



WINTER – 16 EXAMINATION

Model Answer

Subject Code:

0806

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 any equivalent 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.



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Q. No.	Sub Q. N.	Answer	Marking Scheme
1	a	<p>Attempt any <u>FIVE</u> of the following</p> <p>Explain Bronsted Lowry theory of acids and bases with examples and give its advantages over Arrhenius theory.</p> <p>According to Bronsted Lowry concept, an acid is any substance capable of donating a proton in a chemical reaction. A base is any substance capable of accepting a proton in a chemical reaction. An acid is a proton donor and a base is a proton acceptor. This theory is also called Protonic concept.</p> <p>According to this concept, Bronsted acid ionizes to produce a proton and the conjugate base of the acid. This can be shown in following half reaction:</p> $\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$ <p>Bronsted base accepts a proton & forms conjugate acid. This is shown by:</p> $\text{OH}^- + \text{H}^+ \rightarrow \text{H}_2\text{O}$ <p>Advantages over Arrhenius theory-</p> <p>i) It can explain the basic character of substances like Na_2CO_3, NH_3 i.e. which do not contain OH^- group and hence were not bases according to Arrhenius concept on the basis that they accept protons.</p> <p>ii) This concept is not limited to molecules but also covers even the ionic species to act as acids or bases.</p> <p>iii) It can also explain the acid-base reactions in the non-aqueous medium.</p>	<p>5x4=20 marks</p> <p>2M</p> <p>2M</p>



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<p>b</p>	<p>What are topical antimicrobial agents? Classify them based on their mechanism of action.</p> <p>Topical antimicrobials are agents which cause suppression of growth of microorganisms like bacteria, fungi, protozoa etc. The different types of antimicrobials include antiseptic, disinfectant, bacteriostatic, fungicidal etc.</p> <p>They can be classified into three groups based on their mechanism of action-</p> <ul style="list-style-type: none">• Agents acting by oxidation mechanism• Agents acting by halogenation• Agents acting by protein precipitation <p>Oxidation mechanism – The compounds act on protein containing sulphhydryl group (-SH). They oxidize free sulphhydryl group to disulphide bridge and inactivate its functions. Eg – Hydrogen peroxide, potassium permanganate.</p> <p>Halogenation mechanism – These compounds act by liberating chlorine or iodine or hypochlorite. They act on peptide linkage and change its potential and property. They cause destruction of specific functions of protein resulting in death of microorganism.</p> <p>E.g. – Iodine & iodine preparations, chlorinated lime etc.</p> <p>Protein precipitation – The compounds like metal ions interact with protein. The complex formed lead to inactivation of protein. E.g. – boric acid, borax, silver nitrate.</p>	<p>1M</p> <p>3M</p>
<p>c</p>	<p>Describe limit test of iron as per IP and give role of iron free citric acid and iron free ammonia in the test.</p> <p>Limit test of iron is based on the interaction of thioglycolic acid with iron in presence of citric acid & ammonical alkaline medium. This leads to formation of purple colored ferrous thioglycolate.</p>	<p>2M</p>



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As per IP,

	Test solution	Standard solution
i	Dissolve the specified weight of substance in 40 ml water or prepare a solution as per IP.	Dilute 2 ml of standard solution of iron with 40 ml of water.
ii	Add 2 ml of 20% w/v solution of iron free citric acid in water.	Add 2 ml of 20% w/v solution of iron free citric acid in water.
iii	Add 0.1 ml of thioglycolic acid	Add 0.1 ml of thioglycolic acid
iv	Mix & make alkaline with iron free ammonia solution	Mix & make alkaline with iron free ammonia solution
v	Dilute to 50 ml with water & allow to stand for 5 min	Dilute to 50 ml with water & allow to stand for 5 min

Compare test color with standard color by viewing transversely. If the color produced by test solution is less than that of standard, the sample complies the limit test for iron and vice versa.

1M+1M

Purple color develops only in alkaline medium, so iron free ammonia is used, but ammonia solution forms precipitate with iron, so iron free citric acid is added to prevent this precipitation of iron with ammonia.

d

Define Antioxidants. Enlist the criteria for selection of antioxidants.

Antioxidants are the agents which prevent oxidation and deterioration when added to pharmaceutical preparations.

1.5M

Antioxidants are selected based on their property-

2.5M



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- e
- i) They should be non-toxic.
 - ii) They should be physiologically & chemically inert (other than the action required to prevent oxidation of active ingredient).
 - iii) They should be physiologically & chemically compatible.
 - iv) They should not have solubility problem
 - v) They should be effective in very small concentration.

