

केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली  
सैकण्डरी स्कूल परीक्षा (कक्षा दसवीं)  
परीक्षार्थी प्रवेश-पत्र के अनुसार भरें

विषय Subject : Science

विषय कोड Subject Code : 086

परीक्षा का दिन एवं तिथि

Day & Date of the Examination : March 13 2019, Wednesday

उत्तर देने का माध्यम

Medium of answering the paper : English

प्रश्न पत्र के ऊपर लिखे

कोड को दर्शाए :

Write code No. as written on  
the top of the question paper :

Code Number

31/1/2

Set Number

① ● ③ ④

अतिरिक्त उत्तर-पुस्तिका (ओं) की संख्या

No. of supplementary answer -book(s) used

विकलांग व्यक्ति :

हाँ / नहीं

Person with Disabilities :

Yes / No

**NO**

किसी शारीरिक अक्षमता से प्रभावित हो तो संबंधित वर्ग में ✓ का निशान लगाएँ।  
If physically challenged, tick the category

**B D H S C A**

B = दृष्टिहीन, D = सूक व श्रवण, H = शारीरिक रूप से विकलांग, S = स्पास्टिक  
C = डिस्लेक्सिक, A = ऑटिस्टिक

B = Visually Impaired, D = Hearing Impaired, H = Physically Challenged  
S = Spastic, C = Dyslexic, A = Autistic

क्या लेखन - लिपिक उपलब्ध करवाया गया : हाँ / नहीं

Whether writer provided :

Yes / No

**NO**

यदि दृष्टिहीन हैं तो उपयोग में लाए गये

सॉफ्टवेयर का नाम :

If Visually challenged, name of software used :

**N.A.**

\*एक खाने में एक अक्षर लिखें। नाम के प्रत्येक भाग के बीच एक खाना रिक्त छोड़ दें। यदि परीक्षार्थी का नाम 24 अक्षरों से अधिक है, तो केवल नाम के प्रथम 24 अक्षर ही लिखें।

Each letter be written in one box and one box be left blank between each part of the name. In case Candidate's Name exceeds 24 letters, write first 24 letters.

कार्यालय उपयोग के लिए  
Space for office use

**1503342**

**086 / 14188**



## Instructions to Candidates

1. Make sure that the answer-book contains 32 pages and are properly serialied in number (including title pages) as soon as you receive it.
2. DO NOT make any special sign or mark in or outside the answer-book, supplementary answer-book, graph-paper, map etc.
3. DO NOT write your roll no., name of your school or place of examination in any of your answers.
4. You must write the supplementary answer-book serial no. in the attendance sheet.
5. Write on each ruled line on both sides and do not waste pages by leaving a wider margin.
6. DO NOT tear out or fold the pages of the answer-book and do not leave any page blank unnecessarily. No supplementary answer-book(s) should be asked for unless this answer-book / the previous supplementary answer-book is finished.
7. Number your answers according to their numbers in the question paper.
8. Draw a line when a question (or a part thereof) is finished.
9. Securely tag your answer-book with supplementary answer-book(s), graph-paper, map etc. if used by you, but DO NOT write your Roll No. on the supplementary answer-book, graph-paper, map etc.
10. Use only blue-black or royal-blue ink/gel/ball point pen. Using of any other writing instrument/ink/pencil etc will be on your own risk and responsibility.
11. For rough calculation etc., appropriate margin on the right-hand side of the page may be drawn. The rough calculations etc. should be crossed out afterwards.
12. DO NOT leave the examination hall without handing over the answer-book to the Asstt. Supdt.
13. If during the course of examination, a candidate is found indulging in any of the following, he/she shall be deemed to have used unfair means at the examinations, and as such his/her result shall not be declared but shall be marked as UNFAIR MEANS (U.F.M.) :-
  - (a) having in possession papers, books, notes or any other material or information relevant to the examination in the paper concerned;
  - (b) giving or receiving assistance directly or indirectly of any kind or attempting to do so;
  - (c) writing questions or answers on any material other than the answer book given by the Centre Superintendent for writing answers;
  - (d) tearing of any page of the answer-book or supplementary answer-book etc.
  - (e) contacting or communicating or trying to do so with any person other than the Examination Staff, during the examination time in the examination centre;
  - (f) taking away the answer-book out of the examination hall/room;
  - (g) using or attempting to use any other undesirable method or means in connection with the examination;
  - (h) smuggling out Question Paper or its part or smuggling out answer-book/ supplementary answer-sheet or part thereof; and
  - (i) threatening any of the officials connected with the conduct of the examinations or threatening of any of the candidates.



केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली  
Central Board of Secondary Education, Delhi

SECONDARY SCHOOL EXAMINATION (CLASS X)

सैकण्डरी स्कूल परीक्षा (कक्षा दसवीं)

Q. No.	01	02	03	04	05	06	07	08	09	10	TOTAL
MARKS	1	1	2	2	2	3	3	3	3	3	23

Q. No.	11	12	13	14	15	16	17	18	19	20	TOTAL
MARKS	3	3	3	3	3	5	5	5	5	4	39 1/2

Q. No.	21	22	23	24	25	26	27	28	29	30	TOTAL
MARKS	5	2	2	2	2	2	2				17

Q. No.	31	32	33	34	35	36	37	38	39	40	TOTAL
MARKS											

GRAND TOTAL	79 1/2 = 80
MARKS IN WORDS	Eighty only

प्रमाणित किया जाता है कि मैंने इस उत्तर पत्रिका का मल्यांकन उचित प्रश्नपत्र के सेट और अंकन योजना के अनुसार किया है। यह भी प्रमाणित किया जाता है कि उत्तर पत्रिका के अन्दर कोई

7 1 0 2 . .

