Subject Title: PHARMACEUTICS-II

0811

Important Instructions to examiners:

1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills.
4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for anyequivalent figure drawn.
5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
7) For programming language papers, credit may be given to any other program based on equivalent concept.

Q. No.	Sub Q. N.	Answer	Marking Scheme
1		**Attempt any EIGHT of the following**	**16M**
	a)	**Explain the term Tolerated Incompatibility** In tolerated incompatibilities, the chemical interaction can be minimized by changing the order of mixing or mixing the solution in dilute forms but no alteration is made in the formulation. Example- If precipitate is diffusible type ,since therapeutic value is not changed, it is tolerated as it is, and no alteration is made.	**2M** **(1+1)**
1	**b)**	**Translate the following Latin term in English:** **i. tid- ter in die –** Three times a day **ii. utendus-** To be used **iii. post cibos-** after meals **iv. Cocheleare minimum-** One teaspoonful	**2M** **(0.5x4)**
1	**c)**	**Give the metric equivalents of the following:** i. **2 drachm**=2x4ml=8ml ii. **5 grains**=65mgx5=325mg iii. **10 fl.ounces**=10x30ml=300ml iv. **1pound**=450 gm	**2M** **(0.5x4)**
1	**d)**	**Explain the term 'Idiosyncrasy'** • An extra ordinary response to a drug which is different from its characteristic pharmacological action is called idiosyncrasy. • Eg. Small quantity of aspirin may cause gastric haemorrhage and a small dose of quinine may produce ringing in the ears.	**2M** **(1+1)**
1	**e)**	**Enlist various polysaccharides used as a thickening agent in suspension.** **1)Polysaccharides**: a)Natural polysaccharides Acacia, Tragacanth, sodium alginate, starch b) Semisynthetic polysaccharides	**2M**

		Methyl cellulose, Sodium carboxy methyl cellulose, Microcrystalline cellulose **2)Inorganic agents:** Clay, aluminium hydroxide, Bentonite. **3)Synthetic compounds-** carbomer,(carboxy vinyl polymer) colloidal silicon dioxide	
1	**f)**	**Enlist general requirements of parenteral preparation** **General requirements of Parenterals:** i) It should be free from foreign particles, fibers and filaments. ii) It should be free from all type of microorganisms iii) The preparation should be isotonic with blood plasma and body fluids. iv) It should be free from pyrogen v) It should be neutral vi)It should be physically and chemically stable vii) The specific gravity of preparation if it is meant for intra spinal route should be same as spinal fluid.	**2M** **(0.5x4)**
1	**g)**	**Write any four ideal qualities of suppository** i. It should melt at body temperature. ii. It should keep its shape when being handled. iii. It should release the medicament readily. iv. It should be non-toxic. v. It should be stable on storage. vi. It should be compatible with large number of drugs.	**2M** **(0.5x4)**
1	**h)**	**Explain the term HLB.** The HLB scale means (Hydrophilic – Lipophilic Balance System and has an arbitrary scale of 1-18 HLB numbers are experimentally determined for different emulsifiers in laboratory. The system is devised by Griffin. Eg. Acacia-HLB Value-8 Polysorbate 20-HLB value 16.7	**2M**
1	**i)**	**Classify dentifrices on the basis of uses.** **Dentifrice products :**	**2M**

<table>
<tr><td></td><td></td><td>

- Liquid dentifrices
- Tooth powders
- Tooth pastes.

</td><td></td></tr>
<tr><td>1</td><td>j)</td><td>Define Jellies. List types of Jellies.
Jellies are translucent or translucent non-greasy, semisolid preparations meant for external application to the skin or mucous membrane.
There are 3 types of jellies:-
1) Medicated jellies
2) Lubricating jellies
3) Miscellaneous jellies; a)Patch testing
b)Electrocardiography jelly</td><td>2M
(1+1)</td></tr>
<tr><td>1</td><td>k)</td><td>Differentiate eye ointment and Eye lotion
<table>
<tr><th>Eye ointment</th><th>Eye lotion</th></tr>
<tr><td>Eye ointment is sterile preparation of medicament in ointment base</td><td>These are the sterile aqueous solutions used for washing of the eyes are supplied in concentrated form and are required to be diluted with warm water immediately before use.</td></tr>
<tr><td>Used for therapeutic use</td><td>Used for cleansing of eye</td></tr>
<tr><td>Vehicle is mostly ointment base</td><td>Vehicle is mostly aqueous</td></tr>
<tr><td>More contact time</td><td>Less contact time</td></tr>
<tr><td>Preservative is necessary</td><td>Preservative is not necessary</td></tr>
<tr><td>Preparation need not be isotonic</td><td>Preparation has to be isotonic</td></tr>
</table></td><td>2M
(1x2)</td></tr>
<tr><td>1</td><td>l)</td><td>Calculate the quantity of 95% alcohol required to make 400ml 0f 55% alcohol.</td><td>2M</td></tr>
</table>