Write chemical name and molecular formula for-

	Chemical name	Molecular formula
Epsom salt	Magnesium sulphate	$MgSO_4 \cdot 7H_2O$
Rochelle salt	Sodium Potassium tartarate	$C_4H_4O_6NaK \cdot 4H_2O$
Muriatic acid	Hydrochloric acid	HCl
Precipitated chalk	Calcium carbonate	$CaCO_3$

1 mark
each

f **Explain why antacids are given in combination.**

Any single antacid does not meet the ideal requirements of antacid. So combination antacid preparations are formulated. The objectives of combination antacids are –

- The rationale behind such combination is to balance the constipative action of calcium and aluminium containing antacids with laxative effect of magnesium containing antacid.
- Antacids are combined so that one has rapid onset of action and another has longer duration of action.
- They are combined with Simethicone type compounds which are antifoaming agents. They cause dispersion of gases.

4 M



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- E.g. -Combination of Aluminium hydroxide gel and Magnesium hydroxide
Combination of Aluminium hydroxide gel and Magnesium trisilicate
Combination of Aluminium hydroxide gel and Calcium carbonate
Combination of Aluminium hydroxide gel, Calcium carbonate and Magnesium hydroxide.
Sodium bicarbonate and alginic acid.

g

Write uses of:

Uses of Selenium sulphide

- Selenium sulphide has anti seborrheic action and used in non-inflammatory, non-exudative seborrhea of scalp.
- It is used in the form of shampoo in the treatment of dandruff and seborrheic dermatitis of the scalp.
- It is used in 0.5% ointment or gel on limited areas of skin for seborrheic dermatitis and allergic dermatitis with seborrhea.

2M

Uses of Boric acid

- Boric acid has weak bacteriostatic & fungistatic action. It has been replaced by more effective and less toxic antiseptics.
- It is used as a local anti-infective for ophthalmic use in the form of boric acid ointment.
- It is used as buffer to maintain acidic pH in various topical preparations.
- It was used as a dusting powder but due to danger of inhalation, this practice is avoided.

2M



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2	h	<ul style="list-style-type: none">• Its product with glycerine is used as suppository base. <p>Define 'Astringents'. Discuss their uses.</p> <p>Astringents are the agents which show local or surface protein precipitation action.</p> <p>Uses</p> <ul style="list-style-type: none">• It causes constriction of small blood capillaries, and promotes the coagulation of blood, hence used as styptic (able to stop bleeding).• It decreases the volume of exudate from wounds & skin eruptions.• Astringent causes constriction of skin pores & destroy body odor, hence used as an antiperspirant & deodorant.• Higher concentration of astringent is used to remove warts (extra growth of cell on skin).• It promotes healing and toughens the skin.• It restricts blood flow to the surface of mucous membrane hence astringent decreases inflammation.• People with acne are often advised to use astringents if they have oily skin. <p>Attempt any <u>THREE</u> of the following:</p> <p>Enlist the 'source of impurities in pharmaceuticals' and explain any two with examples.</p> <p>Sources of impurities in pharmaceuticals.</p> <ul style="list-style-type: none">• Raw materials used in manufacturing• Processes used in the manufacturing• Material of plant• Storage conditions	1M 3M 3x4=12 marks 2M
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- Accidental substitution or deliberate adulteration
 - Manufacturing hazards
- Raw materials used in manufacturing – Traces of impurities in raw materials may be carried to contaminate the final product. Example – NaCl prepared from the rock salt will almost certainly contain traces of Ca & Mg compounds.
- Processes used in the manufacturing – Some impurities are incorporated during the manufacturing process. This may occur due to –
- a) Reagents used in the process
 - b) Reagents added to remove the other impurities.
 - c) Solvents – Water is the cheapest solvent available and widely used. Tap water has chloride ions, carbonate ions, sulphate ions, calcium ions, magnesium ions and sodium ions as impurities in very small amounts.
 - d) The intermediate products may come along the process in the final product as impurity.
- Material of the plant – The vessel used in the manufacturing process is generally made of metal like iron, copper, zinc, nickel, Aluminum and steel. Due to solvent action on the plant material, the traces of material i.e impurities come in the product. The water pipe and steam pipe may contain lead and hence Pharmacopoeias prescribe limit test for Lead.
- Storage conditions –
- a) Filth- Stored product may become contaminated with dust, insects and insect excreta.
 - b) Decomposition of the product during storage – Many chemical substances undergoes changes and decomposition due to careless storage. E.g. – Ferrous Sulphate is slowly converted into insoluble ferric oxide by air and