8 8 8 8 8 8 8 8 8 8

CASE STUDY

QUESTION

3

### SECTION - A

Answer 1

The SI unit of current is Ampere (A).

When one coulomb charge is passing through a conductor in a second, then the amount of current flowing through the conductor in a circuit is 1 Ampere.

$\frac{1}{2}$

$\frac{1}{2}$

Ans 2 The main constituent of biogas is methane and its percentage in the gas is about 75%.

$\frac{1}{2}$

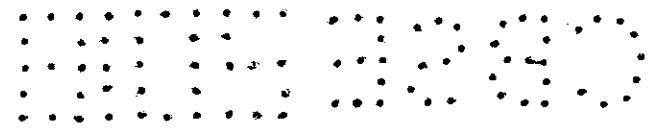
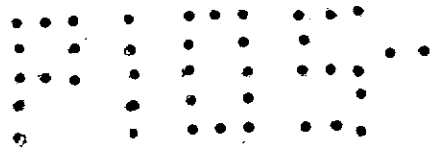
### SECTION B

Ans 3 The name of element <sup>X</sup> whose atomic number is 11 is Sodium (Na).

The symbol of element X is Na.

Electronic configuration of the element would be :

$\frac{1}{2}$



Atomic No.	Electronic Configuration		
	K	L	M
11	2	8	1

Also, the valency of the element would be 1.

Ans 4  
Oxygen is travelled or transported through a respiratory pigment i.e. haemoglobin in human beings.

② Haemoglobin has a high affinity for oxygen, and hence  $O_2$  is transported with the help of haemoglobin in a bind form.

The transportation of  $CO_2$  is through plasma of the blood in dissolved form as it is unable to bind with haemoglobin.

Ans 5  
② Eye lens of a human eye is composed of a fibrous, jelly like material. It is a crystalline convex lens which has an ability to adjust the focal length for viewing nearby and distinct objects.

QUESTION

ANSWER

5

The role of ciliary muscles in a human eye is to facilitate and adjust the focal length of crystalline lens.

When it is relaxed, then lens become thin & distant objects can be viewed.

When it contracts, then lens become thick & nearby objects can be viewed.

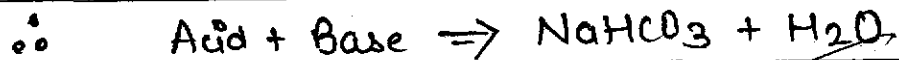
### SECTION C

Ans 6 We know that,

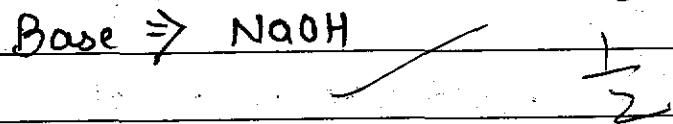
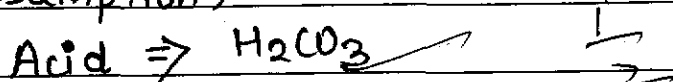
By Neutralisation Reaction,

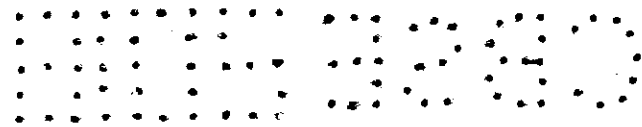
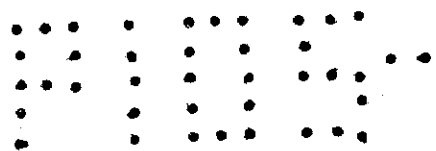


Here, the salt formed is Sodium hydrogen carbonate. ( $\text{NaHCO}_3$ )

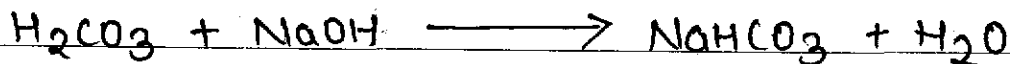


$\therefore$  By Assumption,





∴ The reaction would be



[Already balanced]

This compound is basic in nature, as it's formed from a weak acid and a strong base.

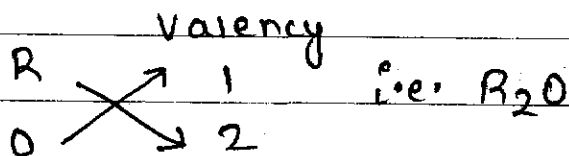
The pH value of  $\text{NaHCO}_3$  is greater than 7 (i.e. 10)

Ans 7

(i) As the first group elements will have a valency 1.

Let the element be R.

∴ Oxide of first group element is  $\boxed{\text{R}_2\text{O}}$ .



(ii) As the element is of group 13.

We know that, group 13 elements would possess a valency 3.

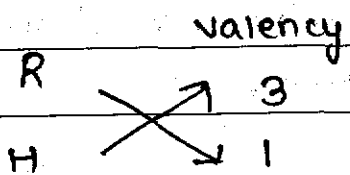


GROUP 13

GROUP 17

Let the Halide element be R and the halide be H.

∴ Halide of group 13 element will have a valency  
the molecular formula  $\boxed{RH_3}$  as halides have a valency 1.

