SSC - BOARD - 2018

Date: 14.03.2018 **SCIENCE - PAPER-1 - SOLUTIONS**

Q.1

(A) (a) Rewrite the following statements with suitable words in the blanks : **[2]**

(i) 1 calorie = _____ joule.

Ans. 1 calorie = **4.18** joule

Topic:Electric spark_; Sub-topic:Energy__L-Easy__SSC Board Test_Science

(ii) The arrangement of elements in a group of three is known as _____.

Ans. The arrangement of elements in a group of three is known as **Dobereiner's traid**.

Topic:School of elements_; Sub-topic:dobereiner's traid_L-Easy__SSC Board Test_Science

(b) State whether the following statements are true or false : **[2]**

(i) Pollen, Bacteria, Fungal spores are also pollutants.

Ans. **True**

All are pollutants because they are airborne substances that cause an allergic reaction.

Topic:Striving for better environment part I_; Sub-topic:__L-Easy__SSC Board Test_Science

(ii) Magnetic lines of force always cross each other.

Ans. **False**

Magnetic lines of force never cross each other. If they cross the magnetic lines of force will show the two directions.

Topic:All about electromagnetism_; Sub-topic:Lines of force__L-Easy__SSC Board Test_Science

(c) Taking into consideration the relationship in the first pair, complete the second pair :[1]

$2H_2 + O_2 \rightarrow 2H_2O$: Combination Reaction : : $2HgO \rightarrow 2Hg + O_2$: _____

Ans. Decomposition reaction

Topic:The magic of chemical reaction_; Sub-topic:Decomposition reaction__L-Easy__SSC Board Test_Science

(B) Rewrite the following statements by selectring the correct options : [5]

1. When crystals of copper sulphate are strongly heated, the residue obtained is _____.
(A) red in colour (B) blue in colour (C) green in colour (D) colourless

Ans. (D) colourless

Topic:The magic of chemical reaction_; Sub-topic:Chemical reaction__L-Easy__SSC Board Test_Science

2. Which type of mirror is used by a dentist ?
(A) Plane (B) Convex (C) Concave (D) Both (B) and (C)

Ans. (C) Concave

Topic:Wonders of light part I_; Sub-topic:Mirror__L-Easy__SSC Board Test_Science

3. The equivalent resistance of the parallel combination of two resistors of 60 Ω and 40Ω is _____.
(A) 24 Ω (B) 100 Ω (C) 50 Ω (D) 240 Ω

Ans. (A)

Let R be the total resistance in parallel combination.

$$\frac{1}{R}=\frac{1}{R_1}+\frac{1}{R_2}$$

$$\frac{1}{R}=\frac{1}{60}+\frac{1}{40}=\frac{100}{60\times 40}=\frac{1}{24}$$

$$R=24\,\Omega$$

Topic:Electric spark_; Sub-topic:Resistors in parallel__L-Easy__SSC Board Test_Science

4. The litmus paper or the litmus solution is obtained from _____ plant.
(A) Moss (B) Lichen (C) Rose (D) Hibiscus

Ans. (B) Lichen

Topic:Acid base chemistry_; Sub-topic:Indicators__L-Easy__SSC Board Test_Science

5. Which substance when used with butter having butyric acid can cure acidity ?
(A) Lime water (B) Soda water (C) Calcium carbonate (D) Lime juice

Ans. (A) Lime water

Topic:Acid base chemistry_; Sub-topic:Bases__L-Easy__SSC Board Test_Science

Q.2 State any five of the following : [10]

1. State Newlands law of Octaves.

Ans. If elements are arranged in order of increasing atomic masses, the properties of the every eighth element is a kind of repetition of first on, just like the notes of music.

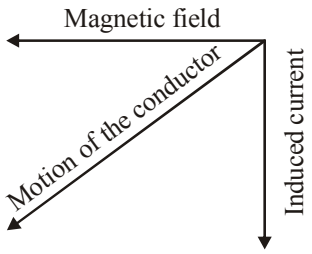
E.g., Li, Be, B, C, N, O, F, Na
(1) (2) (3) (4) (5) (6) (7) (8)

First element (Li) and 8th element (Na) have similar properties.

Topic:School of elements_; Sub-topic:Newlands law of octaves__L-Easy__SSC Board Test_Science

2. State the right hand thumb rule.

Ans. Stretch the thumb, forefinger and middle finger of the right hand so that they are perpendicular to each other. If the forefinger indicates the direction of the magnetic field and the thumb shows the direction of the motion of conductor, the middle finger will show the direction of induced current.



