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PAPER DENTAL MATERIAL  
Program BS.D.T

Q. No. 1

### ① Calcium hydroxide:→

- \* Calcium hydroxide is a dental material.
- \* It is an inorganic compound with chemical formula  $\text{Ca}(\text{OH})_2$
- \* It is introduced by dental professional Hermann in 1921
- \* It is supplied in several forms
- \* Supplied in powder form powder can be mixed with distilled water saline solution to form a thick paste and applied
- \* Supplied as two paste system one base paste another catalyst paste.
- \* Supplied as single paste

### Composition:→

- \* Accelerator Paste
- \* Alkyl Salicylate 36-42%
- \* Inert fillers - titanium oxide 12-14%
- \* Barium sulphate 32-35%
- \* Calcium sulphate 14-15%

### Advantages:→

- \* Initially bactericidal than bacteriostatic

- \* Promotes healing and repair
- \* High pH ~~stim~~ stimulates fibroblasts
- \* Neutralizes low pH of acids
- \* stops internal resorption
- \* In expensive and easy to use

### Disadvantages =>

- \* Does not exclusively stimulate dentinogenesis
- \* Does exclusively stimulate reparative dentin.
- \* Associated with primary tooth resorption
- \* may degrade during acid etching
- \* Degrades upon tooth flexure.
- \* Marginal failure with amalgam condensation.
- \* Does not adhere to dentin or resin restoration

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### Ans(1) USES OF CALCIUM HYDROXIDE CEMENTS =>

Calcium hydroxide cement perform the following function:

#### Pulp capping Agent =>

- \* Calcium hydroxide is generally accepted as the material of choice for pulp capping. Histologically there is a complete dentinal bridging with healthy radicular pulp under calcium hydroxide dressing when calcium hydroxide is applied.

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Q2  
Ans -

## Properties of Mineral Trioxide Aggregate :-

\* PH

\* initial PH of 10.2 which rises to 12.5 (similar to calcium hydroxide) following setting. The high PH is theorized to be responsible for the antimicrobial action and biological activity of the material.

\* Working time 5 minutes

\* setting time 3-4 hours (old one) 20 min

\* Solubility MTA displays low or nearly no solubility, which is attributable to addition of the bismuth oxide

## Manipulation & Setting reaction of MTA

The MTA paste is obtained by mixing 3 parts of powder with 2 part of water to obtain putty like consistency (distilled water, local (anesthesia normal saline). Mixing can be done on paper or on a glass slab using a plastic or metal spatula. This mix is then placed in the desired location and condensed lightly with a moistened cotton pellet.

MTA has a pH of 10.2 immediately

after mixing and increases to 125 after 3 hours of setting which is almost similar to calcium hydroxide.

\* MTA powder should be stored carefully in closed sealed container away from moisture. The mixing time of MTA is crucial. If the mixing of MTA is prolonged, it results in dehydration of the mix.

\* Sluyk et al in 1998 reported that the mixing time should be less than 4 minutes.

\* MTA takes longer time to set compared to any other material. The exact time taken to set varies between different studies.

\* According to Todabinijad and colleagues in 1995, the setting time of grey MTA is about 1 hour and 45 minutes (1.5 minutes) whereas Islahet al in 2006 reports 2 hours and 55 minutes (~~1.5 minutes~~) ~~whereas~~ for grey MTA and 2 hours and 20 minutes for white MTA.

\* MTA being hydrophilic requires moisture to set, making absolute dryness contraindicated. Presence of moisture during setting improves the final strength of the set cement.

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directly to pulp tissue there is necrosis of adjacent pulp tissue and an inflammation of contiguous tissue.

### Endodontic sealer

To be therapeutically effective calcium hydroxide must be dissociated into  $\text{Ca}^{++}$  and  $\text{OH}^{-}$ . Therefore to be effective an endodontic sealer based on calcium hydroxide must dissolve and the solid consequently lose content.

### Apexification $\Rightarrow$

In apexification technique canal is cleaned and disinfected when tooth is free of signs and symptoms of infection. The canal is dried and filled with stiff mix of calcium hydroxide and MTA. ~~isto~~ Histologically there is formation of osteodentin after placement of calcium hydroxide paste. There is formation of osteodentin after placement of calcium hydroxide paste. There appears to be a differentiation of adjacent connective tissue cells; there is also deposition of calcified tissue adjacent to the filling material.

### Pulpotomy $\Rightarrow$

It is the most recommended pulpotomy medicament for pulbally involved vital young permanent teeth with incomplete apices. A pulpotomy is the

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Ans (3)

## MANIPULATION OF AMALGAM.

⇒ Trituration ⇒

Trituration is the process by which mercury is allowed to react with the alloy powder. This procedure allows the rubbing of the surface oxide on amalgam particles, exposing an active surface to react with mercury.

⇒ Trituration 1) hand trituration.

2) Mechanical trituration

Hand mixing

A glass mortar and pestle is used. The mortar is has its inner surface roughened to increase the friction between amalgam and glass surface with carborundum paste. A pestle is a glass rod with a round end.

Mechanically mixing.

⇒ The disposable capsule serves as a mortar. Some capsules have a cylindrical metal or plastic piece in the capsule which serves as the pestle.

\* Reusable capsules are available with friction fit or screw.

\* Amalgamators have automatic times

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and speed control device  
the speed ranges from 3200  
to 4400 cycles per minute. High  
copper alloys require higher  
mixing speed.

### Indications :-

- ⇒ Restoration of posterior teeth  
(Class I & II) Moderate to large preparations
- ⇒ In some cases, restoration distal  
surface of the cavity
- ⇒ Class V Preparation (some cases)
- ⇒ Class VI Preparation
- ⇒ Core build up for badly broken  
down teeth in the posterior teeth  
contraindication:  
when esthetics is important (e.g. anterior  
teeth).

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### Ans) COMPONENTS of COMPOSITE

#### RESIN :-

Following are some of the  
important components

- ⇒ Matrix
- ⇒ Filler
- ⇒ Coupling Agent
- ⇒ Initiators and accelerators
- ⇒ Pigments
- Resin Matrix
- ⇒ Bis-GMA (bisphenol-A glycerol  
methacrylate)
- ⇒ UDMA (unreactive dimethacrylate)

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⇒ TEGDMA (triethylene glycol dimethacrylate)

Use of Composition resins  
Flowable  
Condensable

1) Flowable composites:

Has a reduced filler content to make the material "flowable" indicated for class 2 restoration in the gingival areas used as a cavity base or liner especially for class II preparation where even access is difficult to achieve.

Use as a pit and tissue sealant

Condensable Composites:

- Has a filler particle that inhibits the filler particles by sliding to one another.
- Stiffer, thicker feel.