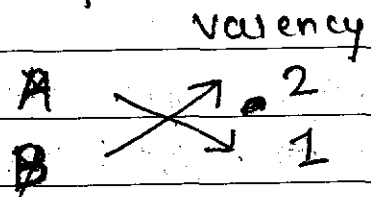


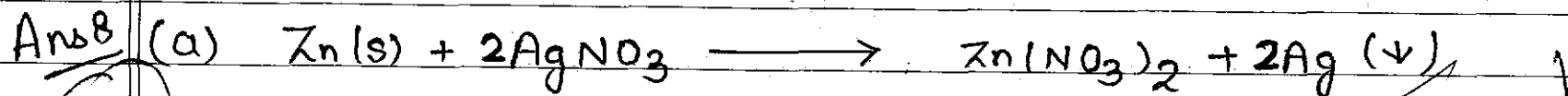
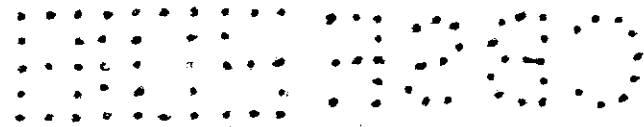
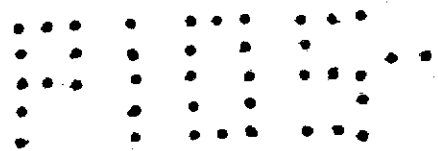
(iii) Element A of group 2 will possess a valency 2.

Element B of group 17 will possess a valency 1.

Let element A be X and element B be Y.

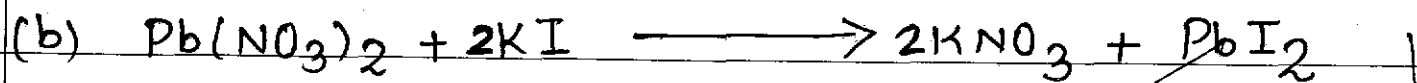
Molecular formula would be,  ~~$X_2Y_2$~~   $\boxed{AB_2}$ .





3

It is a type of displacement reaction as zinc being more reactive than silver, has displaced it from its solution. 1



It is a type of double displacement reaction as the compounds have mutually shared their ions. 1

Ans 9 The continuous loss of water in the form of vapour from the aerial parts of the plant is termed as transpiration. It helps in maintaining temperature of the plant and creates a suction for upward movement of water. 1

## Activity to demonstrate transpiration

**Aim :-** To show transpiration from the plant.

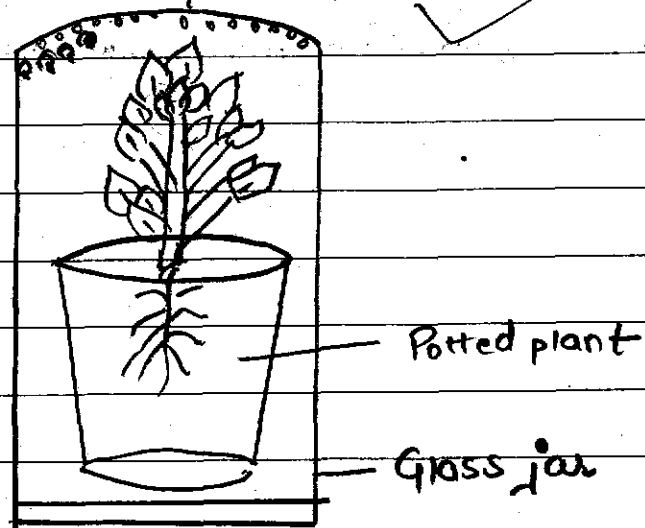
**Materials Required :-** A potted plant, a glass jar, vaseline, colourant.

**Procedure :-**

- \* Take a potted plant and water it which is coloured.
- \* Now, Put a glass jar over it.
- \* Seal it with the help of vaseline.

**Observation :-** We will observe tiny droplets which are coloured over the glass jar which have been condensed.

This shows that, transpiration has occurred through the plant aerial parts.



QUESTION

ANSWER

Ans

3

Hormones are required by a living organism for the working of body in a synchronised way. However, it is required in precise quantities. Hyposecretion and Hypersecretion of hormones lead to various hormonal disorders. Due to this, human body secretes it in desired quantities. This is feedback mechanism of hormonal regulation. For example, Insulin.

The body has detected that blood sugar level has risen and thus commanded pancreas to secrete Insulin hormone. Due to this, the blood sugar level falls. Now, the body has stopped pancreas from secreting more hormone. This is the feedback mechanism.

Ans 11 (3)

Plant Hormones or Phytohormones are chemical substances which controls and coordinates the physiological, metabolic and morphological processes. Due to this, plants are able to work in a synchronised way.

- (i) Hormone responsible for growth of stem is Gibberelins.
- (ii) Hormone responsible for promotion of cell division is Cytokinins.
- (iii) Hormone responsible for inhibition of growth is Abscisic Acid.
- (iv) Hormone responsible for elongation of cells is Auxins.

1/2  
1/2  
1/2  
1/2  
1/2

Ans 12 (3)

Acquired Traits

Inherited traits

(i) Acquired Traits are the traits which we have acquired during life time.

(i) Inherited traits are the traits which we have inherited from our parents.

1

P I N T

W I N T E R

(ii) These traits are not passed on to the progeny as it has not changed the genetic material of an individual.

For example :-

- Weight we have acquired during our lifetime.
- Losing a hand in an accident.

(ii) These traits are passed on to the progeny as it has changed the genetic material of an individual.