		Solution: Volume required x percentage required = Volume used x percentage used Volume required x95=400x55 Volume used = 55x400/95 = 231.57 231.57ml 0f 95 % alcohol is used to prepare 400 ml of 55percent alcohol **OR** 95% 55parts 55% 0% 40 Parts 95 Parts For 400ml, 400X55/95 =231.57 ml of 95 % alcohol Water used is 400-231.57=168.43ml.	
2		**Attempt any FOUR of the followings**	**12M**
2	**a)**	**Define prescription. Write the advantages and disadvantages of prescribing the drug by its proprietary names.** **Definition:** Prescription is a written order from a registered medical practitioners, such as dentist, veterinarian etc. to a pharmacist to compound & Dispense a specific medications for the patient. **Advantages of prescribing the drugs by its proprietary names** 1) Easy to remember 2) Easy to communicate with the patient. 3) The continuity can be maintained by prescribing the same proprietary name every time. 4) Only those proprietary drugs can be prescribed which have better bioavailability. **Disadvantages of prescribing the drugs by its proprietary names** 1) It is cheaper to prescribe the drugs by its official name. 2) It becomes difficult for a pharmacist to dispense the substitute of the drugs which is	**3M** **(1+1+1)**

		available in the stock	
2	**b)**	**How will you dispense the following prescription?** **Rx** **Chloral Hydrate gr iij** **Cocoa Butter q.s.** **Signa-More Dicto.** **Prepare 6 Suppository of 1 gm weight.** **(Displacement value-1.5 g)`** **Problem Solution** – Weight of Calculate for 2 extra suppositories therefore no of supp are 8 cocoa butter for 1 suppository = 1 gm :. Weight of cocoa butter for 8 suppositories = 1 x 8 = 8gm Weight of Chloral hydrate for 1 suppository= 3 grains :. Weight of Chloral hydrate for 8 suppositories = 3 gr X 8 = 24gr=(24x65mg)=1560mg =1.56gm Displacement value of Chloral hydrate is 1.5 :. Quantity of cocoa butter required = total amt of base – (Total amt of drug/d value) = 8 – 1.56/1.5 = 8– 1.04 = 6.96gm Working formula for suppository, Cocoa butter =6.96gm Choral hydrate=1.56gm	**3M**

2	c)	**What are different adjutants used in parenteral preparations.** **1)Solubilising agents:** These are used to increase solubility of drugs which are slightly soluble in water. Eg surface active agents like tweens and polysorbates 2) **Stabilizers** : The drug in the form of solutions are more liable to deteriorate due to oxidation and hydrolysis. The oxidation can be prevented by adding antioxidants like thiourea ,ascorbic acids etc and hydrolysis can be prevented by using non.aq. vehicle or by adjusting pH of the preparation. 2)**Antibacterial agent:** These substances are added in adequate quantity to prevent the growth microorganism during storage, so these substances act as preservative. Used in Multidose containers and Single dose products that are not terminally sterilized. **3)Buffering agent :** Many drugs require a certain pH range to maintain product stability. Parenteral products formulated to possess sufficient buffer capacity to maintain proper pH. eg:-Sodium citrate, acetic acid, citric acid, sodium acetate. **5)Tonicity adjustment agents** Parenteral preparation should be isotonic with blood plasma and other body fluids. Isotonicity of the solution may be adjusted by adding sodium chloride , dextrose and boric acid in suitable quantities**.** **6)Chelating agent:** Chelating agents such as EDTA and its salt, sodium or potassium salts of citric acid are added in the formulations to chelate the metallic ions present in the formulation. **7)Suspending, emulsifying and wetting agents :** Suspending agents are used to improve the viscosity and to suspend the particles for long time. Ex. Methyl cellulose, carboxymethyl cellulose etc. Emulsifying agents are used in sterile emulsions. Ex.lecithin Wetting agents are used to reduce the interfacial tension between the solid particles and liquids **.**	**3M** **(0.5 x 6)**

		8)Vehicle: there are two types of vehicle Water is used as vehicle for majority of injection because water is tolerated well by the body and is safest to administer. a)The aqueous vehicle used is i) Water for injection ii) Water for injection free from CO_2 b) Non aqueous vehicle are used for stability and sterility. Eg oils like fixed oil ,sesame oil and alcohol.	
2	**d)**	**Define cachets .Enlist type of cachets .Write packing and storage condition of cachets.** Cachets are the solid unit dosage are moulded from rice paper and used to enclosed nauseous or disagreeable powders. Cachets are also known as wafer capsules and holds 0.2 to 1.5 gm of powder **Types of cachets** i) Wet seal cachets ii) Dry seal cachets **Packing and storage condition of cachets :** Cachets are packed in boxes or tins in which they are placed on their edges or lying flat. Container should be labelled with directions for its use. Immerse in water for few seconds and then swallow with a draught of water. **Storage**: Store in cool and dry place.	**3M (1+1+1)**
2	**e)**	**Distinguish liniment and lotion on the basis of preparation, application and labelling.**	**3M (0.5 X 6)**

Liniments	Lotions
1.They are used for counter irritant, rubefacient, soothing or stimulating purpose	1.They are used for topical effect such as local cooling, soothing, protective & emollient effect
2.Applied with friction	2.Applied without friction

