



UNIVERSITI KUALA LUMPUR
ROYAL COLLEGE OF MEDICINE PERAK

FINAL EXAMINATION
MARCH 2026 SEMESTER

COURSE CODE : RPD12703
COURSE NAME : DOSAGE FORM DESIGN 1
PROGRAMME NAME : DIPLOMA IN PHARMACY
DATE : 02 JULY 2026
TIME : 9.00 AM – 11.00 AM
DURATION : 2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read CAREFULLY the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of TWO (2) sections; Section A and Section B.
4. Answer ALL questions in Section A and THREE (3) questions in section B.
5. Please mark/write your answers on the OMR answer script and answer booklet provided.
6. Answer all questions in English language ONLY.

THERE ARE 15 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 25 marks)

INSTRUCTION: Answer ALL questions.

Please use the objective answer sheet provided.

1. Which of the following defines a pharmaceutical solution?
 - A. A mixture containing only one base phase of dispersed solids.
 - B. A mixture containing two base phases of immiscible liquids.
 - C. A single homogenous phase containing solutes dissolved in a solvent.
 - D. A sterile dosage form exclusively meant for intravenous administration.
2. Which of the following is classified as a monophasic liquid dosage form for external use?
 - A. Suspension
 - B. Linctus
 - C. Emulsion
 - D. Lotion
3. Which of the following excipients is added to oral liquid formulations to act as a preservative?
 - A. Ascorbic acid
 - B. Amaranth
 - C. Sorbitol
 - D. Benzoic acid
4. Which of the following excipients is classified as a colourant used to enhance the aesthetic appearance of a liquid formulation?
 - A. Amaranth
 - B. Ascorbic acid
 - C. Methylcellulose
 - D. Sorbitol

5. Why are preservatives, colours, and flavours restricted in liquid vehicles prepared for neonates?
- A. They significantly decrease the shelf life of the formulation.
 - B. They reduce the aqueous solubility of the Active Pharmaceutical Ingredient.
 - C. They are physiologically immature and cannot metabolize them safely.
 - D. These additives cause the formulation to become physically unstable.
6. Which of the following best describes the application of a pharmaceutical lotion?
- A. It is rubbed into the skin with friction.
 - B. It is applied to the skin without friction.
 - C. It is applied sparingly for a localized antibacterial effect.
 - D. It is applied and cover with the gauze.
7. Identify the primary function of a Barium Sulphate enema.
- A. Diagnostic aid for X-ray examination of the lower bowel.
 - B. Therapeutic induction of systemic sedation.
 - C. Irrigation to stimulate peristalsis and cleanse the bowel.
 - D. Localized treatment for ulcerative colitis.
8. Which of the following substances is commonly utilized as a non-aqueous vehicle in the compounding of otic drops?
- A. Purified water
 - B. Propylene glycol
 - C. Isopropyl alcohol
 - D. Sodium chloride 0.9%
9. A patient asks why their Liniment Methyl Salicylate comes with a warning not to apply it on broken skin.
- What is the most appropriate pharmaceutical justification?
- A. It will permanently stain the underlying tissue layers.
 - B. It acts as an astringent that rapidly dries out weeping surfaces.
 - C. It evaporates too quickly, losing its therapeutic efficacy.
 - D. It causes severe irritation and potential systemic toxicity on open wounds.

10. Identify the use of Benzyl Benzoate Emulsion.
- A. It provides a cooling effect due to rapid evaporation of its base.
 - B. It acts as a parasiticide specifically formulated to treat scabies.
 - C. It acts as a strong antifungal agent for superficial nail infections.
 - D. It induces localized anesthesia prior to minor dermal procedures.
11. Why is propylene glycol frequently selected as a vehicle for formulating non-aqueous ear drops?
- A. It possesses a strong, natural bactericidal effect against ear canal flora.
 - B. It rapidly evaporates, leaving a cooling sensation that relieves earaches.
 - C. It acts as an astringent to aggressively dry out weeping lesions in the middle ear.
 - D. It allows the medication to safely adhere to the ear canal for a prolonged contact time.
12. What is the main purpose of adding tragacanth in oral suspensions?
- A. To enhance appearance
 - B. To increase compliance
 - C. To maintain uniform distribution of particles
 - D. To prevent microbial growth
13. Which measuring device is most accurate for administering Paracetamol Elixir?
- A. Household teaspoon
 - B. Measuring cup
 - C. Oral syringe
 - D. Measuring spoon
14. A pharmacist formulates an oral syrup containing a high concentration of sucrose. What is the most significant pharmaceutical role of sucrose in this preparation?
- A. Acting as a buffering agent
 - B. Providing antimicrobial effect
 - C. Enhancing drug solubility
 - D. Reducing viscosity