For example :-

- Colour of eye
- Skin colour etc.

Ans 13

3

There should be an equitable distribution of resources so that each & every individual can utilise it and the disproportionate benefits by some individuals should be minimised for achieving this. Only then and then, the sustainable development would come in practice.

The three forces that would be working against an equitable distribution of resources are :-

- (i) The industrialists as they are enjoying the disproportionate benefits for maximising the profits.
- (ii) Government agencies and departments as the resources are a source of revenue for them.
- (iii) Developed Countries as they would try to exploit more resources for accomplishing their developmental goals.

QUESTION

ANSWER

Ans 17

3

When the biotic components (plants & animals) ~~react~~ interact with the abiotic components (land, water, soil etc) to form an environment, then it is termed as an ecosystem. An ecosystem leads to the survival of species.

### FLOW OF ENERGY IN AN ECOSYSTEM

— x — x — x — x —

Sunlight (main source of Solar Energy)



Plants trap 1% energy falling on them and converts it in chemical energy (Producers)



10% energy remained in plants are available for primary consumers



10% energy remained in primary consumers available for secondary consumers



2



10% energy is then available to tertiary consumers.

In this way, flow of energy takes place in an ecosystem. However, at each trophic level, some amount of heat energy is liberated in the environment too.

Ans 15

3

Rainbow is a natural spectrum formed after a rain shower.

It is formed in the direction opposite to the sun.

The phenomena involved in the formation of a rainbow are :

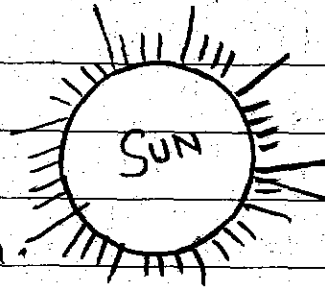
- (i) Atmospheric Refraction
- (ii) Dispersion of light
- (iii) Total internal reflection.

The rain drops, suspended in the atmosphere after a rain shower acts a prism. When sunlight falls on it, it refracts the light and then disperse it into its component colours and then internally

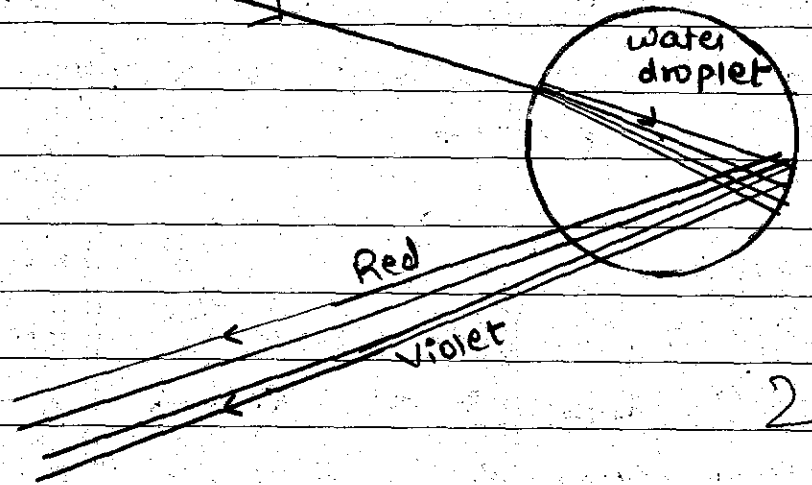
RAINBOW

REFRACTION

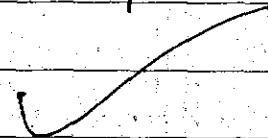
reflect it and after it  
the band of seven colours  
is formed which is  
a bright optical phenomena.

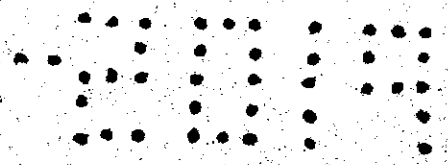
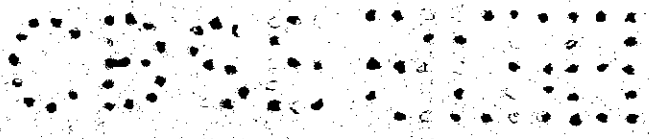


This is how, rainbow formation  
takes place.



Rainbow formation





Ans 16

5

SECTION D

The name of the compound which is the active ingredients of all alcoholic drinks is Ethanol and its chemical formula is  $C_2H_5OH$ .

1  
2

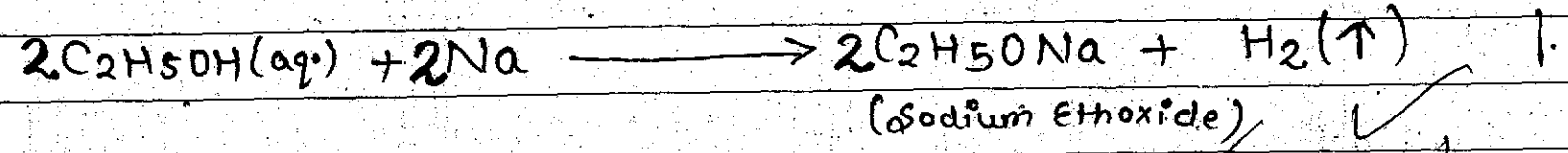
The two uses of ethanol are :-

- (i) It is a good solvent and is used for many industrial purposes.
- (ii) It is also used in tincture iodine, cough syrups and medicines.

1  
2

The equation when Ethanol reacts with Sodium metal is :-

1  
2



The name of product formed is Sodium Ethoxide.