			3.Vehicle is mostly oily or alcoholic 4.These are used for application to the unbroken skin. 5.Applied directly 6.Turpentine liniment	3.Vehicle is mostly aqueous 4.Lotions can be applied on broken or inflamed skin. 5.Applied with cotton gauze 6.Sulphur lotion	
2	**f)**	**Define epilation and depilation .Mention the qualities of ideal depilatory agents** **1) Epilation :** It is mechanical removal of hair by method like plucking, waxing, electrolysis. It is painful & may cause skin damage. Chances of skin secretion can be increased. Contains rosin, Beeswax along with vegetable oil, cooling agent, local anaesthetic & antibacterial agent. **2) Depilation :** It involves chemical breakdown of the hair without injury to skin. They are alkaline reducing agents which cause the hair fiber to swell & produce a cleavage of disulphide or cystein bridges between adjacent polypeptide chains & degrade the hair **Qualities of Ideal depilatory agents;** 1. It should be non-toxic and non irritant to the skin. 2. It should be odourless but pleasantly perfumed. 3. It should be elegant. 4. It should not leave any stains on the cloth. 5. It should be capable of removing the hair within 2-5 mins 6. It should be easy to apply. 7. It should be economical. 8. It should be stable during storage.	**3M (1+1+1)**
3		**Attempt any FOUR of the followings**		**12M**
3	**a)**	**Differentiate between flocculated and deflocculated suspension with example (any**		**3M**

four points each) **0.5 X 6**

Sr. no.	Flocculated suspension	Deflocculated suspension
1	Particles form loose aggregates and form a network like structure.	Particles exist as separate entities.
2	The rate of sedimentation is high	The rate of sedimentation is slow
3	Sediment is rapidly formed	Sediment is slowly formed
4	Sediment is easy to redisperse	Sediment is difficult to redisperse
5	Sediment is loosely packed and does not form a hard cake	Sediment is very closely packed and a hard cake is formed
6	Supernatant liquid is clear	Supernatant liquid is not clear
7	The floccules stick to the sides of bottle.	The floccules do not stick to the sides of bottle.
8	Suspension is not pleasing in appearance	Suspension is pleasing in appearance.
9.	Ex. Bismuth carbonate mixture	Ex. Precipitated chalk mixture

3 b) What is posology? Give formulas for dose calculation in children. **3M (1+2)**

Posology is the branch of medical science which deals with dosage or quantity of drug. **(1 m)**

Formulas: (1 X 2 = 2M)

i. **Dillings formula:** Child Dose = Age in years/20 X Adult dose(1 mark)

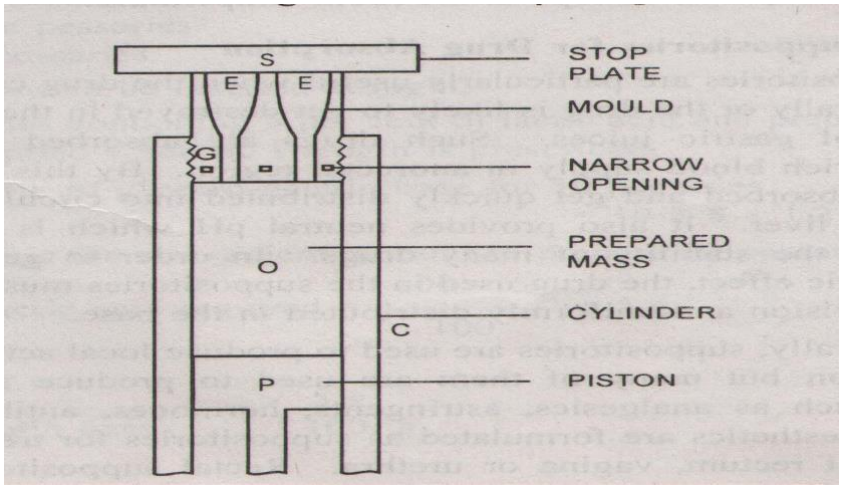
ii. **Clarks formula:** Child Dose = Weight in pound/150 X Adult dose (1 mark)

iii. **Young's formula: child dose =** Age in years/Age in years +12 X adult dose (1 Marks)

iv. Body surface area formula: Child Dose = body surface area of child M^2/ avg body surface area of adult X Adult Dose.(consider $1.73M^2$ as adult body surface area)

v. Frieds Formula: Child Dose = age in month/150 X Adult Dose.

3	c)	**Define suppositories. Describe various methods of preparation of suppositories.** **Definition: (1M)** Suppositories are solid dosage forms intended for insertion in to body cavities other than mouth. They may be inserted into rectum, vagina or nasal cavities where they melt or dissolved & exert localized on systemic effect. **Method of preparation: (any two methods 2M)** **i. Hand rolling.** **ii. Hot process or Fusion method.** **iii. Cold compression method:** **I. Hand rolling:** • It is the oldest and simplest method of suppository preparation and may be used when only a few suppositories are to be prepared in a cocoa butter base. • It has the advantage of avoiding the necessity of heating the cocoa butter. • A plastic-like mass is prepared by triturating grated cocoa butter and active ingredients in a mortar. • The mass is formed into a ball in the palm of the hands, then rolled into a uniform cylinder with a large spatula or small flat board on a pill tile. • The cylinder is then cut into the appropriate number of pieces which are rolled on one end to produce a conical shape. • Effective hand rolling requires considerable practice and skill. The suppository "pipe" or cylinder tends to crack or hollow in the centre, especially when the mass is insufficiently kneaded and softened. **II. Fusion Method:** • Melting the suppository base • Dispersing or dissolving the drug in the melted base. • The mixture is removed from the heat and poured into a suppository mould. • Allowing the melt to congeal	**3M (1M definition Any two method 2M)**

