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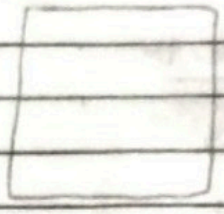
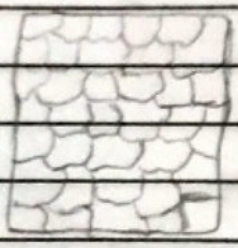
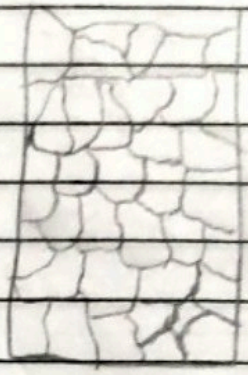
Ans 1.



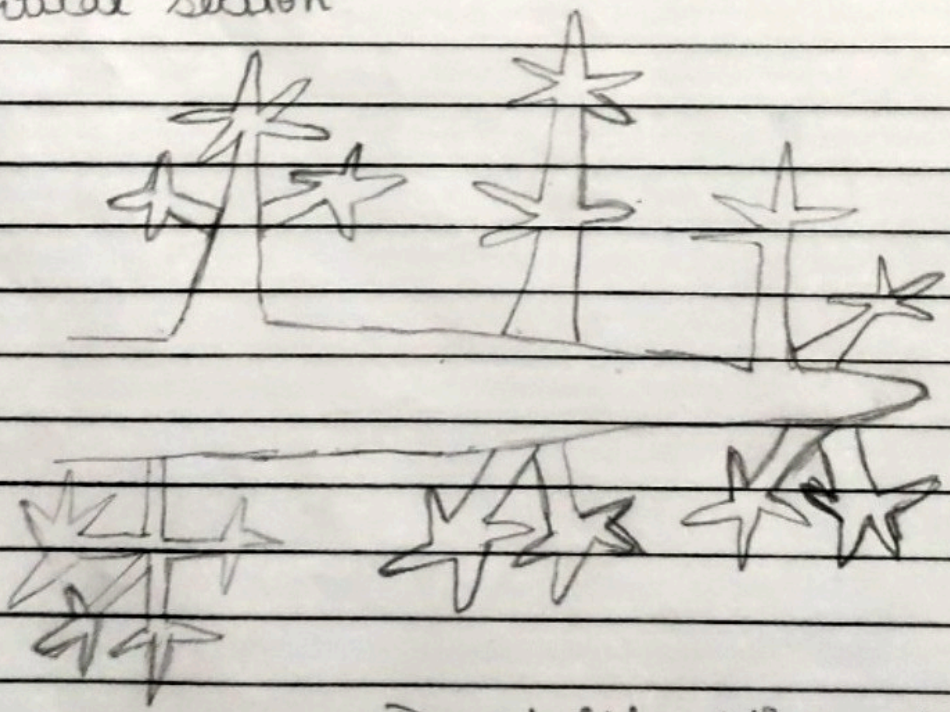
Single Crystal

Vertical Section





Vertical Section



Dendritic Microstructure

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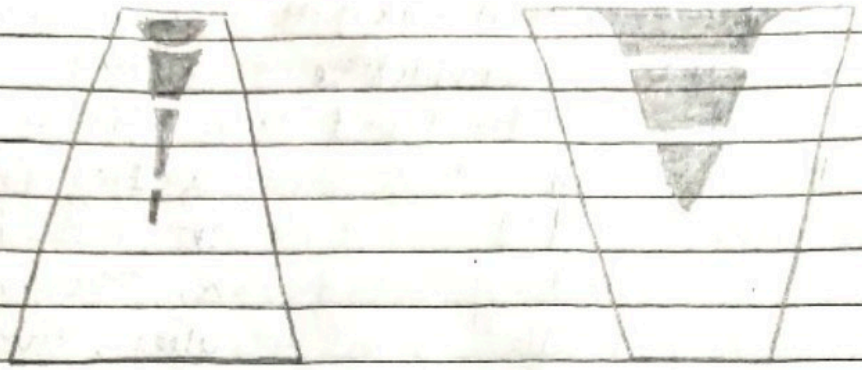
Ans. 2.