2M(for
any 2)



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		<p>moisture.</p> <p>-Accidental substitution or deliberate adulteration – Accidental substitution can take place if toxic substances are stocked with other substances or compounds. Some pharmaceutical products may be adulterated with cheaper substances. Example – Honey may be adulterated with commercial sugar, acacia powder with clay and potassium bromide with sodium bromide.</p> <p>-Manufacturing Hazards – Even in well run manufacturing companies, product contamination may arise due to existence of certain hazards.</p> <ul style="list-style-type: none">a) Particulate contamination – accidental inclusion of dirt, glass, porcelain, metallic or plastic fragment from sieves, granulating, tableting and filling machines or even from product containers may occur.b) Process error – Gross errors due to incomplete mixing in liquid preparations must be detected by normal analytical procedures.c) Cross contamination – the handling of powders, granules and tablets in large quantity create considerable amount of airborne dust and may lead to cross contamination.d) Microbial contamination – liquid preparations and creams for topical application are prone to bacterial, fungal and mould contamination. Special care should be taken in parenteral and ophthalmic preparation to avoid microbial contamination.e) Packaging errors – products of similar appearance as tablets of same size, color and shape packed in similar containers may lead to mislabeling. <p>b</p> <p>Define 'Hyperchlorhydria' and give its symptoms. Write the role of hydrochloric acid in stomach.</p> <p>Hyperchlorhydria is the condition in which there is excess of hydrochloric acid in the</p>	<p>1M</p>
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c	<p>gastric secretion. It is also called as gastric acidity or gastric hyperacidity.</p> <p>Symptoms - Abdominal pain, Heartburn, nausea, vomiting of sour liquid or "water brash", gas, bloating, belching, flatulence and constipation.</p> <p>Role of Hydrochloric acid in stomach –</p> <ul style="list-style-type: none">• It kills the microorganism in ingested food.• It softens the fibrous food.• It stops the activity of salivary amylase and promotes the formation of proteolytic enzyme pepsin.	1M 2M
	<p>Give properties and uses of calamine and talc.</p> <p>Calamine –</p> <p>Properties</p> <ul style="list-style-type: none">• It occurs as amorphous, pink or reddish brown powder.• It is odourless and tasteless.• It is insoluble in water, soluble in mineral acid with effervescence. <p>Uses –</p> <ul style="list-style-type: none">• Calamine has mild astringent action on skin.• Due to its soothing, adsorbent and protective properties, it is used as a dusting powder.• It is used as cream, lotion or ointment in various skin disorders.• It is used in cosmetics	2M
	<p>Talc –</p>	2M



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Properties -

- It is a very fine, white or greyish white powder free from grittiness.
- It is odorless and tasteless.
- It is unctuous to touch and adheres to skin.
- It is practically insoluble in water, dilute acids and bases.

Uses –

- It is used as a skin protective, dusting powder.
- Sterilized talc is used as a base for medicated dusting powder.
- It is used as foot powder.
- It is used as filter aid.
- It is used as lubricating agent in tableting process.

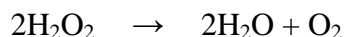
d Define 'Volume strength' and calculate volume strength of 27% w/v H₂O₂ solution.

"Volume strength" is defined as number of ml of oxygen available upon complete thermal decomposition of 1 ml of Hydrogen peroxide solution.

1.5M

Given Concentration of hydrogen peroxide=27 % w/v

2.5M



i.e. 68g of H₂O₂ gives 32 g of oxygen = 22.4 litres of oxygen at NTP

i.e. 1 g of H₂O₂ will give 22400/68ml of oxygen=329.4 ml of oxygen

Therefore, Volume strength of 27% w/v solution is

$$329.4 \times 27/100 = 88.94 \text{ V}$$



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e

What are ORS mixtures? Give composition of ORS mixtures recommended by WHO and UNICEF.

2M

ORS Mixtures – A large number of formulations of oral rehydration preparations are available in market. When there is a heavy loss of water and electrolytes e.g. in excessive vomiting, diarrhoea, or prolonged fever, electrolyte combinations are used as electrolyte replacement therapy. Various electrolyte combinations in varying concentrations are commercially available as dry powders to be dissolved in specified amount of water or in the form of prepared solutions as “oral electrolyte solutions” or “oral rehydration salts”. A large number of formulations of oral rehydration preparations are available in the market, which contains anhydrous glucose, sodium chloride, potassium chloride, and either sodium bicarbonate or sodium citrate. These dry powder preparations are to be mixed in specific amount of water and are used for oral rehydration therapy. These preparations may contain a flavouring agent & a suitable agent for free flow of the powder. Various oral rehydration electrolyte solutions are also available.