15. A pharmacist included carboxymethylcellulose in an oral liquid dosage form. Identify the possible dosage form.
- A. Suspension
 - B. Emulsion
 - C. Elixir
 - D. Oral drops
16. Which of the following best describes an oral emulsion?
- A. A homogeneous mixture of two completely soluble liquids
 - B. A liquid mixture where one immiscible liquid is uniformly dispersed in another immiscible liquid
 - C. A solid drug dissolved in a liquid vehicle
 - D. An insoluble solid drug dispersed in a liquid vehicle
17. What is the primary function of acacia in an oral emulsion?
- A. To increase the sweetness of the preparation
 - B. To stabilize the dispersion of one liquid within another
 - C. To prevent microbial contamination
 - D. To reduce the viscosity of the preparation
18. Which of the following is the most important consideration when formulating infant drops?
- A. Bright color to attract attention
 - B. Safety of excipients used
 - C. High alcohol content for solubility
 - D. Increasing viscosity to thicken the liquid
19. Which of the following best describes an oral elixir?
- A. A clear sweetened hydroalcoholic solution
 - B. A viscous syrup containing a high concentration of glycerin
 - C. A liquid containing dispersed solid particles
 - D. A viscous oral liquid preparation used to relieve cough

20. Why are paediatric doses often different from adult doses?
- A. Children need liquid preparations only
 - B. Children have different pharmacokinetics
 - C. Children require more potent medications
 - D. Children metabolize all drugs faster
21. Which statement correctly compares loading dose and maintenance dose?
- A. Both are given only once
 - B. Loading dose maintains steady-state levels
 - C. Maintenance dose is used to replace drug eliminated from the body
 - D. Loading dose is always smaller than maintenance dose
22. 'A fraction of the total drug quantity to be given repeatedly at short interval.'
- The above statement refers to
- A. dosage regimen
 - B. daily dose
 - C. average dose
 - D. divided doses

Question 23 to 25 requires the following answer.

A	B	C	D
I and III	II and IV	I, II and III	II, III and IV

23. Identify the liquid preparations that are specifically formulated and clinically indicated for administration into the oral cavity.
- Crystal Violet Paint
 - Potassium Chlorate Gargle
 - Phenol Glycerin
 - Malathion solution
24. Which of the following statements regarding the stability of liquid pharmaceutical preparations are correct?
- Chemical stability refers to preventing active drug degradation due to hydrolysis or oxidation.
 - Flocculating agents are strictly added to prevent chemical oxidation of the API.
 - Microbiological stability ensures the formulation resists the growth of bacteria and fungi.
 - Antioxidants protect the physical stability of an emulsion from breaking.
25. Which of the following statements regarding the formulation and function of external liquid preparations are correct?
- Hydrogen peroxide is utilized in otic preparations specifically to soften and dislodge impacted ear wax.
 - Glycerin is used in mouth paints to rapidly dry out the oral mucosa.
 - Barium sulphate is formulated as a rectal suspension for use as a diagnostic aid in X-ray imaging.
 - Normal saline is universally used as the primary vehicle for all deep-tissue liniments.

SECTION B (Total: 75 marks)

INSTRUCTION: This section consists of **FOUR (4)** modified essay questions (MEQ).

You are required to answer **THREE (3)** questions in the answer booklet provided.

Question 1 and Question 2 are COMPULSORY.

Answer either Question 3 OR Question 4.

Question 1

- (a) State **TWO (2)** disadvantages of formulating drugs as liquid dosage forms. (2 marks)
- (b) State **ONE (1)** type of chemical stabilizer commonly used in liquid preparations and explain its mechanism of action. (3 marks)
- (c) List **FOUR (4)** factors to be considered when formulating nasal drops. (4 marks)
- (d) Suggest **TWO (2)** suitable packaging and closure requirements for liniment preparations. (2 marks)
- (e) Differentiate between a retention enema and an evacuation enema based on their mechanism of action and provide **ONE (1)** example for each. (4 marks)

Rx		
Liquid Paraffin	30 ml	
Acacia	qs	
Syrup Bp	20 ml	
Methylparaben	0.4%	
Vanillin	2 ml	
Purified Water to	100 ml	

(f) Based on the above formula, answer the following questions.

- i. Suggest the dosage form of the above formula.
Justify your answer.

(3 marks)

- ii. State the use of methylparaben and syrup BP in the above formula.

(2 marks)

- iii. Calculate the amount of acacia needed to produce $\frac{3}{4}$ L of the above dosage form.

(5 marks)

Question 2

For each of the questions below, you are required to show a COMPLETE calculations.

- (a) Aina, 8, was supplied with the following syrup. The doctor prescribed as follows:

Rx

Syrup Zyrtec 8mg bd x 3/52



- i. Calculate the dose (ml) for Aina.

(3 marks)

- ii. Calculate the total dose (g) for Aina.

(1 mark)

- (b) The following is the information regarding Nitrofurantoin.

The usual dose for adults is 100 milligrams 4 times daily. The dose for children is 5 to 8 milligrams per kilogram body-weight daily in divided doses, but for the treatment of severe infections 10 milligrams per kilogram body-weight may be given. Treatment is usually continued for 7 to 14 days.