		• Removing the formed suppositories from the mould. **III. Cold Compression Method:** • Compression moulding is a method of preparing suppositories from a mixed mass of grated suppository base and medicaments which is forced into a special compression mould using suppository making machines. • The suppository base and the other ingredients are combined by thorough mixing. • The friction of the process causing the base to soften into a paste like consistency. • In the compression machine, the suppository mass is placed into a cylinder which is then closed. • Pressure is applied by moving the piston forward. • Once the movement of piston stops base is completely filled in the mould. • Remove the suppositories from mould. 	
3	**d)**	**Prepare 400 ml of 5% solution and label with a direction for preparing 2 litre quantity of a 1 in 2000 solution.** Data Give: Strength of concentrated solution = 5% Strength of dilute solution = 1 in 2000	**3M (1+2)**

		Volume of dilute solution required = 2 liter. Volume of concentrated solution required = 400 ml **Part-I: prepare 400 ml 5% solution. (1M)** 1 gm required for preparing 1% w/v solution 100 ml Therefore for 400 ml 400 X 5/100 = 20 gm required. **Part-II (2M)** Degree of dilution = strength of concentrated solution/ Strength of dilute solution Degree of dilution = 5/0.05 = 100 times Volume of concentrated solution required = Volume of dilute solution/degree of dilution. Volume of concentrated solution required = 2000ml/100 times = 20 ml Therefore, 20 ml of concentrated solution required to prepare 2 litre 1 in 2000 solution.	
3	**e)**	**Define effervescent granules. Describe preparation procedure with one example.** **Definition: (1M)** • These are solid dosage form of medicament, meant for internal use. • These are composed of citric acid, tartaric acid & sodium bicarbonate. • In presence of water, acid reacts with alkali to release carbon dioxide. • Carbon dioxide helps to mask the bitter and saline taste of the drugs • Carbon dioxide stimulates the flow of gastric juices and therefore helps in absorption of drugs **Preparation: (any one 2M)** **Method of preparation (Heat method) (any one method 2mks)** A large porcelain dish is placed on a water bath, with as much of the dish as possible exposed to the water or steam 2)The dish must be hot to ensure rapid liberation of water of crystallization from citric acid. If heating is delayed until powder is placed in the dish, the water is liberated slowly as the temp. Rises, but much is lost by evaporation.	**3M (Definition 1M Any one method 2M)**

		3) The ingredients are powdered, sieved, weighed & mixed. They are then placed in dish & pressed down with spatula until the mixture has been formed a loose cake or damp coherent mass. 4) The mixture is passed through sieve No. 8- 14 initially. Dry the granules at 60 º c Then they are again passed through sieve no. 14-20. to collect reqd. Fraction **(Dry method)** The mixed ingredient are moistened with a non aqueous liquid (alcohol) to prepare the coherent mass which is passed through a no 8 sieve and dried in oven at the temperature not exceeding 60^{o}C the dried granules are passed through sieve no. 14-20. to collect reqd. Fraction	
3	**f)**	**Explain the term- eye drop. State precautions used in handling eye drop.** **Definition: (1M)** • Eye drop are sterile aqueous or oily solution or suspension of drugs that are instilled into the eye with the help of dropper. • The usually contain the drugs having antiseptic, anaesthetics, anti-inflammatory, mydriatic or meiotic property. **Precautions: (0.5 X 4 = 2M)** • Do not touch the tip of the dropper. • Never rinse the dropper. • Never use eye drop that have changed colour. • After instillation of drop, do not close eyes tightly or blink more than usual. • Discard the content after one month of use.	**3M (Definition1M and any 4 precautions 2M)**
4		**Attempt any FOUR of the followings**	**12M**
4	**a)**	**Define the term with example: (any three).** **i. Antiperspirants** **ii. Deodorants.** **iii. Cold cream.** **iv. Mascara.** **Definitions: (1MK for each))**	**3M (1 marks each, any three))**

Antiperspirants:

These are the agents used to prevent the flow of perspiration to overcome bad smell which is due to bacterial decomposition. eg Gillete, Nivea etc

Deodorants:

Deodorant inhibits the formation of bad odour in perspiration by suppressing the growth of bacteria or masks the unpleasant odour.eg. Rexona etc

Cold cream:

Creams are semisolid emulsion meant for external application to the skin and mucus membrane. When applied they produce cooling effect due to slow evaporation of water, they are prepared by emulsification of oil and water. Ex Ponds cold cream, Nivea cream etc

Mascara:

Mascara is a black pigmented preparation for application to the eye lashes to beautify the eyes. It is used to darken the eyelashes and to increase their apparent length Ex Loreal , Maybelline etc

4 b) What are syrup? Explain how they differ from elixir and linctuses with suitable example. — **3M (Definition1M and difference any 4 =2M)**

Syrup: (1M)

Syrup is sweet, viscous, concentrated or nearly saturated aqueous solution of sucrose containing 66.7% w/w of sugar.