The quantities for preparing one liter solution are given below –

Ingredients	WHO formula	UNICEF formula
Sodium chloride	3.5g	3.5g
Potassium chloride	1.5g	1.5g
Sodium bicarbonate	2.5g	-
Sodium citrate	-	2.9g
Anhydrous glucose	20g	20g

2M



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3	a	<p>Attempt any <u>THREE</u> of the following:</p> <p>What is ‘Quality control’. Give its significance in pharmacy.</p> <p>Definition of Quality control:-The term quality control may be defined as the planned system of activities consistently followed to place a quality product in the market.</p> <p>Significance of Quality control in pharmaceutical industry:</p> <p>The responsibility of Pharmaceutical industry and Pharmacist has increased considerably to maintain the Good Manufacturing Practices.</p> <p>The term quality as applied to drugs and its products includes all those factors which contribute directly or indirectly to the safety, effectiveness and reliability of the product.</p> <p>The quality control include all those aspects starting with the procurement of raw material to the finished products available at the drug store and till it consumed by the customer. The job of quality control is to test a drug for quality and quantity. Hence qualitative identification and quantitative determination should be done by following the standards given official books.</p> <p>The good quality product should be available to the patient which must be –</p> <p>i) of a genuine quality and of nature</p> <p>ii) physically and chemically pure</p> <p>iii) retains quality in terms of shelf life</p>	3x4=12M 1M 3M
	b	<p>Write chemical properties and uses of potassium permanganate and hydrogen peroxide.</p> <p>Potassium permanganate-</p> <p>Chemical properties:</p> <ul style="list-style-type: none">• When heated to about 240°C, potassium permanganate decomposes with the liberation of oxygen forming manganese dioxide and potassium manganate.• Hydrochloric acid is oxidized to produce chlorine gas when it is added to a solution	2M



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of potassium permanganate.

- Potassium permanganate oxidizes oxalic acid to give carbon dioxide and water in presence of dilute sulphuric acid.
- Potassium permanganate solution oxidizes ethanol to acetaldehyde with precipitation of manganese dioxide which can be removed by filtration to get colourless filtrate which can be used to perform limit tests for chloride and sulphate.

Uses-

- Anti-infective, Antiseptic & Antibacterial.
- In barbiturate poisoning.
- Oxidizing agent.
- 1:5000-1:15,000 solutions is used in cleaning wounds & ulcers.

Hydrogen peroxide-

Chemical properties:

- It oxidizes potassium iodide to iodine and potassium bromide to bromine in acidic medium.
- When black lead sulphide reacts with hydrogen peroxide, it is oxidized to white lead sulphate.
- Hydrogen peroxide reduces silver oxide to metallic silver.
- Hydrogen peroxide oxidizes many organic substances like hair, fibers and textiles. Its dilute solution has decolorizing and bleaching actions.

Uses-

- Mild antiseptic.
- Disinfectant.
- Cleansing agent for cuts & wounds and for loosening ear wax.
- 1.6% solution is used in deodorants, Gargles & mouth washes.