Topic:All about electromagnetic_; Sub-topic:Electromagnetic induction__L-Medium__SSC Board Test_Science

3. If a bulb of 60W is connected across a source of 220V, find the current drawn by it.

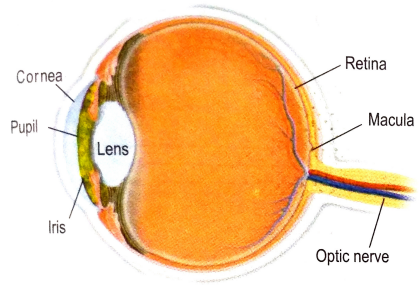
Ans. Power P = 60W, Voltage V = 220. To find eye ?

We have current $I = \frac{P}{V} = \frac{60}{220} = 0.272\,A$

Topic:Electric spark_; Sub-topic:Electric power__L-Medium__SSC Board Test_Science

4. Draw a neat and labelled diagram of structure of the human eye.

Ans.



Topic:Wonders of light part I_; Sub-topic:Lens__L-Easy__SSC Board Test_Science

5. Define :

(a) Radius of curvature of spherical mirror

(b) Focal length of spherical mirror

Ans. (a) The distance between the centre of curvature and between the centre of curvature and pole. It is measured in meter or cm.

(b) The distance between the pole and the focus is called focal length of mirror. It is measured in meter or cm.

Topic:Wonders of light part I_; Sub-topic:Concepts related to spherical mirrors__L-Easy__SSC Board Test_Science

6. Give scientific reason :

The sun appears reddish early in the morning.

Ans. At the time of sunrise or sunset, the sun is very close to the horizon. Sunlight has to travel a longer path through the atmosphere to reach the observer. The blue and violet colours are scattered in a greater amount than red colour. They are scattered away from the path of light as thickness of the atmosphere is more between the horizon and the observer. The light that reaches the observer is mostly red and yellow. Hence the colour of the sky is reddish orange.

Topic:Wonders of light_; Sub-topic:Scattering of light__L-Medium__SSC Board Test_Science

Q.3 Answer any five of the following **[15]**

1. Write the merits of the modern periodic table over Mendeleev's Periodic table.

Ans. (a) Elements are arranged on the basis of increasing atomic number which is more fundamental.
(b) Isotopes of an element can be placed along with parent element.
(c) It explains periodicity of properties of elements configuration.
(d) Lanthanides and actinides are placed separately.
(e) Anomalous pairs of elements like Ar and K having same atomic mass could be justified.

Topic:School of elements_; Sub-topic:Modern periodic table__L-Easy__SSC Board Test_Science

2. What is redox reaction ? Explain with one example.

Ans. The reaction in which simultaneous oxidation and reduction take place is called redoc reaction.

$Cu^{+2} + Zn \longrightarrow Zn^{+2} + Cu$

in the above reaction, copper undergoes reduction where as Zn undergoes oxidation.
Therefore the reaction is redox reaction.

Topic:Magic of chemical reaction_; Sub-topic:Redox reaction__L-Easy__SSC Board Test_Science

3. What is Resistivity ? Write the formula of resistivity. Write the SI unit of resistivity.

Ans. Resistivity of a conductor is defined as the resistance of a conductor of unit length and unit area of cross section.
Resistance R of a conductor depends on the length 'l' and area of cross section 'A' of the conductor.

$R \alpha l$

and $R \alpha \frac{l}{A}$

$\therefore \quad R \alpha \frac{l}{A}$

$\therefore \quad R = \rho \frac{l}{A}$ ...(ρ is constant)

where ρ is called resistivity of the conductor.

The SI unit of resistivity is ohm-metre $(\Omega - m)$

Topic:The electric spark_; Sub-topic:Resistivity__L-Medium__SSC Board Test_Science

4. Distinguish :

Degradable pollutants - Non-degradable pollutants

(any three points)

Ans.

Degradable Pollutants	Non – degradable Pollutants
They are decomposed and degradable by microbes.	They cannot be decomposed by microbes.
They are not accumulated but are used up in short time.	They are often accumulated.
Degradation process is rapid.	Degradation process is slow.
They are used to produce energy manures compost and biogas.	They cannot be used to produce energy.
E.g. Plant waste, Animal residue, Paper, rotten vegetables	E.g. Plastic items footwear, polythene bags

Topic:Striving for better environment part I_; Sub-topic:Sources of soil pollution__L-Easy__SSC Board Test_Science

5. Kavita from 10th is using spectacles. The power of the lenses in her spectacles is –2.5 dioptre. Answer the following questions :

(a) Which lenses are used in her spectacles ?

