlitre</td>
</tr>
<tr>
<td>m = metre; cm = centimetre; mm = millimetre</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Conversion 1</th>
<th>Conversion 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) 1 Kg</td>
<td>=? g</td>
<td>(16) 0.0015 Kg =? g</td>
</tr>
<tr>
<td>(2) 1 g</td>
<td>=? Kg</td>
<td>(17) 4500 mcg =? g</td>
</tr>
<tr>
<td>(3) 1 g</td>
<td>=? mg</td>
<td>(18) 3765 g =? Kg</td>
</tr>
<tr>
<td>(4) 1 mg</td>
<td>=? g</td>
<td>(19) 0.25 g =? mg</td>
</tr>
<tr>
<td>(5) 1 mg</td>
<td>=? mcg</td>
<td>(20) 0.125 mg =? mcg</td>
</tr>
<tr>
<td>(6) 1 mcg</td>
<td>=? mg</td>
<td>(21) 350 mg =? g</td>
</tr>
<tr>
<td>(7) 1 L</td>
<td>=? mL</td>
<td>(22) 0.005 mg =? mcg</td>
</tr>
<tr>
<td>(8) 1 mL</td>
<td>=? L</td>
<td>(23) 0.375 mg =? mcg</td>
</tr>
<tr>
<td>(9) 1 mL</td>
<td>=? mcL</td>
<td>(24) 62.5 mcg =? mg</td>
</tr>
<tr>
<td>(10) 1 mcL</td>
<td>=? mL</td>
<td>(25) 0.01 mL =? mcL</td>
</tr>
<tr>
<td>(11) 1 m</td>
<td>=? cm</td>
<td>(26) 1.75 L =? mL</td>
</tr>
<tr>
<td>(12) 1 cm</td>
<td>=? m</td>
<td>(27) 125 mL =? L</td>
</tr>
<tr>
<td>(13) 1 m</td>
<td>=? mm</td>
<td>(28) 100 mcL =? mL</td>
</tr>
<tr>
<td>(14) 1 mm</td>
<td>=? m</td>
<td>(29) 156 cm =? m</td>
</tr>
<tr>
<td>(15) 1 cm</td>
<td>=? mm</td>
<td>(30) 25.4 mm =? cm</td>
</tr>
</tbody>
</table>
SECTION 3: PROPORTION CALCULATIONS

**QUESTION 1:** Quantities of DOSAGE FORM to supply on a Prescription

What quantities of medication will you supply when you dispense the following prescriptions?

(1) A Rx for Diamicron® 40 mg twice a day for 28 days. You have 80 mg Diamicron® tablets

(2) A Rx for Glucophage® 1 g twice a day for 28 days. You have Glucophage® 500 mg tablets

(3) A Rx for Ibuprofen 200 mg 4 x daily for 5 days. You have Ibuprofen 20 mg/mL suspension

(4) A Rx for Paracetamol 1 g 3 times a day for 5 days. You have Paracetamol 500 mg tablets
**QUESTION 2: Complete the following Proportion Calculations**

<table>
<thead>
<tr>
<th>Make sure you use the same Metric Units for all Dose Calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the calculations you are asked to solve below, the Metric units for;</td>
</tr>
<tr>
<td>- DOSE prescribed and</td>
</tr>
<tr>
<td>- CONCENTRATION of Active Pharmaceutical Ingredient (API) in the Product supplied</td>
</tr>
<tr>
<td>When this is the case, make sure you <strong>convert the units</strong> for Dose and Concentration to the same Metric Units before you attempt to solve the problem</td>
</tr>
</tbody>
</table>

1) A patient has been prescribed 0.01 gram twice a day Methylphenidate (Ritalin®).
   If Ritalin contains 10 mg per tablet, how many tablets must the patient receive for each dose?

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2) If the dose of Salbutamol prescribed (given by IM injection) is:
   - 8 micrograms per Kilogram (8 mcg/Kg) every 4 hours as necessary (SAMF) and
   - your patient is a 93.75 Kg adult.
   If you have Ventolin® Ampoules that contain 0.5 mg Salbutamol per 1 mL (0.5mg/mL), what **volume** of injection must be administered to this patient **per dose**?