- i. Amir, 12, 50kg, was prescribed as follows:

Rx

Tab. Nitrofurantoin 250mg bd x 2/52

With referring to the maximum suitable dose for Amir, identify whether the dose for Amir is overdose or not.

Show your complete calculation.

(3 marks)

- ii. Rita, 30, was supplied with Cap. Nitrofurantoin for her urinary tract infection. The doctor prescribed usual dose for her. Calculate the total dose (g) for Rita.

(2 marks)

(c)

Name	: Suhaila	Rx	Medical 6A Pin 3/26 C CAS No. 30068639A Syr. Motilium 10mg tds x 3/7 then 10mg bd x 3/7 then 10mg od x 3/7 then 5mg od x 3/7
IC No.	: 08-2116		
MRN	: 312000		
Age	: 5 years		
Date	: <i>current date</i>		
Diagnosis	: Vomiting		

Provided: Motilium Oral Suspension 1mg/ml (120ml/bottle)

- i. Based on the above dosage regimen, calculate the total dose (ml) for Suhaila.
- ii. Calculate the quantity of bottle(s) you should supply to Suhaila throughout her treatment.

(2 marks)

(d) The following is the information regarding Propranolol Hydrochloride.

The treatment of angina pectoris and arterial hypertension is started with a dosage of 80 milligrams by mouth daily in divided doses and increased at intervals of 3 days up to 160 milligrams daily, which may be further increased to 2 grams daily if necessary.

Propranolol hydrochloride is used in the treatment of cardiac arrhythmias and hyperthyroidism in children. The usual dosage is in the range 250 to 500 micrograms per kilogram body-weight 3 times a day by mouth or 25 to 50 micrograms per kilogram body-weight 3 or 4 times daily by slow intravenous injection.

- i. Mr. Hamdan recently was diagnosed with angina pectoris. The doctor prescribed him as follows:

Rx

Tab. Propranolol 60mg bd x 1/12

Identify whether the prescribed dose is overdose or not.

Show your complete calculation.

(3 marks)

- ii. Atikah, 9, 48kg, is having cardiac problems. She was supplied with Propranolol Oral Solution 20mg/5ml. Based on the maximum usual dose for her age, calculate the dose (ml) for Atikah.

(4 marks)

- iii. Calculate the daily dose (g) for Atikah.

(2 marks)

Answer either Question 3 OR Question 4

Question 3

- (a) State **TWO (2)** general methods that can be used to increase the dissolution rate during the compounding of liquid preparations. (2 marks)
- (b) State **ONE (1)** type of sweetening agent suitable for a diabetic patient and explain why it is the preferred choice. (3 marks)
- (c) List **FOUR (4)** indications for prescribing otic medications. (4 marks)
- (d) Suggest **TWO (2)** auxiliary labels to be placed on Benzyl Benzoate Emulsion. (2 marks)
- (e) Differentiate between alcohol-based liniments and oil-based liniments in terms of their intended clinical application and physical effects. (4 marks)

(f)

Rx		
Phenobarbitone		3g
Compound Tartrazine solution		10ml
Compound Orange Spirit		24ml
Alcohol 90%		48ml
Glycerol		48ml
Water for preparation	to	1000ml

- i. Based on the above formula, state the role of the following:
- Phenobarbitone
- Compound Tartrazine solution
- Compound Orange Spirit

(3 marks)

- ii. Give **TWO (2)** apparatus that needed to compound the above formula.
(2 marks)
- (g) i. Describe suspension containing indiffusible solid and give **ONE (1)** example.
(4 marks)
- ii. State an important instruction to be displayed on the label of oral suspension.
(1 mark)

Question 4

- (a) State **TWO (2)** physical forces that must be overcome to allow solid solutes to dissolve in a solvent.

(2 marks)

- (b) State **ONE (1)** type of synthetic flavouring agent and explain its advantage over natural plant-origin flavours in pharmaceutical compounding.

(3 marks)

- (c) List **TWO (2)** specific indications for prescribing:

i. mouth paints

(2 marks)

ii. gargles

(2 marks)

- (d)



Suggest **TWO (2)** auxiliary labels for the above dosage form.

(2 marks)

- (e) Differentiate between gargles and mouthwashes in terms:

i. therapeutic purpose

(2 marks)

ii. Flavour

(2 marks)

(f)

Rx		
Potassium citrate		3g
Citric acid monohydrate		500mg
Syrup		2.5g
Quillaia Tincture		0.1ml
Lemon spirit		0.05ml
Chloroform water double strength		3ml
Purified water	to	10ml

i. Based on the above formula, state the role of the following:

Syrup

Lemon spirit

Chloroform water double strength

Purified water

(4 marks)

ii. Suggest a storage condition for the above formula.

(1 mark)

(g) i. Describe suspension containing diffusible solid and give **ONE (1)** example.

(3 marks)

ii. Explain an advice to patient taking suspension.

(2 marks)

END OF EXAMINATION PAPER

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