Pre-Registration Calculations Training Exercise 2

1. You receive a prescription for hydroxycarbamide 80 mg/kg every third day for the month of March, with the first dose to be taken on the 2nd March. The patient weighs 75 kg therefore you should supply 120 hydroxycarbamide 500 mg capsules.

80mg/kg for a 75 kg patient = 80 x 75 mg every third day = 6000 mg = 12 caps
Admin on: 2nd, 5th, 8th, 11th, 14th, 17th, 20th, 23rd, 26th, 29th therefore 10 days
Require 12 x 10 capsules = 120 hydroxycarbamide 500 mg capsules

TRUE

2. A patient is prescribed Nutriflex® plus (2000 mL bag). The prescribing doctor wants you to increase the potassium content in the bag to 80 mmol. It would be appropriate to add 25 mL of sterile potassium chloride concentrate 15% to the bag.

Nutriflex® plus contains 25 mmol K^+ /L
In 2L will contain 50 mmol therefore to achieve 80 mmol need to add 30 mmol
Potassium chloride conc, sterile 15% 2mmol K^+/mL
30 mmol within 15 mL of Potassium chloride conc, sterile

FALSE

3. At 10.30 am a 1L bag of normal saline infusion is set up for a patient at an administration rate of 1 mL/min. After 9 hours the doctor requests the flow rate to be increased to 90 mL/hour. The bag will be due for replacement at 1 am the next day.

Rate is 1 mL/min therefore 60 mL/ hour
After 9 hours will have used 540 mL
460 mL left before change needed
New Rate = 90 mL/hour therefore 460 mL will last 460/90 hours = 5.111 hours = 5 hours 6 minutes and 40 seconds
Therefore bag finished at 10:30 + 9 hrs + 5 hours 6 minutes and 40 seconds = 00:36:40

FALSE

4. A child is prescribed 5 mL of reconstituted CellCept® oral suspension twice daily in combination with a corticosteroid and ciclosporin as prophylaxis against acute rejection after a renal transplant. Upon checking the patient's case notes you find that the child is 4 feet 4 inches tall and weighs 30 kg. As part of your ward role you double check the prescribed dose against the standard recommended dose. It is appropriate for you to contact the prescriber as you consider this dose to be an under dose.

Body Surface Area (m^2) = √ {weight (kg) x height (cm) ÷ 3600}

Using Equation:
BSA (m^2) = √ {30 x height (cm) ÷ 3600)
From BNFC 1 ft = 304.8 mm and 1 in = 25.4 mm
Therefore height = 4(304.8) + 4(25.4) mm = 1320.8 mm = 132.08 cm
BSA (m^2) = √ *{30 x 132.08 ÷ 3600) = 1.101 m^2*
Dose = 600 mg/ m^2 BD = 600x1.101 mg BD = 660.6 mg BD
Cellcept® oral suspension = 1 g/5mL = 1000 mg/5mL = 200 mg/mL
Therefore requires 3.3 mL BD

or

Using Tables at back of BNFC
BSA (m^2) for 30 kg child = 1.1 m^2
Dose = 600 mg/ m^2 BD = 600x1.1 mg BD = 660 mg BD
Cellcept® oral suspension = 1 g/5mL = 1000 mg/5mL = 200 mg/mL
Therefore requires 3.3 mL BD

Therefore, for child 5 mL BD would be an overdose rather than an underdose

FALSE

5. A patient with diabetes uses Byetta® as one of his medications. Following his recent hospital review his dose has been adjusted to 5 mcg before lunch and 10 mcg before his evening dinner. He currently has three unopened 5 mcg/dose prefilled pens at home and asks you how many days in total these two pens will now last him. It is correct to advise him they will last 60 days in total.

Each 5 mcg/dose prefilled pen contains 60 doses
Patient dose is now 5 mcg at lunch and 10 mcg before evening meal = total of 15 mcg/day and 3 doses/day
Therefore each pen would last 60/3 days = 20 days
Three pens therefore will last 20 x 3 days = 60 days

TRUE

6. You are a hospice pharmacist and are contacted by a local GP about the transfer of a terminally ill patient from oral morphine sulphate to a subcutaneous infusion of diamorphine hydrochloride. The patient has previously been taking one MST Continus® 100 mg sachet and one MST Continus® 20 mg sachet every 12 hours. It would be appropriate for you to suggest to the GP that he prescribes for this patient diamorphine hydrochloride 40 mg by subcutaneous infusion in glucose 5% continuously over 24 hours.

Current dose = 120 mg every 12 hours = total dose of 240 mg over 24 hours
With reference to BNF 240 mg over 24 hours which is equivalent to 80 mg of subcutaneous infusion of diamorphine hydrochloride over 24 hours
Diamorphine is given in glucose 5% but no need to use this

FALSE

7. Sodium nitroprusside is being prescribed for a 65 kg patient in hypertensive crisis. 50 mg of sodium nitroprusside has been diluted to 1000 mL in 5% glucose infusion. The drug is to be administered to the patient at an initial rate of 1.5 mcg/kg/min and then increased in steps of 500 ng/kg/min every 5 minute intervals. The infusion rate 18 minutes after treatment is commenced is 3.9 mL/min.