2M



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	<p>c</p>	<p>• Antidote in phosphorous & cyanide poisoning.</p> <p>• Bleaching agent.</p> <p>Give properties and uses of magnesium trisilicate and aluminium hydroxide.</p> <p>i) Magnesium Trisilicate</p> <p>Properties:</p> <ul style="list-style-type: none">• It is white, odourless, tasteless fine powder free from grittiness.• It is slightly hygroscopic in nature.• It is practically insoluble in water and alcohol. <p>Uses:</p> <ul style="list-style-type: none">• It is used as an antacid in the treatment of peptic ulcers.• It is also used as gastrointestinal protective agent with colloidal silica, which can coat gastrointestinal mucosa conferring further protection.• It can also be used in oral pharmaceutical formulations and food products as a glidant.• It is used as a food additive. <p>(ii) Aluminium hydroxide- It is available in two physical forms</p> <p>i) Aluminium hydroxide gel ii) Dried Aluminium hydroxide gel.</p> <p>Properties: i)Aluminium hydroxide gel</p> <p>It is a white, viscous suspension, from which small amounts of clear liquid may separate on standing.</p> <p>Properties: ii) Dried Aluminium hydroxide gel</p> <p>White, odorless, tasteless, amorphous powder, insoluble in water & alcohol but soluble in dilute mineral acids & solutions of fixed alkali hydroxides.</p> <p>Uses.</p> <ul style="list-style-type: none">• It is non-systemic or non-absorbable antacid. It shows antacid activity not by	<p>2M</p> <p>2M</p>
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	<p>d</p>	<p>neutralization but by physical absorption of acid molecules.</p> <ul style="list-style-type: none">Externally it is used as mild astringent.Used in the treatment of diarrhea & cholera.Externally used as dusting powder. <p>What is 'Slaked Lime'? Give its properties, uses and molecular formula.</p> <p>Slaked Lime is chemically Calcium hydroxide prepared by slaking of lime.</p> <p>Properties:</p> <ul style="list-style-type: none">It is soft white powder with an alkaline and bitter taste.It is very slightly soluble in water, less in boiling water, soluble in glycerine and aqueous solutions of sugar but insoluble in alcohol. <p>Uses:</p> <ul style="list-style-type: none">It is used as an antacid.Used as an astringent in infantile diarrhea and vomiting in the form of limewater.It is also used in the preparation of some skin lotions.Its CO₂ absorbing property is useful in certain types of gas traps. <p>Molecular formula: Ca(OH)₂</p>	<p>1M</p> <p>1M</p> <p>1M</p> <p>1M</p>
	<p>e</p>	<p>Discuss mechanism of action of antioxidants. Give molecular formula of sodium thiosulphate and sodium nitrite.</p> <p>Mechanism of action of Antioxidants:-</p> <ul style="list-style-type: none">The mechanism of action of inorganic type of antioxidants is the same as is involved in a redox chemical reaction.In a redox reaction, there is a transfer of electron from one compound to the other.Since oxidation is the loss of electrons from chemical species and reduction is the gain of	<p>2M</p>



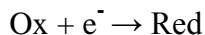
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electrons, the overall reaction can be shown as



- The inorganic type of antioxidants basically acts as reducing agents.
- When a substance acts as antioxidant (it being a reducing agent) it gets oxidized itself and prevents the oxidation of the active pharmaceutical species.
- If the active constituent is already oxidized, the antioxidant reduces it back to its original oxidation state.
- Inert gas like nitrogen displaces the oxygen in container & prevents oxidation.

Formula of Sodium thiosulphate - $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$

Sodium nitrite - NaNO_2

1M each

4

Attempt any **THREE** of the following

3x4=12M

a

Define the terms:

1M each

Hyponatremia – The condition in which there is low serum sodium level is called as hyponatremia.

Anticaries agents- The agents used for treatment of dental caries are anticaries agents. Dental caries is a disease of teeth caused by acids formed by action of microorganism on carbohydrate and it is characterized by decalcification of tooth and foul mouth odour.

Hyperkalemia- The condition in which there is an increase in serum potassium level is called as hyperkalemia.

Desensitizers-The agents used in treatment of sensitive teeth to reduce the sensitivity from heat and cold are called desensitizers.

b

Give uses, storage condition and labeling requirement of oxygen gas.

2M

Uses of Oxygen:



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- It is a therapeutic/medicinal gas used in respiratory diseases.
- It is used in the treatment of chronic bronchitis, pneumonia, pulmonary edema.
- It is used in treatment of circulatory failure, Myocardial infarction, Cardiac arrest.
- It is used in Gas/ Carbon monoxide poisoning.
- As a diluent of gaseous anesthetics.
- Used at high altitude where oxygen content in the air is less.

Storage condition and labeling requirement :

It should be stored under compression in metal cylinder. It should be stored in a special storage room which should be cool and free from inflammable materials. The shoulder of the metal cylinder is painted WHITE and remainder is painted BLACK. The cylinder carries a label stating the name of the gas and in addition, the name of gas or the symbol "O₂" is stenciled in paint on the shoulder.

What is shadow meal? Give its properties, uses and molecular formula.

Shadow meal is Barium sulphate.

Properties of Barium sulphate –

- It is fine white, odorless, tasteless, bulky powder and free from grittiness.
- Salt is insoluble in water, organic solvent and dilute acids and alkalies. It is soluble in conc. H₂SO₄

Uses of Barium sulphate –

It is used for preparation of barium sulphate compound powder and also as a contrast medium for X-ray examination of the alimentary tract.