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3) The dose of salbutamol administered by inhalation is 1 metered dose (1 puff). If a Ventolin® aerosol inhaler contains:

- **200 metered doses**
- a total of **20 mg of salbutamol**

How many microgrammes (mcg) of salbutamol does a patient receive in 1 puff?

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4) A geriatric patient has been prescribed Digoxin **62.5 mcg** once daily.

If you have Lanoxin® elixir in stock which contains

- **0.05 mg/mL** of digoxin.

How many milliliters of the Lanoxin® elixir would you administer to the patient?

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5) If one (1) tablet of a preparation:

- **6 mg** of an antihistamine per tablet and there are
- **25 tablets** in the pack

What is the total number of milligrams of antihistamine present in the pack of tablets?

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6) There are **27 g** of Aspirin in a pack of tablets that have **300 mg** of Aspirin per tablet. How many tablets are there in the pack?

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7) If 30 doses of Aspirin contain a total of 9g of Aspirin, how many milligrams of Aspirin are there in a single dose?

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8) The drug ‘Kur-alkaloid’ is a potent drug that is given in doses of 500 microlitres (500mcL).

If the bottle of ‘Kur-alkaloid’ contains
• a volume of 7mL
How many doses are there in the bottle?

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9) The prescribed dose of a drug is 2.5 mg per 1 Kilogram (2.5mg/Kg). The patient weighs 70 Kg.

If one (1) tablet contains 50 mg of drug, how many tablets would you administer to the patient?

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10) Your patient weighs 72 kilograms and he must receive 1.4mg/Kg of the antihypertensive drug metoprolol tartrate (Lopressor®) twice a day. The drug is available in the form of 100 mg tablets. How many tablets should this patient receive twice a day?

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11) A bottle of Stilpane® Syrup contains 100 mL of liquid. In this 100 mL of liquid there are
  - 20 doses
  - 2.4 g of Paracetamol
  - 0.1 g of Codeine Phosphate
  - 0.13 g of Promethazine Hydrochloride

(i) What is the size of a single dose of Stilpane®?

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(ii) How many milligrammes (mg) of Paracetamol are contained in a single dose?

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(iii) How many milligrammes (mg) of Codeine Phosphate are contained in a single dose?

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(iv) How many milligrammes (mg) of Promethazine Hydrochloride are contained in a single dose?

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12) You have a 3 year old male patient, Lukas Mguni. He has acute tonsillitis, accompanied by fever
    and pain from his sore throat. For his tonsillitis, you decide to prescribe Len V.K.® Suspension.
    This product contains 125 mg of Phenoxythymethylpenicillin per 5 mL (125mg/5mL).

(i) Lukas has a body mass of 15 Kg. The maximum paediatric dose of phenoxythymethylpenicillin
    recommended by the SAMF is 50 mg/Kg/day. Use this to calculate the maximum daily dose of
    phenoxythymethylpenicillin that Lukas should receive
(ii) If this daily dose is to be given in 4 divided doses – how many milligrammes of phenoxymethylpenicillin will Lukas receive in each dose he is given?

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(iii) How many mL of Len V.K.® Suspension would contain the prescribed dose?

(Remember: you were told that Len V.K.® Suspension contains 125 mg/5mL Phenoxymethylpenicillin).

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(iv) You want Lukas to take the Len V.K.® Suspension for 10 days. If each bottle of Len V.K.® Suspension contains 100 mL – what quantity of Len V.K.® Suspension and what repeat instructions must you prescribe?

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(v) What specific instructions, required by Good Pharmacy Practice in South Africa, should appear on the label of the Len V.K.® Suspension that is issued for Lukas?

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13) An infant has been prescribed a dose of 250 000 u (u = units) of Benzyl Penicillin via an Intramuscular Injection.

You have in stock:
- a vial containing 5 Mega units (5 Mu = 5 000 000 u) of Benzyl Penicillin as a dry powder
- a 20 mL vial of buffered diluent containing which is used to reconstitute the injection

To minimize the volume of fluid injected, the required dose of 250 000 u is to be administered in exactly 0.5mL of the reconstituted injection.

(i) What is the total volume of the reconstituted injection in which the 5 Mu Benzyl Penicillin must be contained so that 250 000 units is contained in 0.5 mL of the reconstituted injection?
(ii) Explain how you would proceed to prepare the syringe to administer the prescribed dose.