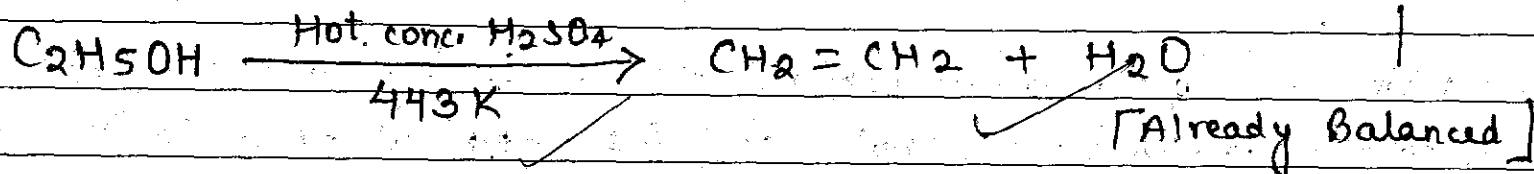
1  
2

QUESTION

ANSWERS

11

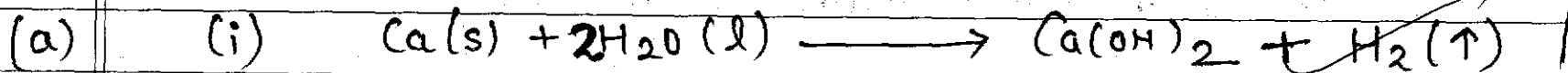
The equation when Ethanol reacts with hot conc.  $H_2SO_4$  is



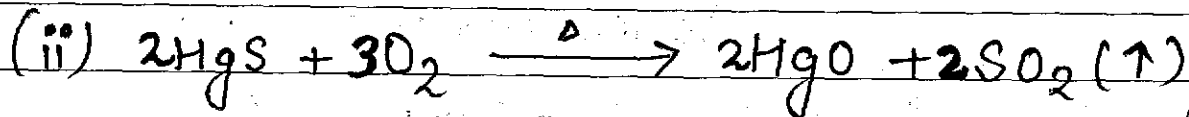
The name of product formed is ethene.

Ans 17

5

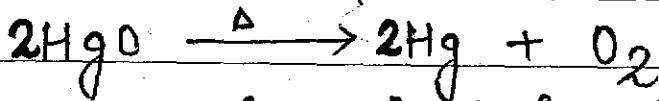


When this reaction takes place, then the hydrogen attaches to the surface of calcium, and it starts floating.

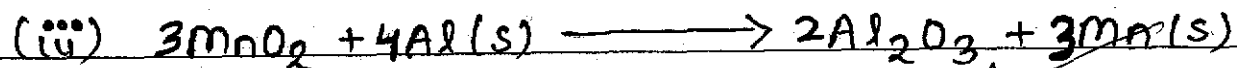
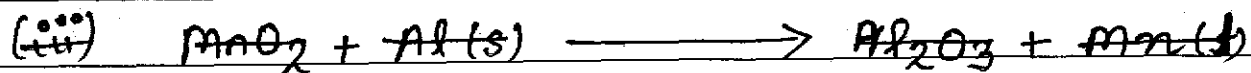


This is the first step of heating cinnabar ( $HgS$ ).

then,



and mercury is obtained from its ore.



The manganese obtained is in the molten form and this reaction is an example of thermit reaction.

(b)

Alloys is a homogeneous mixture of more than two metals or a metal or non-metal. It is made by first melting primary metal and then adding constituents in their proportions.

For example: Solder (Lead & Tin)

Nichrome (Nickel & Chromium)

The two properties of alloys are :-

(i) Its melting and boiling points and electrical conductivity is  $\frac{1}{2}$  less than that of its constituent metals.