Molecular formula: BaSO₄

2M

1 M each

c



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	<p>d</p>	<p>Explain how dental caries are formed and give role of fluoride in prevention of dental caries.</p> <p>Dental caries: Caries or tooth decay is a disease of teeth caused by acids formed by the action of microorganisms on carbohydrates & is characterized by decalcification of tooth & bad mouth odour. Though the exact cause and mechanism of dental caries is not known, it is believed that dental caries begins on the surface of the teeth.</p> <p>Acids produced by bacterial metabolism of fermenting carbohydrates act on teeth, produce lesions where bacteria get localized and dental caries is produced.</p> <p>Role of fluoride as anticaries:</p> <ul style="list-style-type: none">• Administration of small quantity of fluorides in dental product may produce good results.• Fluorides act as anticaries by two mechanisms: i) fluorides decrease the solubility of enamel in lactic acid & also act against bacterial growth. Lactic acid is formed during the partial digestion of carbohydrates. This acid has ability to dissolve the enamel. Therefore, bacteria can localize on surface of teeth & thus cavities can be formed.ii) Fluorides act by inhibiting bacterial growth.• Fluorides have toxicity when they are taken in large quantity.• When more quantity of fluoride is ingested, it is carried to bones & teeth and produces mottled enamel which is known as dental fluorosis.	<p>1.5M</p> <p>2.5M</p>
	<p>e</p>	<p>Define Antidotes and explain treatment of cyanide poisoning.</p> <p>Definition of Antidote:</p> <p>Antidote is a chemical agent which counteracts or reverses or stops the action of poison.</p> <p>Role of antidote in cyanide poisoning:</p> <p>In cyanide poisoning, sodium nitrite and sodium thiosulphate are used as antidotes. Firstly injection of sodium nitrite is given which causes the oxidation of the ferrous (Fe^{++}) ion of haemoglobin to the ferric (Fe^{+++}) ion of methaemoglobin. The methaemoglobin then</p>	<p>1M</p> <p>3M</p>



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combines with serum cyanide that has not yet entered the cell to produce cyanomethaemoglobin, thus protecting the essential cytochrome oxidase enzyme from the cyanide ion. This cytochrome oxidase enzyme is required for electron transfer cycle and cellular respiration. After 5 minutes a slow intravenous infusion of sodium thiosulphate is given. The thiosulphate ions react with cyanide ions in presence of rhodanese enzyme to non-toxic thiocyanate ions which is excreted through the urine.

ATTEMPT ANY THREE OF THE FOLLOWING.

3x4=12M

a

Write molecular formula and uses of ammonium chloride and sodium bicarbonate.

2M each

Ammonium Chloride-

Molecular formula- NH_4Cl

Uses-

- It is used as an expectorant. 0.3 to 0.5gm dose is generally employed as expectorant.
- It is used as diuretic.
- It helps to eliminate overdose of drug Amphetamine and in treatment of lead poisoning.
- It is used as systemic acidifier.
- It maintains acid base equilibrium of the body.

Sodium bicarbonate

Molecular formula- NaHCO_3

Uses-

- It is used as Antacid.
- It is used as systemic antacid in treatment of systemic acidosis.
- It is used as electrolyte replenisher.
- 3 to 5% solution in warm water is used as eye lotion.
- It is used as an ingredient of compound NaHCO_3 tablets.