Differences: (0.5 X 4 = 2M)

Syrup	**Elixir**	**Linctuses**
Syrup is sweet, viscous, concentrated or nearly saturated aqueous solution of sucrose containing 66.7% w/w of sugar	Elixirs are clear, sweetened and flavored hydroalcoholic liquid preparation intended for oral use.	Linctuses are viscous, monophasic liquid preparation containing a high concentration of syrup intended to be sipped and swallowed slowly for treatment of cough.
Uses:	Uses:	Uses:

		Can be simple syrup use for sweetening and flavouring purpose and medicated syrup for therapeutic purpose	Can be used as Antibiotic Antihistaminic Sedative purpose	Can be used as Demulcent. Sedative. Expectorant action.
		More viscous than elixir and less viscous than linctuses	less viscous than syrup	More viscous than syrup
		Ex Tolu syup ginger syrup ect	Ex chloral hydrate elixir ect	Ex codein phosphate lictus
4	**c)**	**Explain herapath reaction for quinine.** Oxidation of iodides with quinine sulphate : Quinine sulphate is not freely soluble in water.it is made soluble in presence of sulphuric acid. The sulphuric acid librates hydroiodic acid from the potassium iodide and the hydroiodic acid is partly oxidized by the sulphuric acid, yielding iodine. The iodine, hydroiodic acid and quinine sulphate then combine to form a compound called 'herapathite or iodosulphite of quinine'.(1M) **Example: (1M)** Rx Quinine sulphate……1.5 g Dil. Sulphuric acid ……4.0 ml Potassium iodied ……8.0 ml Water ……..200ml **Procedure: (1MK)** Dissolve quinine sulphate in dil sulphuric acid in little quantity of water Separately dissolve potassium iodide in half quantity of water Mix the two solutions and make up the volume Dispense the preparation for three days and if required more call for refill.	**3M (1+1+1)**
4	**d)**	**Define ointment. Dermatological factor govern the selection of an ointment base. Justify.** **Definition: (1M)** Ointment is a semisolid preparation intended for external application to the skin or mucous	**3M (Definition1M and**

		membranes, usually but not always, they contain medicinal substances. **Dermatological factor: (Explanation of any four factors = 2M)** 1. Absorption & penetration. 2. Effect on skin. 3. Miscibility with skin secretion and serum. 4. Compatibility with skin secretion. 5. Freedom from irritant effect. 6. Emollient properties. 7. Ease of application. • **Absorption & penetration** :Absorption indicates entry of medicament into the blood stream, systemic absorption. Penetration indicates passage of vehicle along with medicament through the skin, cutaneous absorption. The substances soluble both in 0il & water are readily absorbed. • **Effect on skin function :**Greasy bases may interfere with skin functions like heat radiation& sweat excretions, hence are skin irritant. Water soluble bases & o/w emulsion bases provides cooling effect rather than healing effect. This bases readily mix with skin secretions. • **Miscibility with skin secretion:** Water miscible & emulsion bases are miscible with skin secretions readily thereby releasing medicament rapidly & completely as compared to greasy bases. • **Compatibility with skin secretions:** The ointment bases should have a pH around 5.5 which is the average pH of the skin secretions. Neutral ointment bases are preferable since does not cause irritation • **Freedom from irritant effect:** The ointment bases used should be non-irritant.Greasy bases cause irritation and may cause edema. • **Emollient properties:** Ointment bases used should possess emollient properties that should be able to keep the skin moist. Humectants like glycerin and propylene glycol keep the skin surface moist and soft. Wool fat, lard and paraffin keep the skin soft by preventing rapid loss of moisture from the skin.	**any four factor 2M)**

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- **Ease of application and removal:** Ointment bases used should be easily applicable and easy to remove from the skin. Stiff and sticky ointment bases are not suitable because they may cause damage to the newly formed tissues of the skin. o/w type emulsion bases are preferable as they are easy to apply & remove from skin.

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<tr><td>4</td><td>e)</td><td>

b. Propose the proportion of oil, water and gum acacia in the preparation of primary emulsion using.

i. Fixed oil.
ii. Volatile oil.
iii. Mineral oil.

Table (1+1+1 = 3M)

<table>
<tr><td>particulars</td><td colspan="3">Primary emulsion ratio</td></tr>
<tr><td></td><td>Oil</td><td>Water</td><td>Gum</td></tr>
<tr><td>Fixed oil</td><td>4</td><td>2</td><td>1</td></tr>
<tr><td>Volatile oil</td><td>2</td><td>2</td><td>1</td></tr>
<tr><td>Mineral oil</td><td>3</td><td>2</td><td>1</td></tr>
</table>

</td><td>3M (1+1+1)</td></tr>
<tr><td>4</td><td>f)</td><td>

Explain Intravenous admixture. State different method for safe and effective use for intravenous admixture.

