

علامہ اقبال اپن یونیورسٹی، اسلام آباد



مشقی فارم

حل شدہ مشق کے ساتھ مقررہ تاریخ سے پہلے اس فارم کے 3 پر اپنے ٹیوٹر کو اسال کریں۔

یہ حصہ طالب علم پر کریں

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میں کی فٹو کا پی بھی استعمال ہو سکتی ہے۔

Question #01

Write salient features of science laboratory. Tell how you will manage science laboratory when there is only one room available for science laboratory?

The main features to be found in a laboratory are:

- 1- Laboratory benches including the side benches.
- 2- Bench services; water, gas and electric supplies.

Laboratory Benches:

The laboratory benches can be categorised into (a) fixed benches, and (b) mobile benches.

Whether the benches are fixed to the floor or are mobile depends on the use made of them. Fixed benches are adequate for the present curriculum. But the newer

curriculum after demands mobile
benches.

The obvious advantages of fixed benches are that water, gas and electric supplies can be fixed onto them and thus giving convenience to the resecess. The benches are always horizontal and they should be vibration-proof.

For safety in the laboratory, a high table with the students performing the experiments in the standing position is preferable.

The students can easily move away from the bench if something should go wrong with the experiments thus avoiding personal injury.

(a)

the fixed benches:

Most of the laboratories in the South-East Asian region have benches, their are fixed to

the floor. The water pipes, gas pipes and electrical conduits are permanent fixtures and they form part of a laboratory bench, which is usually made of wood.

(b)

The Mobile benches:

In laboratories with mobile benches, the water and gas pipes, if any, and electric conduits all to be found only in the side or wall benches, which are fixed.

Bench Service:-

Science experiments may require one or a combination of these services:

— water

— heat

— electricity

In science laboratories, water is usually obtained from taps connected to water pipes or from aspirators.

Heat is obtained by burning.

- gas from the mains
- gas from portable tanks called **bottled gas**
- solid chemical fuel
- liquid fuel i.e. a spirit lamp.

Electricity is obtained from:

- Dry cells
- lead acid accumulators
- NiFe cells
- 80-ampere low voltage aerial
- direct from the mains.

In a laboratory with fixed benches, the students' benches may have:

either, running water or 3-lit aspirators; gas from the mains or portable tanks or, running water or 3-lit aspirators, gas from the mains or portable tanks; electricity from cells, batteries and mains or none of these services.

- The side benches usually have all the services
- The teachers' bench usually has all these services.

Question #02

Financing and budgeting have a central role in any organization. write different aspects of financing and budgeting for science laboratory.

Finance:-

For the operation of any enterprise, financial resources must be available to meet all the financial requirements. The school science laboratories are no exception. The laboratories need financial aids or grants to meet all the operational costs involved in the management.

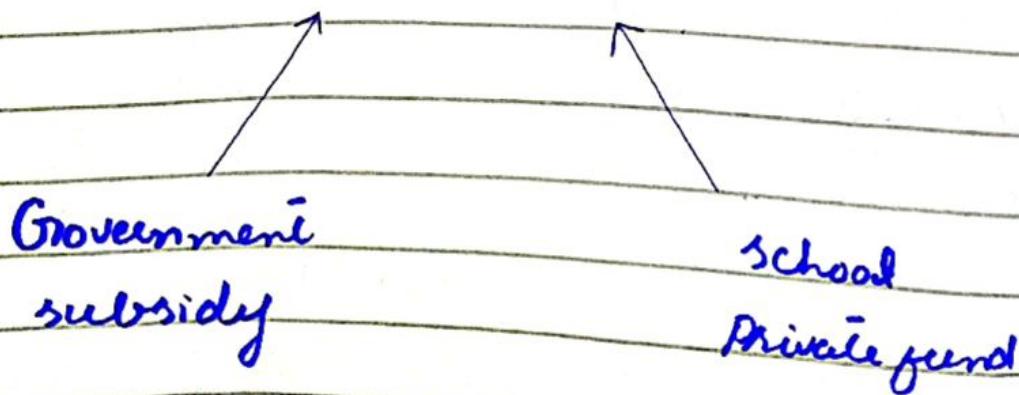
In Malaysia, Singapore, Thailand, Indonesia and Philippines, the government-aided schools rely mainly on their government for financial assistance. The amount of science grant from a government normally depends on the enrolment

of pupils in the school and also on the categories of pupils and types of science subjects taught in the school.

Generally teachers in the member countries of SEAMEO feel that the science grants allotted by their governments are enough to meet the rising prices for science equipment and apparatus.

Furthermore the increasing emphasis on practical work in science teaching has increased the demand for more sets of equipment in the laboratories.

Science Fund



Budgeting:-

With the limited and insufficient amount of science grant allotted, it is of vital importance to ensure that every cent of it is well-spent on essential items and to avoid purchase of equipment and apparatus.

What is a good budgeting then?

Before an answer could be given to this question, another basic question is:

What is budgeting?

In simple terms, budgeting is a process that involves systematic planning of expenditure of a certain amount of allotted money.

How to budget?

Budgeting for science laboratories should always be

done two or three months before the end of the school year so that sufficient time is given for preliminary considerations.

The sequence of actions for preparing a budget for science laboratories is suggested below. It is in no way a standard procedure. It may be varied according to different administration of schools.

1 - Check all the stocks in the laboratories to ascertain the quantity of stock available for every item.

2 - To obtain information on the projected enrolment of science students in the school for the coming year.