(ii) It has a higher resistance than its constituent metals.  $\frac{1}{2}$

(iii) It is also resistant to corrosion.  $\frac{1}{2}$

PIRE

PIRE

Ans 18

5 Here, Object distance ( $u$ ) =  $-30$  cm  
focal length ( $f$ ) =  $-30$  cm [Concave lens]

(i) Using lens formula,

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

or  $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$

$$\frac{1}{v} = \frac{1}{-30} + \frac{1}{-30}$$

or  $\frac{1}{v} = \frac{2}{-30}$

or  $\frac{1}{v} = -\frac{1}{15}$

or  $v = -15$  cm

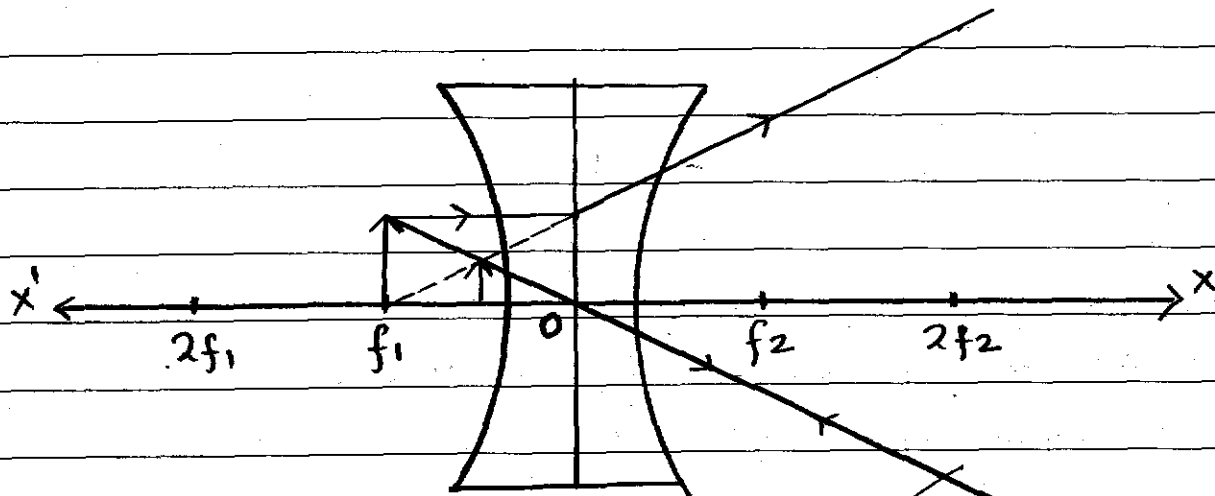
Also,

$$m = \frac{h'}{h} = \frac{v}{u}$$

$$\Rightarrow m = \frac{-15}{-30} = 0.5$$

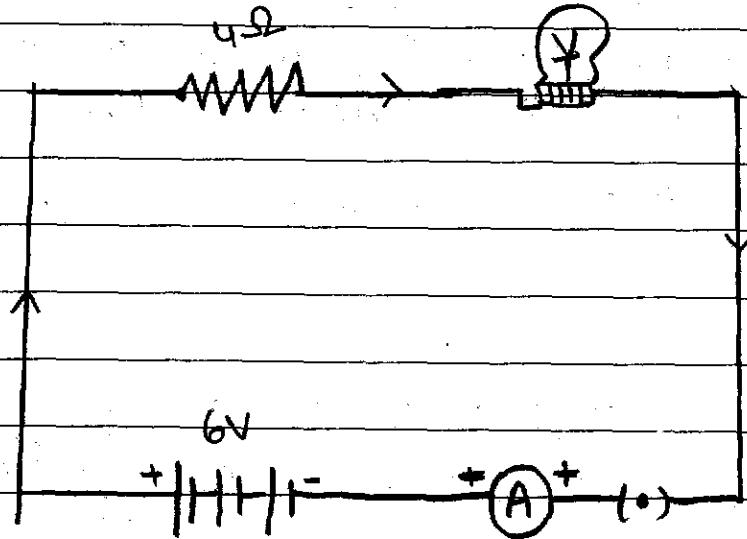
$\frac{1}{30}$   
 $\frac{1}{30}$   
Also

- (ii) Nature of image  $\Rightarrow$  Virtual ✓  
 Position of image  $\Rightarrow$  B/w  $f_1$  and  $O$  (same side of mirror) ✓  
 Size of image  $\Rightarrow$  Diminished (As  $m = 0.5$ ) ✓  
 Erect / Inverted  $\Rightarrow$  Erect ✓



Ans 19

5



Here, Resistance of electric lamp ( $R_1$ ) =  $20 \Omega$  ✓

Resistance of conductor ( $R_2$ ) =  $4 \Omega$  ✓

Voltage source ( $V$ ) =  $6V$

(a) Total Resistance of the circuit  $\Rightarrow$

$$R_s = R_1 + R_2 \quad \left[ \text{As they are connected in series combination} \right]$$

$$= 20 \Omega + 4 \Omega$$

$$R_s = 24 \Omega \quad \checkmark$$



(b) the current throughout the circuit =  $\frac{\text{Voltage}}{\text{Effective Resistance}}$

$$I = \frac{6V}{24\Omega} = \frac{1}{4} A = 0.25 A$$

Hence, Current = 0.25 A.

(c) Potential difference across electric lamp ( $V_1$ ) =  $IR_1$

[As current remains constant in a series combination]

$$V_1 = 0.25 \times 20 = 5V$$

Potential difference across electric conductor ( $V_2$ ) =  $IR_2$

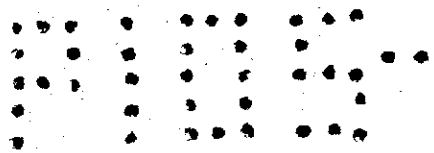
$$V_2 = 0.25 \times 4 = 1V$$

(d) Power of lamp =  $I^2 R$

$$= 0.25 \times 0.25 \times 20$$

$$= \frac{1}{4} \times \frac{1}{4} \times 20$$

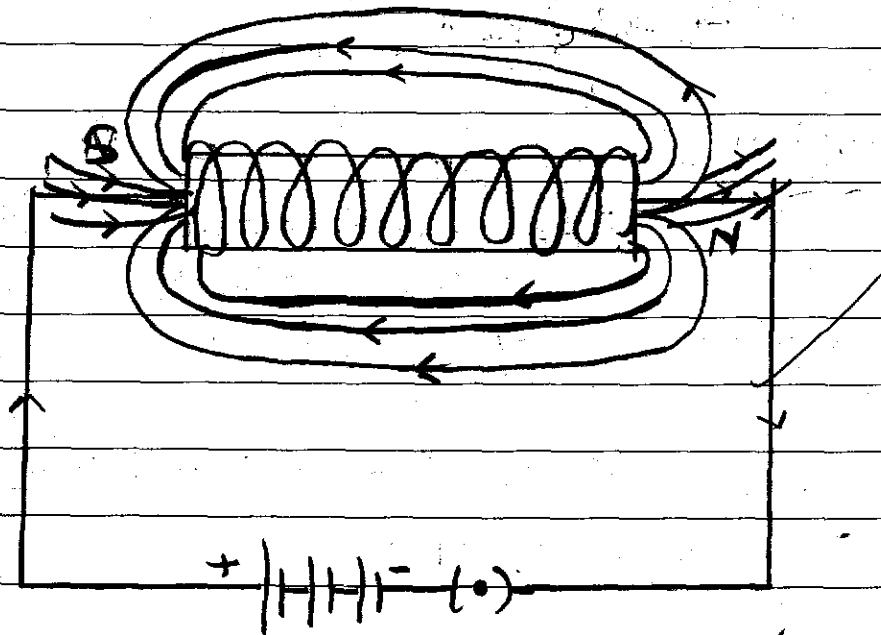
$$= \frac{5}{4} = \boxed{1.25 \text{ W}} \text{ Am}$$