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14) You regularly dispense Whitfield’s Ointment (Compound Benzoic Ointment BP 1988) in your practice. The concentration of Salicylic and Benzoic acids in this ointment are:
   • 3% of Salicylic Acid
   • 6% of Benzoic Acid
which are in a simple admixture with Emulsifying Ointment as vehicle (base)

If you want to make 1.5 Kg of Whitfield’s Ointment, how much of each ingredient would you need?

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(i) How much Salicylic Acid would you need to weigh out?

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(ii) How much Benzoic Acid would you need to weigh out?

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QUESTION 3: Complete the following Percentage Calculations

Remember: Percentage Calculations use the same logic as Proportion Calculations
In working out the calculations below, it is important to remember that;
1) When working out the Percentage strengths of Solid preparations (e.g. Ointments etc.) the Metric Units for the Ingredient and Product must always be the same. If they are not, you must CONVERT them to the same Units before you start the calculation
2) When working out the Percentage strengths of Solutions, because 1mL has a mass of ± 1 g the amount of the dissolved substance (solute) must be expressed either in:
   (i) Grams (g) of solute per given volume, millilitre (mL), of solution (most commonly used) or
   (ii) Kilograms (Kg) of solute per given volume, Litre (L), of solution (only used when dealing very large volumes – for example in manufacturing large volumes of liquid preparations (the reason for this is that 1 mL of water has a mass of ± 1 g and 1 L of water weighs 1 Kg)

1) Panado syrup contains **125 mg** of paracetamol per 5 mL. What is the % strength of paracetamol in this product?

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2) What is the **Percentage (%) Concentration of the stated active ingredient** in each of the following?

   a) An Analgesic Mixture containing 600 mg of Codeine in 100 mL of mixture

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   b) An anticonvulsant Suspension containing 0.25 grams of Phenytoin in 10 mL of suspension

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   c) An ointment containing 75 mg of Hydrocortisone in 15 grams of ointment

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   __________________________________________________________________
SECTION 4: DILUTION CALCULATIONS

Dilution Calculations: Use the Formula $C_1 \times V_1 = C_2 \times V_2$
In working out dilution calculations, the principle applied is that:
☞ the Product of Concentration x Volume of Weaker and Stronger Solutions are equal.
This means that the:
☞ Product of the CONCENTRATION (1) multiplied by the VOLUME (1) of the strong solution
   WILL ALWAYS BE EQUAL TO THE
☞ Product of CONCENTRATION (2) multiplied by the VOLUME (2) of the weaker solution
   i.e. Concentration (1) x Volume (1) = Concentration (2) x Volume (2)

Question 1

1) How many milliliters of 90% v/v alcohol do you require to prepare 150 mL of a 70% v/v alcohol solution?

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2) You keep Betadine ® antiseptic solution which contains 10g of Povidone Iodine per 100 mL of solution. How would you dilute this solution to supply your patient with a 500 mL bottle containing 1% of Povidone Iodine as an oral antiseptic mouthwash solution.

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3) Hibiscrub ® liquid is a concentrated solution that contains 4% of Chlorhexidine Gluconate.
In your clinic you want to use chlorhexidine gluconate as an antiseptic for the following purposes:
   (i) To prepare 500 mL of a 0.5% solution in 70% alcohol for preoperative skin disinfection and as a handwash. (You have a solution of 90% Alcohol which you must use to prepare your final product).
       This calculation requires 2 steps:
       Firstly: calculate the amount of the Concentrated Chlorhexidine Solution to use

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Secondly: Calculate volume of 90% alcohol required to make up 500 mL of 70% alcohol

To prepare the final product:

Take ? mL of 4% Chlorhexidine Soln
Add ? mL of 90% alcohol
⇒ make up to 500 mL with distilled water

(ii) To prepare 500 mL of a 0.02% aqueous solution for bladder irrigation

4) Adrenaline injection is used in treatment of anaphylaxis. It contains 1 g of Adrenaline per Litre.
   (i) What is the concentration of this adrenaline solution expressed as;
      (i) A Ratio

      (ii) A percentage

      (iii) Milligrammes of adrenaline per 1 mL

(ii) How would you dilute a 1 mL ampoule of the 1 : 1000 Adrenaline solution with normal saline to get a 1 : 10 000 solution of adrenaline?