(b) State the defect of vision Kavita is suffering from.

(c) Find the focal length of the lenses used in her spectacles.

Ans. (a) Concave lens

(b) Mypio or near sightedness

(c) $f = \frac{1}{D} = \frac{1}{2.5} = 0.4\,m$

Topic:Wonder of light part II_; Sub-topic:Powet of lenses__L-Easy__SSC Board Test_Science

6. Write the chemical name of bleaching powder and write its properties.

Ans. Bleaching powder - $CaOCl_2$

Calcium hypochloride

Uses :

(a) It is used as disinfectant

(b) Used as oxidising agent in many chemical reactions.

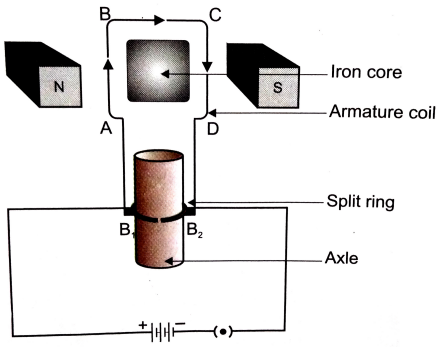
Topic:Acid base chemistry_; Sub-topic:Oxidation reduction__L-Easy__SSC Board Test_Science

Q.4 Answer any one of the following **[5]**

(A) Explain the construction and working of an electric motor.

Ans.

Construction :



(i) Armature coil : A large number of turns of insulated copper wire wound on iron core in rectangular shape forms an armature coil ABCD as shown in figure.

(ii) Strong magnet : The armature coil is placed in between two pole pieces (N and S) of a strong magnet. This provides a strong magnetic field.

(iii) Split ring commutator : It consists of two halves (R_1 and R_2) of a metallic ring. The ends of the armature coil are connected to these rings. Commutator reverse the direction of current in the armature coil.

(iv) Brushes : Two carbon brushes B_1 and B_2 are used to press the commutator.

(v) Battery : The battery supplies the current to the armature coil.

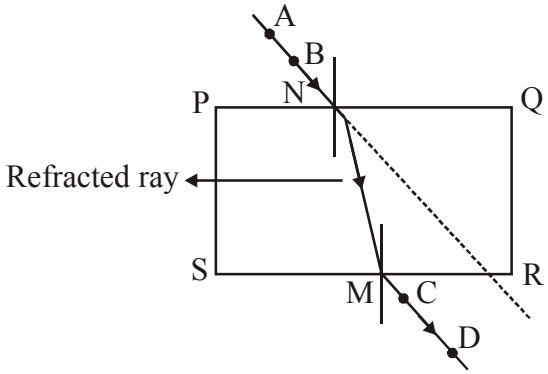
Working of the electric motor :

When current is passed through the coil ABCD, arms AB and CD experience force. According to Fleming's left hand rule the force experienced by arm AB is in the downward direction and arm CD in the upward direction. Both these forces are equal and opposite. This force rotates the coil in anticlockwise direction until the coil is vertical. At this position, the contact between commutator and brushes break. So the supply to the coil is cut off. Thus no force acts on the coil. But the coil does not stop due to inertia. It goes on rotating until the commutator again comes in contact with the brushes B_1 and B_2. Again, the current starts passing through the coil and the arm AB rotates through 90°, 180°, 270° and 360 degrees. Now the force acting on arm AB is upward and arm CD is downward. Again this force moves the coil in anticlockwise direction.

Topic:All about electromagnetism_; Sub-topic:Electric motor__L-Tough__SSC Board Test_Science

(B) What is refraction of light ? Draw the diagram of refraction of light in glass slab. Write the laws of refraction.

Ans. The phenomenon of change in the direction of light when it passes from one transparent medium to another is called refraction.



Refraction of light through a glass slab

Laws of Refraction

(i) The incident ray and the refracted ray are on the opposite sides of the normal at the point of incidence and all threee lie in the same plane.

(ii) For a given pair of media, the ratio of the sine of the angle of incidence to the sine of the angle of refraction is constant.

If 'i' is the angle of incidence and 'r' is the angle of refraction then,

$$\frac{\sin i}{\sin r} = \text{constant}$$

This constant is called as the refractive indec of second medium with respect to the first medium. it is denoted by η.

Topic:Wonder of light Part II_ ; Sub-topic:Refraction of light_L-Medium__SSC Board Test_Science