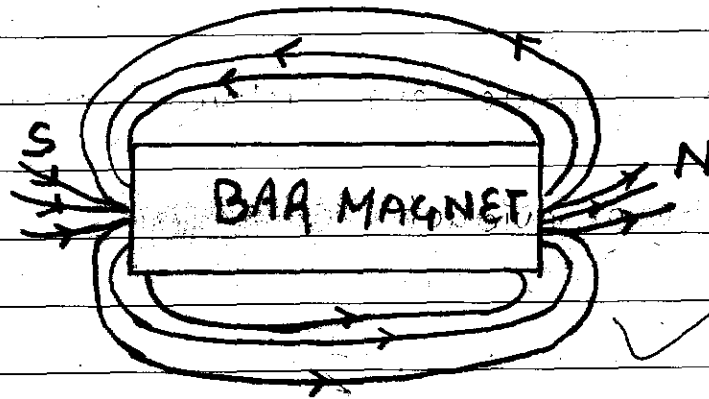
Ans 20

A solenoid is coil of many turns of an insulated copper wire wrapped closely in the form of a cylinder.

49



Magnetic field lines across a  
current carrying solenoid



Magnetic field lines across a bar magnet

Solenoid (magnetic field lines)

(i) The field along the solenoid will depend upon the current flowing through circuit i.e. magnetic field strength can be changed.

(ii) Inside a solenoid, the magnetic field lines are parallel due to a constant magnetic field strength.

Bar magnet (magnetic field lines)

(i) Here, magnetic field strength is fixed.

(ii) Magnetic field lines inside a bar magnet are not parallel.

PLUSE

Answer 21

5

(a)

The given diagram is of a <sup>human</sup> female reproductive system. 1

(1) → Fallopian tube or oviduct

(2) → Ovary ✓

(3) → Uterus

(4) → Cervix ✓

(5) → Vagina ✓

$2\frac{1}{2}$

(b) Contraception is a barrier which is used for preventing unwanted pregnancies. Some of contraceptive measures are :- 1

(1) Barrier methods - Condoms, diaphragms

(2) Oral pills

(3) Surgical methods. ✓

$\frac{1}{2}$

The three advantages of adopting contraceptive measures are

- (i) It helps in removal of unwanted pregnancies by acting as a barrier.  $\frac{1}{2}$
- (ii) It helps in preventing from sexually transmitted diseases especially condoms.  $\frac{1}{2}$
- (iii) It helps to keep a healthy body and due to this population can be controlled and living standards can be improved.  $\frac{1}{2}$

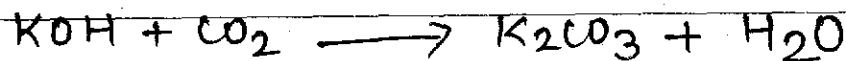
### SECTION E

Ans 22

(2)

The substance that is taken in the small test tube is potassium hydroxide (KOH).  $\frac{1}{2}$

It is used because it absorbs the  $\text{CO}_2$  present in the conical flask due to following reaction