(iii) If you injected a patient with 5 mL of a 1:10 000 solution for cardiac arrest, what dose (= how many mg) of adrenaline would the patient receive?
SECTION 5: ADMINISTRATION OF INTRAVENOUS SOLUTIONS

Equations for Intravenous Administration

1) When using an Infusion Pump, the Flow Rate of an intravenously administered solution is given by the Volume (in mL) to be administered divided by the Time (in minutes) over which the solution is to be administered. Expressed mathematically as:
   \[
   \text{Flow Rate (in mL per minute)} = \frac{\text{Volume to be Administered (in mL)}}{\text{Time (in minutes)}}
   \]

2) When using an I/V Administration Set, the Flow Rate, in Drops per Minute, of an intravenously administered solution is given by multiplying the above expression by the Drop Factor of the Administration Set. Expressed mathematically as:
   \[
   \text{Flow Rate (in Drops per minute)} = \frac{\text{Volume to be Administered (in mL)} \times \text{Drop Factor}}{\text{Time (in minutes)}}
   \]

3) Admin Sets come in Drop Factors of 10, 15, 20 or 60 Drops per millilitre (Drops/mL)

(1) The physician orders 3 L of 5% dextrose in Normal Saline (D5NS) to run for 24 hours. The drop factor of the Admin set is 15 drops/mL. At what flow rate (drops/min) should this IV be set?

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____________________________________________________________________________________________

(2) The physician orders 2000 mL Ringer's lactate (RL) to run for 16 hours. The drop factor of the Admin set is 10 drops/mL. At what flow rate (drops/min) should this IV be set?

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(3) The physician orders 1000 mL of 5% dextrose (D5W) to run for 10 hours. The drop factor of the Admin set is 20 drops/mL. At what flow rate (drops/min) should this IV be set?

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(4) The physician orders 2500 mL of 5% dextrose in Ringers Lactate (D5RL) to run at 125 mL/Hour.

   (i) How many hours will this IV run?

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   (ii) If the drop factor is 10 drops/mL - what flow rate (drops/min) should this IV be set at?

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(5) The physician orders 100 mg of gentamycin to be administered in 150 mL IV fluid over 1 hour. If you use an Admin Set with a drop factor of 20 drops/mL what would the drop count be over a 15 second period?

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(6) The physician orders 80 mg of Tobramycin in 100 mL IV fluid over 2 hours. If you use an Admin Set with a drop factor of 60 drops/mL what would the drop count be over a 15 second period?

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(7) The physician orders 1 g of Vancomycin HCl to be administered in 100 mL IV solution over 30 minutes. The drop factor is 10 drops/mL. What is the flow rate for this IV? (75 drops/min)

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(8) The physician is treating a patient - a 4 year old child - with severe herpes encephalitis. The patient and prescribing details are as follows:

- Patient mass is 17 Kg; Height is 110 cm
- The prescription is for Aciclovir. The dose prescribed is 500 mg/m² every 8 hours.
- The drug comes in a 250 mg vial and the prescribed dose is to be administered via 100 mL I/V infusion over one hour (60 minutes) using an Admin set that has a drop factor of 10 drops/mL

(i) What is the dose – in mg – that is administered every 8 hours?

Since the dose prescribed is based on Body Surface Area (500 mg/m²) the child’s BSA has to be calculated to enable the dose to be calculated

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(ii) How many micrograms per second (mcg/sec) of Acyclovir does the patient receive?

(iii) What is the flow rate (drops/minute) that must be set for this I/V?

SECTION 6: CALCULATION OF COMMON CLINICAL VALUES

(1) Calculate the Body Surface Area (BSA) of a patient who weighs 94 Kg and his height is 1.86 metres.

(2) Calculate the GFR of a 62 year old male patient who weighs 67 Kg and whose Serum Creatinine is 124 mcmol/L. Use the Cokroft-Gault Equation.

(3) You have an obese patient.
   (i) If the patient’s body mass is 139 Kg and his height is 1.82 m calculate the patient’s Body Mass Index (BMI = Mass (in Kg) / Height (in metres) ^ 2)

   (ii) How many Kilograms must the patient loose to achieve a target BMI of 32 Kg/m^2?

To perform this calculation you need to make Mass the subject of the BMI equation