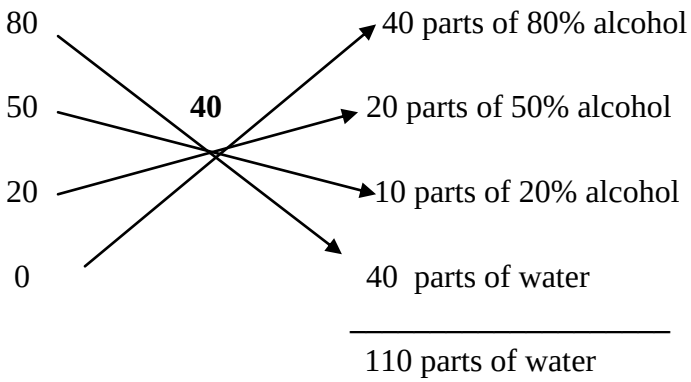
Intravenous admixture: (1M)

When one or more solution is added to an Intravenous fluid for administration the resulting combination is known as Intravenous admixture These Intravenous admixture are generally prepared as and when required by nurses by mixing drugs to transfusion fluids.

Method for safe and effective use: (2M)

- Proper training should be given to nurses and pharmacists for preparation of admixtures
- Nurses should be instructed to label the drug along with its quantity which is added to the transfusion fluid
- The pharmacy department should update the paramedical staff regarding the latest information of drug stability and compatibility
- Pharmacist must use the readymade formulation available instead of making

</td><td>3m (Definition1M and use 2M)</td></tr>
</table>

		admixtures.	
5		**Attempt any FOUR of the followings**	**12M**
5	**a**	**Calculate the volume of 80%,50%,20%, and water required to get 500 ml of 40% alcohol** By using the alligation method:  110 parts of water Therefore, when 40 parts of 80% alcohol,20 parts of 50% alcohol,10 parts of 20% alcohol &40 parts of water are mixed together, the resulting solution will produce 40 % alcohol. i) Volume of 80% alcohol required = 110 parts **:** 500 ml **::** 40 parts **:** V $V = \frac{500 \times 40}{110} = \frac{20,000}{110} = 181.81ml$ ii) Volume of 50% alcohol required =110 parts **:** 500 ml **::** 20parts **:** V $V = \frac{500X20}{110} = 90.90ml$ iii) Volume of 20% alcohol required = 110 parts **:** 500 ml **::** 10 parts**:** V $\frac{500 \times 10}{}$ 5000	**3M**

		V = ---------- = --------- = 45.45ml 110 110 iv) Volume of water required = 500 – 181.81 + 90.90+ 45.45 = 181.84 ml	
5	**b)**	**Enlist factor influencing dose of drug** • Age • Sex • Body weight • Route of administration • Time of administration • Environmental factors • Emotional factors • Presence of disease • Accumulation • Additive effect • Synergism • Antagonism • Idiosyncrasy • Tolerance • Tachyphylaxis. • Metabolic disturbance	**3M (0.5 X 6 factors)**
5	**c)**	**Differentiate between Pastes and Ointments Difference:**	**3M (0.5 X 6 point)**

Sr. No.	Paste	Ointment
1	They contain high concentration of medicament.	They contain low concentrate of insoluble medicament.
2	They are stiffer, less greasy in consistency	They are soft & greasy in consistency
3	They are more absorptive	They are less absorptive.

			4	They resist to flow with increase in force of Application.	They flow more easily with increase In force of application.	
			5	The paste adheres to the skin.	They do not adhere to the skin.	
			6	They are used mainly as Antiseptic, Protective.	They are mainly used as protective Emollient.	
			7	Zinc oxide paste BPC	Ex. Sulphur ointment	
5	**d)**	**Describe steps involved in processing of parental preparation** Steps involved in parental preparation i) Cleaning of containers, closures and equipment: All the containers, closures and equipment which are required for the preparation are cleaned thoroughly with detergent and washing is done with tap water followed by distilled water and finally rinsed with water for injection. Rubber closures are washed with hot solution of 0.5% sodium pyrophosphate in water, than washed with water and rinsed with water for injection. ii) Collection of materials: Ingredients of parental preparation are weighed and collected in preparation room all the ingredients has to be of pharmacopial standards Water for injection which is free from pyrogen has to be used for preparation. iii) Preparation of parenteral product: The pharmacist should decide the order of mixing and exact method of preparation to be followed before preparing the parenteral product, the parental preparations must be prepared under strict aseptic conditions. iv) Filtration: The parental solution so formed is passed through bacteria proof filter, the primary objective is to clarify the solution by removing foreign particles, if the preparation has to be sterilized by filtration than it has to be done in strict aseptic conditions before it is transferred into final container and sealed. v) Filling the preparation in final containers: The filtered product is filled into final container, which are cleaned dried and sterilized on small scale hypodermic syringe and needle are used and on large scale automatic filling machine are used. The sterile powders are filled into the container by individual weighing or by using automatic or semi automatic devices. The filling operation is carried under strict aseptic precautions. vi) Sealing the container: Sealing should be done immediately after filling. Ampoules are sealed manually on a small scale, but on a large scale ampoule sealing machine is used.			**3M** **0.5 X 6 steps)**