(X) (Y)

Ans. 3. Spruce is the opening of the mold from where metal is poured. It is made tapered to prevent aspiration effect i.e. to allow passage of gas.

(a) Vent holes :- Holes which are provided so that gases can escape out of the molten metal during solidification.

(b) Core :- A core is that element which is used in moulding process to make hollow cavities or holes and give different contours which is usually expensive to be machined.

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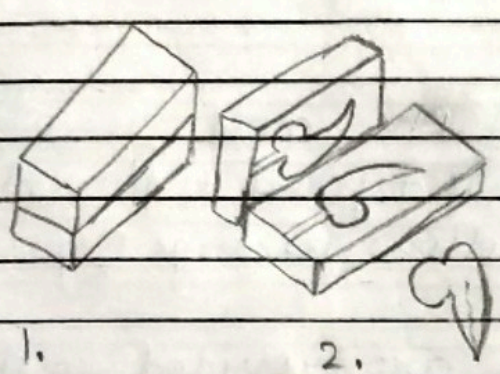
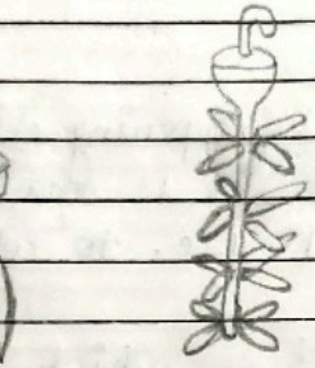
A.4 Investment Casting :- A wax pattern of the product that you want to manufacture is coated. Once this coating is hardened then dipping process is repeated several times to increase coating thickness. Then this wax is melted out & molten metal is poured into the cavity created by wax pattern. Then metal casting is removed after metal solidifies. This is used for more complex shapes. Though this is expensive.

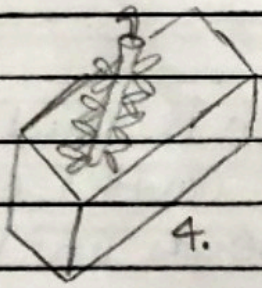


1.



2.

3.



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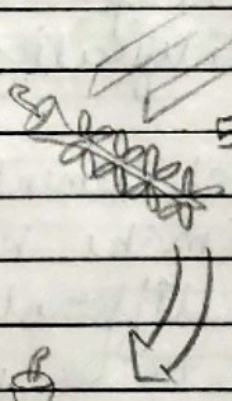
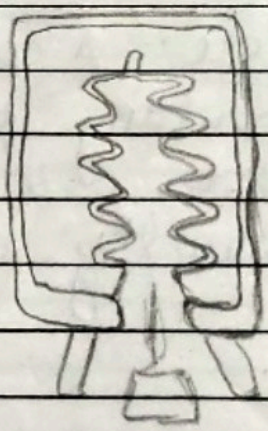


5.

6.