0-5 mins: 1.5 mcg/kg/min
-10 mins: 2 mcg/kg/min
- 15 mins: 2.5 mcg/kg/min
-20 mins: 3 mcg/kg/min = rate at 18 mins
Patient weighs 65 kg therefore rate = 3x65 mcg/min = 195 mcg/min
Drug available at strength: 50 mg in 1000 mL = 50000 mcg in 1000 mL
Rate = 100o/50000 x 195 mL/min = 3.9 mL/min

TRUE

8. The BP lists the following formula for the extemporaneous preparation of Paediatric Ferrous Sulfate Oral Solution:

Ferrous Sulphate Heptahydrate	12 g
Ascorbic Acid	2 g
Orange Syrup	100 mL
Double-strength Chloroform Water	500 mL
Water	Sufficient to produce 1000 mL

You are required to produce one dozen bottles of Paediatric Ferrous Sulphate Oral Solution each containing 120 mL. The first stage of this process is to prepare the double-strength chloroform water from concentrated chloroform water. This first step will require you to use 36 mL of concentrated chloroform water. You can assume no excess is made at any stage.

Need to prepare 12 x 120 mL bottles = 1440 mL of oral solution
This will require 1440/2 mL of Double-strength Chloroform Water=720 mL
Double-strength Chloroform water prepared by a 1 in 20 dilution of Concentrated Chloroform water
Therefore would require 1 mL of CCW to prepare 20 mL DSCW and
720/20 mL CCW for this preparation = 36 mL

TRUE

9. There is the same amount of oxycodone hydrochloride in 150 mL of OxyNorm® oral solution and 15 mL of OxyNorm® concentrated oral solution.

OxyNorm® oral solution is 5 mg/5 mL therefore in 150 mL have 5x30 mg = 150 mg
OxyNorm® concentrated oral solution is 10 mg/mL therefore in 15 mL have 150 mg

TRUE

10. You have in your pharmacy 400 mcg potassium permanganate tablets. You are requested to dispense 200mL of a potassium permanganate solution such that the patient will dilute this 1 in 10 to obtain a 0.01% solution suitable for wound washing. To prepare this you would dissolve 30 of the tablets in a small amount of water and make the solution up to a final volume of 200mL with water.

Final solution strength = 0.01%
Therefore, original strength dispensed to patient = 0.01 x 10 = 0.1%
0.1%= 0.1 g in 100 mL therefore 0.2g in 200 mL = 200 mg

30x 400 mcg tablets used = 30 x 0.4 mg = 12 mg

FALSE

11. Pregaday® tablets are currently unavailable due to a supply issue with one of the inactive ingredients. You regularly dispense this tablet for Miss Y at a dose of 1 tablet daily. Following a discussion with her prescriber you both agree to it is appropriate to supply her Galfer® Syrup at a dose of 10 mL once daily because this contains an equivalent daily dose of iron.

Pregaday® tablets contain 100 mg Iron
Galfer® Syrup contains 45 mg Iron/5 mL therefore 10 mL OD= 90 mg/Day

FALSE

12. The fluoride in a water supply is 0.6 ppm. This is equivalent to a concentration of 0.00006% w/v.

0.6 ppm = 0.6 g in 1000000 mL
0.06 g in 100000 mL
0.006 g in 10000 mL
0.0006 g in 1000 mL
0.00006 g in 100 mL = 0.00006% w/v

TRUE

13. 2 litres of chlorhexidine gluconate 5% w/v is needed to produce 2500 mL of chlorhexidine gluconate 4% w/v.

Chlorhexidine gluconate 4% w/v: 4 g in 100 mL
X g in 2500 m L
X = 4 x 25 g = 100 g

How much Chlorhexidine gluconate 5% w/v contains 100 g of chlorhexidine gluconate?

Chlorhexidine gluconate 5% w/v: 5 g in 100 mL
1 g in 20 mL
100 g in 20 x 100 mL = 2000 mL = 2 L

Or

V1C1=V2C2
2000 x 5 = 2500 x 4
10,000 = 10,000

TRUE

14. A cream contains 1% w/w zinc oxide. The amount of zinc oxide powder that should be added to 150 g of the cream to produce a 3% w/w zinc oxide is 0.3 g.

Original Cream: 1% w/w = 1 g in 100 g and 1.5 g in 150 g
Amount of Zinc Oxide added = x g
New Cream weight = (150 + x) g
New Zinc Oxide content = (1.5 + x) g
Percentage Zinc Oxide Content = {(1.5 + x)/ (150 + x)} X 100 = 3
(1.5 + x) X 100 = (150 + x) X 3
(1.5 X 100) + 100 x = 450 + 3x
100 x – 3 x = 450 – 150
97 x = 300
x = 3.09 g

Or

1% = 1 g in 100 g = 1.5 g in 150 g
1.5 +0.3 = 1.8 g
1.8 g in 150.3 g = (1.8/150.3)x 100 % = 1.197%

FALSE

15. A 26 year old woman is prescribed two medicines daily. She is completely compliant with her therapy. Every week, she will consume less than 150mmol K^+ from her medicines. Her PMR records that her medicines and their doses are:

500mL	Kay-Cee-L® oral solution	10mL twice daily
500mL	Movicol® liquid	25mL daily

Kay-Cee-L contains 1mmol/mL = 20mmol per day = 140mmol/week K^+

Movicol liquid K+ 5.4mmol/L ; Dose is 175mL per week = 0.945mmol potassium

Total consumption of potassium is 140.945 mmol

TRUE