		Vials and transfusion bottles are sealed by closing its opening with rubber closures, and then crimping of aluminium cap is done manually or mechanical means. vii) Sterilization: The parental preparation should be immediately sterilized after sealing any method of sterilization can be used depending on nature of medicaments present in the preparation. viii) Evaluation of parenteral preparations: The finished products are subjected to following tests in order to maintain quality control a) sterility test b) clarity test c) leakage test d) pyrogen test e) essay.	
5	**e)**	**What is physical incompatibility? Explain why physical incompatibility occurs due to liquidification** When two or more than two substances are combined together, a physical change takes place and an unacceptable product is formed. Physical incompatibility is usually due to immisibility, insolubility, precipitate formation or liquidification of solid material. **Liquefaction**: When certain low melting point solids are mixed together they form a new chemical compound which has melting point lower than room temperature, therefore they become liquid at room temperature. Rx Menthol ---------- 5g. Camphor ---------- 5g. Ammonium chloride ---------- 30g. Light magnesium carbonate ---- 60g. Send five powders The combination forms eutectic mixture. **The substance can be dispensed by any one of the following methods;** i) Triturate together to form liquid and mixed with an absorbent like light kaolin or light magnesium carbonate to produce free flowing powder. II) The individual medicaments are powdered separately and mixed with absorbent and then combined together lightly and filled in suitable container.	**3M (1mks for definition** **2mks for example)**
5	**f)**	**Describe cracking of emulsion. Explain various reasons for cracking of emulsion** Cracking means the separation of two layers of dispersed phase and continuous phase, due	**3M (1mks**

		to the coalescence of dispersed phase globules which are difficult to redisperse by shaking The following factors results in the cracking of emulsion. i) Decomposition of the emulsifying agent ii) Addition of a solvent which dissolves both the phases iii) High temperature and change in pH. iv) Addition of opposite types of emulgents v) Growth of micro – organism vi) Extensive creaming. **Decomposition of emulsifying agent:** • When acid is added to alkali soap emulsion it causes decomposition of emulsifying agent & thus leading to cracking of emulsion. **Addition of common solvent:** • Addition of common solvent in which both disperse & continuous phase are soluble forms one phase system & destroys the emulsion. • Eg. Turpentine, soft soap & water are soluble in alcohol. **Change in Temperature:** • Increase in temperature leads to reduction in viscosity; encourage creaming thus leads to cracking. Low temperature causes freezing of water content. **Addition of emulsifying agent of opposite type:** • **Soaps of monovalent** metal produces **o/w** emulsion,& Soaps of **divalent metal** produces **w/o** emulsion. But addition of monovalent soap to divalent soap emulsion & viceversa may leads to cracking. **Growth of microorganism:** • Preservative should be present otherwise bacteria may destroy emulsifying agent & cause cracking.	**for definition 0.5mks for each reason)**
6		**Attempt any FOUR of the followings**	**16M**
6	**a)**	**Find the concentration of sodium chloride required to make 50ml of solution containing 0.5% ephedrine HCl and 0.5% chlorobutol isotonic sio tonic with blood plasma.**	**4M**

		As the concentration of ephedrine hydrochloride in the preparation is 0.5% w/v, the depression in freezing point of ephedrine hydrochloride = 0.165 X 0.5 = 0.0825^{o}C As the concentration of chlorobutol in the preparation is 0.5% w/v, the depression in freezing point of chlorobutol = 0.138 X 0.5 = 0.069^{o} C Therefore, total depression in freezing point of both the substance = 0.0825 + 0.69 = 0.1515 Percentage w/v of sodium chloride required = $\frac{0.52 - 0.1515}{0.576}$ = 0.644% w/v Weight of sodium chloride required to make 100 ml of solution = 0.644 g Weight of sodium chloride required to make 50 ml of solution = 0.322 g	
6	**b)**	**Calculate the dose of paracetamol for** **i. Nine months old infant.** Dose of the child = $\frac{\text{Age in months}}{150}$ X Adult dose = $\frac{9}{150}$ X500 =30mg **iii) A boy of 16 years of age** Dose for the child = $\frac{\text{Age in years}}{20}$ X Adult dose = $\frac{16}{20}$ X500mg =400mg	**4M** **2M for each problem**
6	**c)**	**State any four qualities of shampoo. Describe formulation of shampoo.** **Ideal qualities of shampoo.** • It should be capable of removing grease dirt, and skin debris from the hair and scalp • It should be non toxic • It should be non irritant	**4M** **(Ideal qualities 1M and Formulation**