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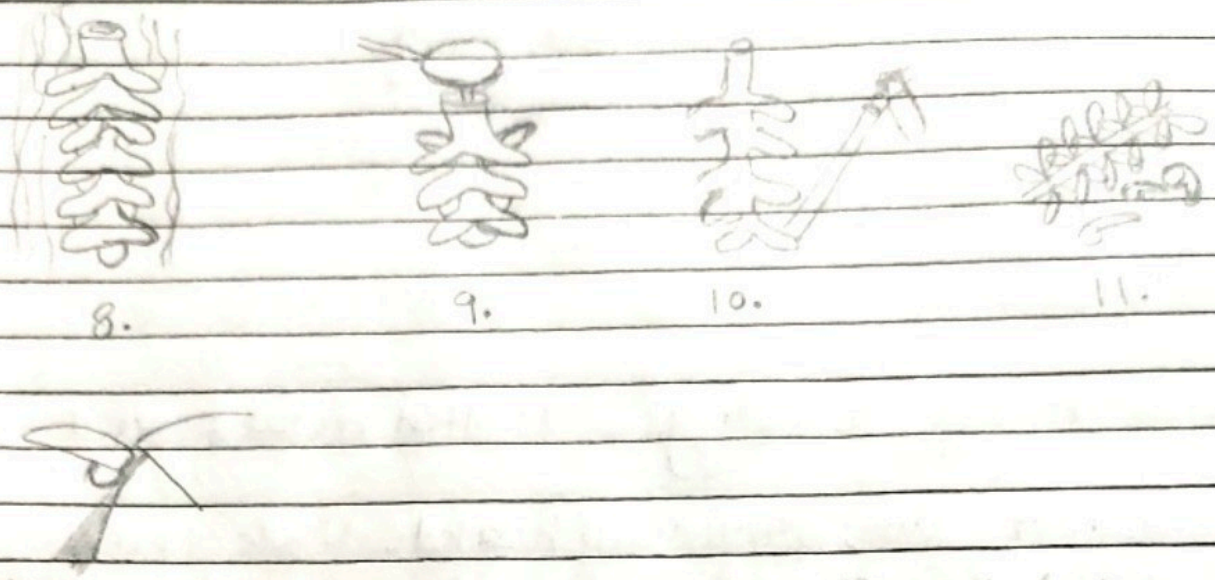
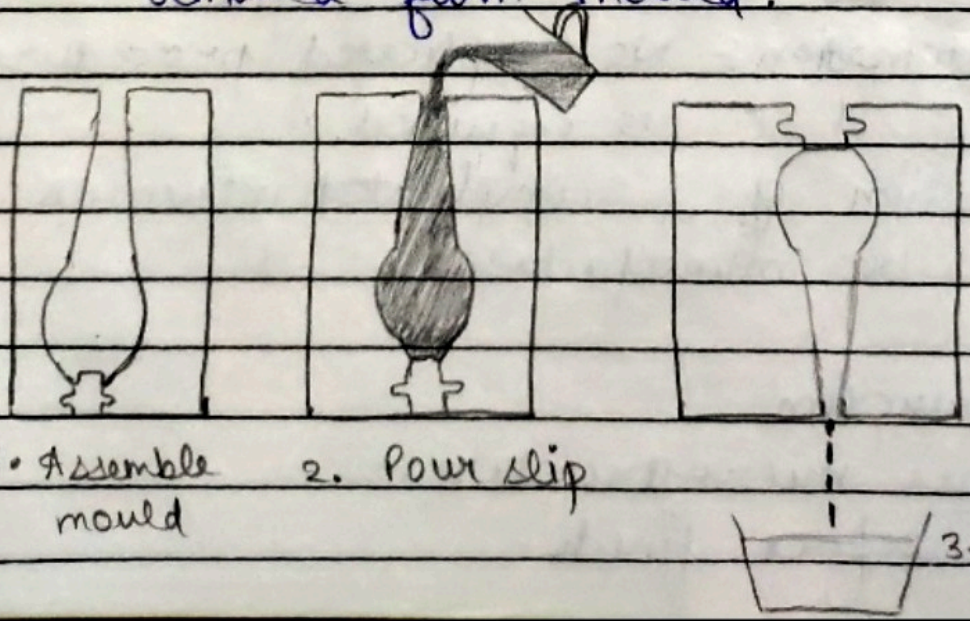


~~(b) Casting Slip~~

~~(b) Casting Slip.~~

(b) Slip Casting :- This is suspension of fine particles in a liquid medium. Slip is poured into a mould, then liquid is drawn out. Then a layer of solid clay remains sticked to the walls of the mould. Then the residue liquid is drained out of mould. Then the casting is removed from mould.