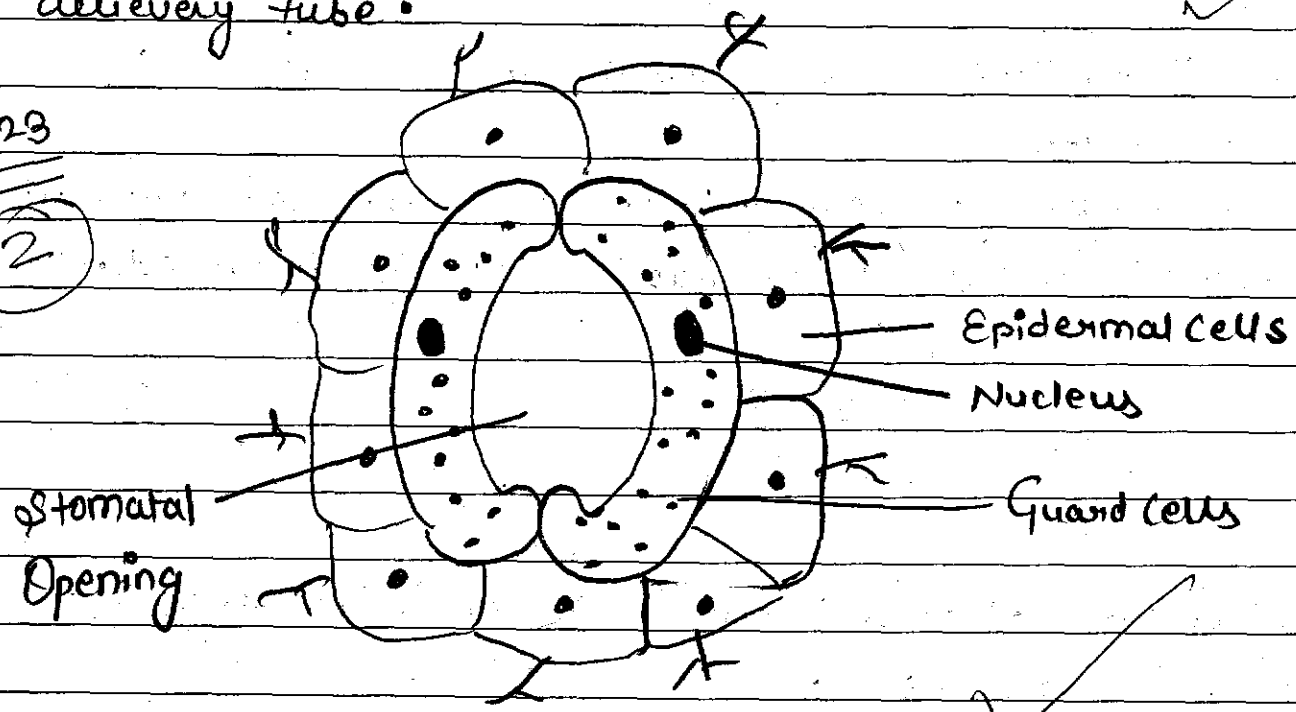


$\frac{1}{2}$

The consequence of its use is that it creates a vacuum in the conical flask due to which water was forced upwards in the delivery tube.

Ans 23

2



STRUCTURE OF STOMATA

Ans 24

②

The precautions are :-

- (i) An object at infinity should be chosen, as it will give the exact focal length.
- (ii) Focal length should be measured only when the image formed is sharp and clear.
- (iii) Metre scale should be placed horizontal for actual calculations.
- (iv) Lens holder and the lens should not be disturbed while taking measurements.

Ans 25

②

As the pointer of the needle doesn't coincide with the zero marks, this indicates that it has zero error.

Therefore, I will suggest him to subtract the no. of zero error divisions from the actual no. of divisions and then multiply it by the least count. This will give the exact value or readings of the voltmeter and ammeter.

Ques

Ques

3

Ans 26

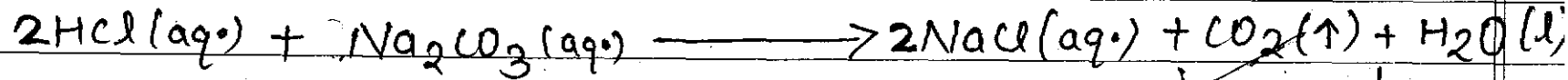
9

Test Tube A → distilled water ✓  
B → underground water (hard water)  
C → Pure water +  $\text{CaSO}_4$   
distilled ✓

The length of foam (lather) will be longest in Test tube A as it doesn't contain any impurities while in test tube B & C the scum formation would take place and less or no amount of lather will be formed due to calcium and magnesium salts present in it.

Ans 27

2



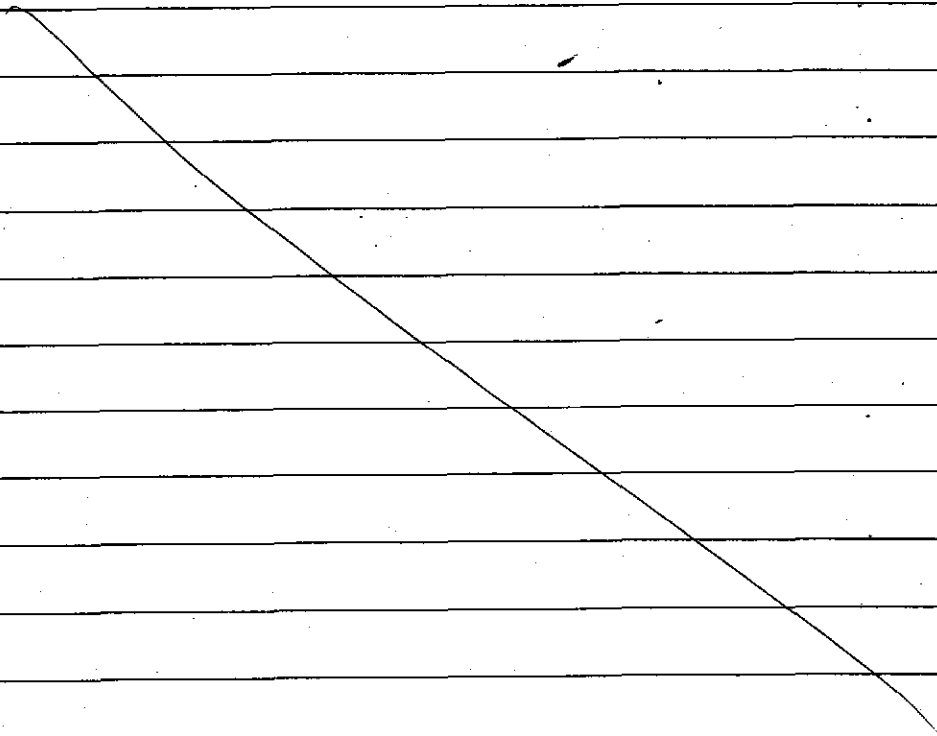
We will observe a colourless gas evolving from it which turns lime water milky.

79 1/2 = 80 / 80 gals 184/10



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



11 12 13 14

15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