		• It should provide sufficient fragrance to the hair after its use • It should be effective in small amounts • It should get easily removed by washing with water • It should produce sufficient foam in hard and soft water • It reduces the fluffiness and smoothens the hair shaft, it makes the hair soft and shiny. 1) **Conditioning Agent:-** used to lubricate the hair & improve the texture of hair & it reduces the fluffiness & make the hair soft & shiny. e.g. Lotion & its derivatives, Glycerin, PG 2) **Thickening Agents:-** Use to increase the viscosity of shampoo & provide desired consistency. e.g. Polyvinyl alcohol, Methyl cellulose, Na Alginate 3) **Solubilizig Agent :-** Used to solubilize poorly soluble subs. e.g. ethyl alcohol, glycerol, PG. 4) **Opacifying Agents:-** used to make shampoo opaque. e.g. glycerol, glyceryl stearate, stearyl alcohol. 5. **Preservatives: -** used to preserve the shampoo against bacteria or mould. e.g. Methyl Paraben, Propyl Paraben	**2M)**
6	**d)**	**Give reasons for the following** **I. Phase inversion occurs in emulsion** Reasons 1. By the addition of an electrolyte 2. By changing the phase- volume ratio 3. By temperature change 4. By changing the emulsifying agent **II. Emulsifying agent is required in the preparation of emulsion** Reason: The emulsifying agents reduce the interfacial tension between two phases i.e, oily phase and the aqueous phase and thus make them miscible with each other and form a stable	**4M (Any four 1M each)**

		emulsion. **III. Nasal drops made isotonic** Reason: If nasal drops are isotonic it will prevent irritation to epithelial cilia of nasal mucosa. **Isotonic** saline **nasal** sprays are commonly used in infants and children to wash out the thick mucus from the **nose** in case of allergic rhinitis. **IV. Gargles are dispensed in concentrated form.** Reason: • The quantity of solution require for doing one time gargle is around 20 ml • Therefore if it is dispensed in dilute form it requires the large quantity • This is practically impossible to dispense. • Therefore they are dispensed in concentrated form **V. Linctuses should be taken in small doses** Reasons: Linctuses should be taken in small doses, sipped and swallowed slowly without diluting it with water in order to have the maximum and prolonged effect of medicament.	
6	**e)**	**Define pyrogen. Explain principle and method for pyrogen testing** **Definition:** Pyrogens are by-product of bacterial metabolism, pyrogens are polysaccharides, thermostable, soluble in water, unaffected by bactericide and can pass through bacterial proof filters **Principle:** The test involves the measurement of the rise in the body temperature of rabbit following i.v. injection of a sterile solution of a substance being examined. Rabbits are used to perform this test because they are more sensitive to pyrogen. **Material Used:** Temperature recording device, glass wares, syringe& needles. Three healthy adult rabbits of either sex, each weighing not less than 1.5kg. Do not use any rabbit having a temperature higher than 39.8°c. **Method of testing :**	**4M** **(Defination 1mk** **Principle 1mk** **Method 2 mk)**

		Sham Test: Pyrogen testing done on rabbit: The test involves the measurement of rise in body temp of rabbit following intravenous injection of a sterile solution of a substance being examined. Three healthy rabbits ,each weighing not less than 1.5 kg are selected. They are kept on balanced diet.& are not showing any loss in body weight .The solution under test is injected slowly through ear vein in a volume of 0.5 to 10 ml/body weight. Record the temperature of each rabbit in an interval of 30 mins for three hrs. after the injection. The difference between initial temp & the maximum recorded as response. If no rabbit shows an individual rise in temperature of 0.6 °C or more above its respective control temperature, and if the sum of the 3 temperature rises does not exceed 1.4 °C, the tested material meets the requirements for the absence of pyrogen. If 1 or 2 rabbits show a temperature rise of 0.6 °C or more, or if the sum of the temperature rises exceeds 1.4 °C, continue the test using 5 other rabbits If not more than 3 of the 8 rabbits show individual rises in temperature of 0.6 °C or and sum of group maximum temp rises doesn't exceed 3.7°c. **LAL test** is used for the detection and quantification of bacterial endotoxins. Limulus amebocyte lysate (LAL) is an aqueous extract of blood cells (amoebocytes) from the horseshoe crab, Limulus polyphemus. LAL reacts with bacterial endotoxin or lipopolysaccharide (LPS), which is a membrane component of Gram negative bacteria. The solution of endotoxins containing preparation is added to the lysate derived from heamolymph cells of horseshoe crab (limulus Polyphemus). The result of the reaction is turbidity or precipitation or gelation of the mixture. This is used as a quantitative measure to estimate the endotoxin content. The rate of reaction depends upon conc. of endotoxins, pH, temperature and presence of clotting enzyme system and clottable proteins from lysate	
6	**f)**	**Predict incompatibility, suggest suitable remedy and dispense the prescription** **Rx** **Sodii salicylalis zii** **Quininae sulhatis grii** **Acidi sulphuri ci dilute mxxx** **Fiat mistura** **Signa –cochleare magna dicto tertis horis summenda**	**4M (2mks for the explanation and 2mks**

		Quinine sulphate is not freely soluble in water, in this prescription dil sulphuric acid has been included by the prescriber to dissolve quinine sulphate but the prescriber overlooked the fact that the acid would decompose the sodium salicylate and prevent the formation of a clear mixture in order to prepare the clear mixture omit dil sulphuric acid. **OR** Dilute sulphuric acid will precipitate out free salicylic acid which is indiffusible in nature therefore suspending agent has to be added 1. Divide water into two equal parts 2. Add quinine sulphate and dil sulphuric acid in one part 3. Titurate compound tragacanth powder,sodium salicylate with other part of water 4. Mix the two solutions together and make up the volume if required 5. Transfer to the bottle and label Label : Table spoon to be taken every four hours in the manner prescribe.	**for method)**