3 - To check the current prices for all the items in the laboratories and to make projections on the prices for the coming year.

Question No: 3

Explain the characteristics of the following laboratory furniture: benches, stools, chalkboards, cupboards and display cupboards.

In laboratory these components are very necessary without these components we can't perform our experiments efficiently.

Benches:

All the experiment are performed on the benches which are placed into the laboratories. At the benches we can do our practical very easily we can put our extra-ordinary apparatus on the benches.

If any laboratory have not any benches in it then it can produce the problems to perform experiment into the laboratory.

Stools:-

The stools are also very important into the laboratories we sit on the stools and perform our practicals easily. However in some practicals the stools are not necessary to do it but as a component of laboratories the stools should present into any efficient laboratories. Any well equipped laboratory must have stool this is the basic feature of laboratories. Most stools into the laboratories are present for the students.

Chalkboard:-

The chalkboard is also important into any laboratories. These are mostly used for instructor. The instructors are used the chalkboards to explain the complete practical for whole students of

the class. As we know that ^{it} before performing any experiment it is necessary to understand to all students so chalkboard is most commonly used for this purpose.

Cupboards:

The furnished laboratories have different cupboards in it. There are lot of apparatus into the laboratories which is difficult to put into the laboratories without cupboards because without cupboards the apparatus can damage, destroy ~~any~~ and difficult to save so the cupboards are used to secured the apparatus into the laboratories. When we put our apparatus into the laboratories then we can label the different apparatus which can easily search for further use.

In the laboratories & as there is lot of apparatus so some of apparatus are required to display and some are not used for display.

Display Cupboards:

The display cupboards are used for showing the apparatus into the laboratories. Some important and sensitive apparatus which are used into the laboratories are put into the display cupboards. In this way we can easily search these types of apparatus.

In display cupboards we use the sticker, display cards etc to finds out the apparatus. The display cupboards are also decorate the laboratories. It can make the laboratories most beautiful and interesting to the students.

Question #04

Write procedures of preparing following reagents; alcohol, electro-plating solutions, Benedict solution and Millon reagents, write at least one use of these reagents in science practicals.

Following are the other useful reagents.

1- Alcohol:-

Add drop by drop to the proper percentage is needed. Add 6 drops of concentrated hydrochloric acid.

2- Alcohol Alkaline:-

Add a few drops of 0.1% sodium bicarbonate to 70% alcohol. Used as wash.

3. Alcohol acid:-

100 c.c alcohol of the proper percentage is needed. Add 6 drops of concentrated hydrochloric acid.

4. Aqua regia:-

Mix 1 part concentrated nitric acid with 3 parts concentrated hydrochloric acid. This formula should include one volume of water of the aqua regia if it is to be stored for any length of time, without water objectionable quantities of chlorine and other gases are evolved. Used for dissolving metals.

Heat sensitive

Paper:-

A solution of cobalt chloride in water is added to a solution of ammonium

chloride in water.

Sea water:-

A substitute for sea water can be prepared by dissolving the following in 2 litres of water.

40.0 g	sodium chloride	3.5 g
magnesium chloride	sulphate	5.0 g magnesium
2.0 g	potassium sulphate	

Silvering solution:-

This is used for depositing silver mirror on glass.

Solution 1. 12.5g of silver nitrate are dissolved in 100ml of water and 32.5g of sodium potassium tartrate dissolved separately in 100 ml of water.

The two solutions are mixed and then cooled and

the clear liquid poured off from the precipitate and made up to 200 ml.

Electroplating Solutions:-

copper. About 100 g of copper (II) sulphate crystals are dissolved in 300 ml of water, 6 grams of potassium acid phthalate and 5 g of potassium cyanide (poison) are then added. The solution is made up to 450 ml. The solution should be kept cold while it is being made.

Question#05

How will you fabricate apparatus for demonstration of process of osmosis?

Osmosis is the spontaneous net movement of solvent molecules through a selectively permeable membrane into a region of higher solute concentration, in the direction that tends to equalize the solute.

Concentrations on the two sides, it may also be used to describe a physical process in which any solvent moves across a selectively permeable membrane separating two solutions of different concentrations.

Osmosis is a vital process in biological systems, as biological membranes are semipermeable.

Osmosis is a special type of diffusion of liquids. When two solutions of different concentration are separated by a selectively permeable membrane, diffusion of water or solvent molecules takes place from the solution of lower concentration to the solution of higher concentration. This process is called osmosis.

Potato Osmoscope:

Demonstration of osmosis in a living system can be done using the potato osmometer.

A potato is peeled and one side is flattened which serves as the base.

A cavity is made in the potato and is filled with concentrated sugar solution and a pin mark is

made to indicate the initial level. This potato is then placed in a beaker containing coloured water for some time.

This proves the entry of water into the sugar solution through the potato tissues which serve as the selective permeable membrane.

Plasmolysis:

When a plant cell is placed in hypertonic solution, the process of exosmosis starts and water from the cell sap diffuses out into the solution of external medium. This causes a reduction in the tension of the cell wall and brings about the contraction of protoplasm due to the continuous loss of water. The protoplasm becomes rounded in shape due to contraction and such a cell is

very useful.

In other words

Osmosis is the diffusion of water or solvent from a region of its higher concentration to a region of its lower concentration through a selectively permeable membrane. This can also be expressed as the movement of water from a region of higher free energy of water or water potential to a region of lower free energy or water potential through a selectively permeable membrane.

Osmosis provides the primary means by which water is transported into and out of cells.