<p>b</p>	<p>• It is also used in effervescent antacid.</p> <p>Give role of Iron in body. Enlist four official Iron compounds.</p> <p>Role of Iron in body-</p> <ul style="list-style-type: none">• Essential part of Haemoglobin in blood (Treatment of anaemia).• In blood it transports Oxygen from lung to various organs.• It is involved in oxidation-reduction reaction constantly taking place in normal metabolism.• It is associated with myoglobin, catalase, ferredoxin, Cytochrome P450, electron transport, enzyme cofactor etc.• It is required during growth, menstrual cycle, pregnancy, pathological bleeding.• Involved in cellular respiration.• Production of ATP.• It is an essential element of several nucleoproteins.• Externally used as astringent. <p>Official compounds of iron</p> <ul style="list-style-type: none">• Ferrous sulphate IP, B.P.• Ferrous Gluconate I.P., B.P.• Ferrous Fumarate I.P., B.P.• Ferrous Succinate B.P.• Ferric ammonium citrate I.P., B.P.	<p>2M</p> <p>2M</p>
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c	<p>Define ‘Respiratory stimulants’. Give chemical formula and properties of Ammonium carbonate.</p> <p>Respiratory Stimulant- The substances which increase the rate & depth of respiration are called as Respiratory stimulants.</p> <p>Chemical formula- $(\text{NH}_4)_2\text{CO}_3$</p> <p>Ammonium carbonate is salt of variable composition of ammonium bicarbonate (NH_4HCO_3) and ammonium carbamate ($\text{NH}_2\text{CO}_2\text{NH}_4$)</p> <p>Properties of Ammonium carbonate:</p> <ul style="list-style-type: none">• It occurs as translucent, crystalline mass with odour of ammonia.• When exposed to air it loses both CO_2 and NH_3 and gets converted in to porous, opaque, easily friable porous lumps or white powder.• It is very soluble in water and sparingly in alcohol.• Its aqueous solution is alkaline to litmus. On prolong boiling it is completely decomposed in to CO_2 and NH_3.	1M 1M 2M
d	<p>What are ‘Expectorants’ ? Classify them. Give uses of Potassium iodide.</p> <p>Expectorants- Expectorants are the drugs that remove sputum from the respiratory tract & these drugs either increase the fluidity (or reduce the viscosity) of sputum or the volume of fluids that are to be expelled from the respiratory tract by coughing.</p> <p>Classification- They are classified according to their mechanism of action into 2 categories:-</p> <ul style="list-style-type: none">• Sedative type- Sedative types of expectorants are stomach irritants. They produce their effect through stimulation of gastric reflexes. These types of drugs are bitter in taste. E.g.-Antimony potassium tartrate, Ammonium chloride, KI etc.• Stimulant type- In this type the drugs bring about a stimulation of secretory cells of respiratory tract directly or indirectly. Since the drug stimulates the secretion, more fluid is produced in respiratory tract and sputum gets diluted. E. g- Terpenoid oils like Eucalyptus, lemon, Anise etc.	1M 2M



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Uses of KI-

- It is used as Expectorant.
- It is used as source of Iodine.
- It is used in treatment of Goiter.
- Used as antifungal in veterinary practice.

1M

e **Define ‘metabolic acidosis’ and ‘metabolic alkalosis’. Give name of compounds used for their treatment.**

Metabolic acidosis: When pH of the blood falls below 7.38, the condition is known as metabolic acidosis.

1M each

Metabolic alkalosis: When pH of blood is higher than 7.42, it is known as metabolic alkalosis.

- Compounds used for metabolic acidosis are-

Sodium bicarbonate

Sodium acetate

Potassium acetate

Sodium citrate

Potassium citrate

Sodium lactate

- Compounds used for metabolic alkalosis is-

Ammonium Chloride.



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6

ANSWER ANY THREE OF THE FOLLOWING

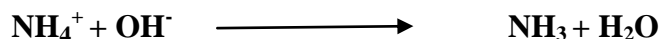
3x4=12M

a Write two identification tests each for ammonium and carbonate ions with reaction involved.

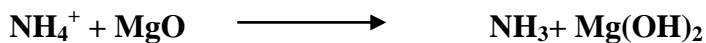
Ammonium-

2M

1-When ammonium salt is heated with sodium hydroxide solution it evolves ammonia which is recognizable by its odour, it is confirmed when moist red litmus paper over the fumes turns blue.



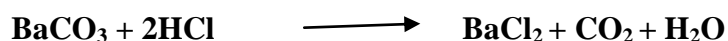
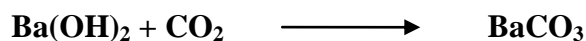
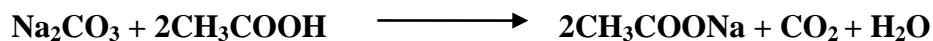
2-When aqueous solution is treated with light MgO and current of air is passed & the evolved gas is passed through HCl containing methyl red indicator, the colour of solution changes to yellow, then freshly prepared solution of cobaltinitrite is added, it gives yellow ppt of ammonium cobaltinitrite.



Carbonate-

2M

1) When carbonate dissolved in water, is treated with acid gives effervescences due to formation of CO₂, this when passed in barium hydroxide solution gives precipitate of barium carbonate. This on addition to HCl dissolves as it forms barium chloride.



2) Aqueous solution of carbonate on treatment with Magnesium Sulphate gives white precipitate of magnesium carbonate.

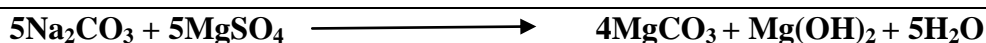


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3) Solution of carbonate produces reddish brown precipitate of mercury carbonate on treatment with mercuric chloride solution.



b

Enlist various applications of Radioisotopes.