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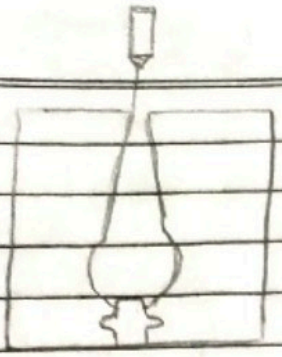
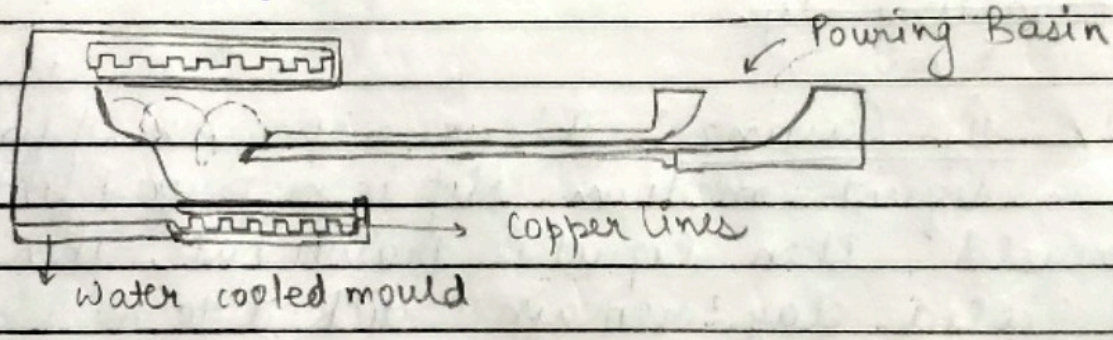


4. Trim.

5. Removed mould

(c) Centrifugal Casting :- Molten metal poured into spinning die, previously heated. While spinning the mold ~~meta~~ molten metal is poured into it., centrifugal force act and the metal distributes to the wall. And ~~metal~~ more dense metal forced to walls.



Q.5. Advantages of powdered metallurgical processes are:-

(i) Eas of automation :- No complicated procedure is required.

(ii) High precision of complicated instruments can easily be manufactured.

(iii) low cost

(iv) High Production

(v) Unique microstructure.

(vi) Good surface finish

(vii) Can be used for higher melting point metals like Tungsten

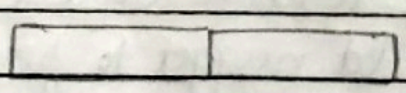
A.6. (ii) Fusion Welding Process requires heat, that is applied to softer ~~or~~ & surface which then flows into joint. Extra material may be required to fill the joint completely.

(iii) Soldering: In this process 2 or more metal items are joined together by melting & then flowing a filler metal into the joint. Filler metal have low melting point.

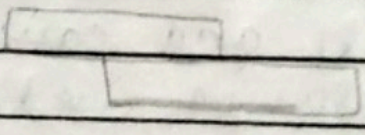
(iii) Brazing: This is metal joing process in which metals are joined together by melting & flowing a filler metal having a lower M.P.

A.7. (iv)

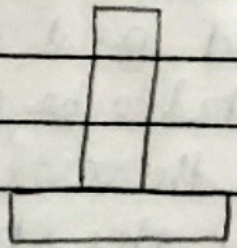
A.8.



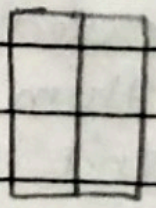
(a) Butt Joint



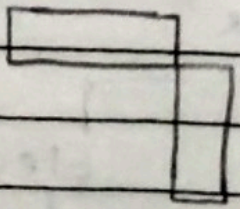
(b) Lap Joint



(c) T-joint



(d) Edge Joint



(e) Corner Joint

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Q.9. OAW - Oxyacetylene Welding
MIG - Metal Inert Gas
SAW - Submerged arc welding
EBW - Electron beam welding.

→ EBW has the least HAZ because this type of welding happens due to electrons. This process gives concentrated heat and that too only on the region to which it is applied thus generating a small HAZ.

→ SAW has the highest HAZ because it gives least concentrated heat due to which heat is more diffused and thus generates large HAZ

A.10. Resistance welding is a process to weld 2 metals. In this 2 metals are squeezed between two weld tips. Current flows between weld tips and encounter resistance. which cause metal to melt and cause a weld nugget to form.
RSW is used mainly for joining 2 to 4 light gauge overlapping metal sheets. For clamping the metal sheets two electrodes are used and current is passed through them. As the metal to be joined doesn't have great thermal conductivity the heat remains at the spot & the spot gets melted. Then the plates are joined.