Radioisotopes are widely used in medicines & surgery. There are various uses of radioisotopes in pharmacy-

1. Diagnostic applications: By using radioisotopes, size & morphology of organ can be detected. Radiations have sufficient energy to pass through tissue.

e.g. ^{32}P - used for diagnosis of eyes, brain & skin cancer,

^{51}Cr - used to determine volume of RBC.

^{57}Co , ^{58}Co - used for diagnosis of pernicious anemia.

2. Radiotherapy: Radioisotopes are helpful to destroy diseased tissue without affecting normal cells. Gamma radiation has high penetrating power hence it destroys deep seated tumor.

e.g. ^{60}Co - Treatment of cancer of cervix, vagina, bladder, mouth, uterus

^{131}I - Treatment of thyroid carcinoma, thyrotoxicosis,

^{32}P - Treatment of polycythemia (rise in RBCs)

3. Sterilization: Some radioisotopes are used for sterilization of heat labile drugs.

e.g. ^{60}Co –used for sterilization of hormones, vitamins, antibiotics, surgical dressing, disposable syringes etc.

4. Research applications: In biochemical research radioisotopes are used in the determination of reaction mechanism.

E.g. ^{13}C - used to label organic compounds.

^{131}I used to determine effective renal plasma flow.

5. Analytical chemistry: Radioisotopes have applications in analytical chemistry mainly

1M for
any four



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	<p>when dealing with very dilute solution</p> <p>6. They are widely used in various diverse fields- e.g. Industry, hydrology, agriculture, pollution control, pest control, food preservation etc.</p> <p>Classify gastrointestinal agents with examples.</p> <p>Gastrointestinal agents are the drugs which are used to treat gastrointestinal disorders like achlorhydria, hyperacidity, constipation and diarrhoea.</p> <p>Classification :</p> <ul style="list-style-type: none">• Acidifying agent: Dilute Hydrochloric Acid• Antacid: Aluminum Hydroxide, Aluminum Phosphate, Basic aluminum carbonate, Magnesium carbonate, Magnesium oxide, Magnesium hydroxide, Magnesium trisilicate, Calcium carbonate, Calcium Phosphate, Sodium bi-carbonate etc.• Protective and Adsorbent: Bismuth Sub carbonate, Bismuth sub nitrate, Kaolin, Milk of bismuth• Cathartics –They are further classified as Stimulant ii) Bulk purgative iii) Lubricants iv) Saline cathartics E.g. – castor oil, Methyl cellulose, liquid paraffin, mineral oil, Senna, magnesium sulphate, isabgol, etc. <p>d Define half-life of Radioisotopes. Explain the units ‘Curie’ and ‘Rad’ used for measurement of radiation.</p> <p>Half-life-</p> <p>It is the time taken for half of the radioactive nucleoid to disintegrate.</p> <p>OR It is defined as the time in which amount of radioactive nucleoid disintegrate to half of its initial value.</p> <p>Curie- The basic unit of radioactivity is curie, symbolised as “C”.</p> <p>It is defined as the quantity of any radioactive substance undergoing the same number of disintegration in unit time as of 1gm of radium.</p> $1 \text{ Curie} = 3.7 \times 10^{10}$ <p>The subunits of Curie are called as Mill curie and Micro curie.</p>	<p>4M</p> <p>1M</p> <p>1.5M</p>
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		<p>$m\text{c}=3.7\times 10^7$ Disintegration/Second $\mu\text{c}=3.7\times 10^7$ Disintegration/Second</p> <p>Rad- The rad is radiation absorbed dose. It measures the amount of energy transferred to a particular medium. It is defined to be equal to the absorption of 100 ergs per gram of absorbing medium regardless of the medium.</p> <p>Write molecular formula of Calcium gluconate. Write its uses and give reason why it is preferred over other calcium salts.</p> <p>Molecular formula: $\text{C}_{12}\text{H}_{22}\text{CaO}_{14}\cdot\text{H}_2\text{O}$</p> <p>Uses :</p> <ul style="list-style-type: none">• It is used as a source of calcium in calcium deficiency.• It is drug of choice for hypocalcaemic tetany.• The tablets are used in supplementing diet of convulsant mother.• Injections are used intravenously. The I.M route should not be used particularly in children as it causes abscess at the site of injection. <p>Reason-</p> <ul style="list-style-type: none">• Calcium gluconate tablets when administered orally do not cause irritation of Gastrointestinal tract.• It has better bioavailability compared to other calcium salts.	<p>1.5M</p> <p>1M</p> <p>2M</p> <p>1M</p>
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