SRI RAMAKRISHNA VIDYASHALA, YADAVAGIRI, MYSURU – 20

S. S. L. C. EXAMINATION, MARCH/APRIL, 2022

Subject Code: 83 E **MODEL ANSWERS** **Max Marks: 80**

Date: 11 – 04 - 2022 **Subject: SCIENCE**

PART - A [PHYSICS]

I)

(1) B) Electric generator

(2) D) $R = \frac{V}{I}$

(3) A) induced electric current

(4) C) beyond $2F_1$

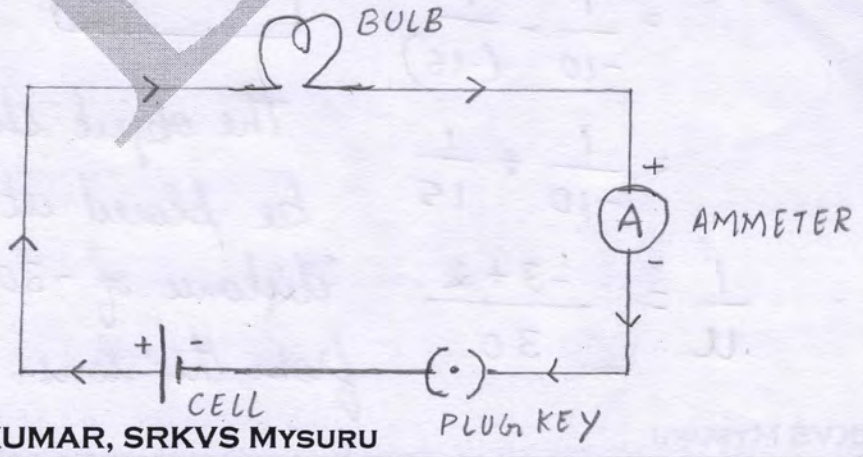
II)

(5) Magnetic field lines do not intersect each other. If they did, it would mean that at the point of intersection, the compass needle would point towards two directions, which is not possible.

(6) The SI unit of power of lens is dioptre.

III)

(7)



(8) GIVEN: CONCAVE MIRROR

$u = -25$ cm

$f = -15$ cm

$v = ?$

FORMULA:

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

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

SOLUTION:

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

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

$$= \frac{1}{-15} - \frac{1}{(-25)}$$

$$= \frac{1}{-15} + \frac{1}{25}$$

$$\frac{1}{v} = \frac{-5+3}{75}$$

$$= \frac{-2}{75}$$

$$\frac{1}{v} = \frac{-2}{75}$$

$$v = -\frac{75}{2}$$

$$\boxed{v = -37.5 \text{ cm}}$$

A screen should be placed -37.5 cm from the mirror in order to obtain a sharp image.

(OR)

GIVEN: CONCAVE LENS

$f = -15$ cm

$u = ?$

$v = -10$ cm

FORMULA

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

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

SOLUTION

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

$$= \frac{1}{-10} - \frac{1}{(-15)}$$

$$= \frac{1}{-10} + \frac{1}{15}$$

$$\frac{1}{u} = \frac{-3+2}{30}$$

$$\frac{1}{u} = -\frac{1}{30}$$

$$\boxed{u = -30 \text{ cm}}$$

The object should be placed at a distance of -30 cm from the lens.

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IV)

(9) The major component of biogas is <u>methane</u>. Characteristics of good source of energy are as follows.

- (*) be easily accessible
- (*) be easy to store and transport
- (*) be economical
- (*) do a large amount of work per unit volume/mass.

OR

<u>Silicon</u> is the element used in making solar cell. Four advantages of solar cells are as follows.

- (*) They have no moving parts
- (*) require little maintenance
- (*) they can be set up in remote and inaccessible hamlets
- (*) work quite satisfactorily without the use of any focussing device.

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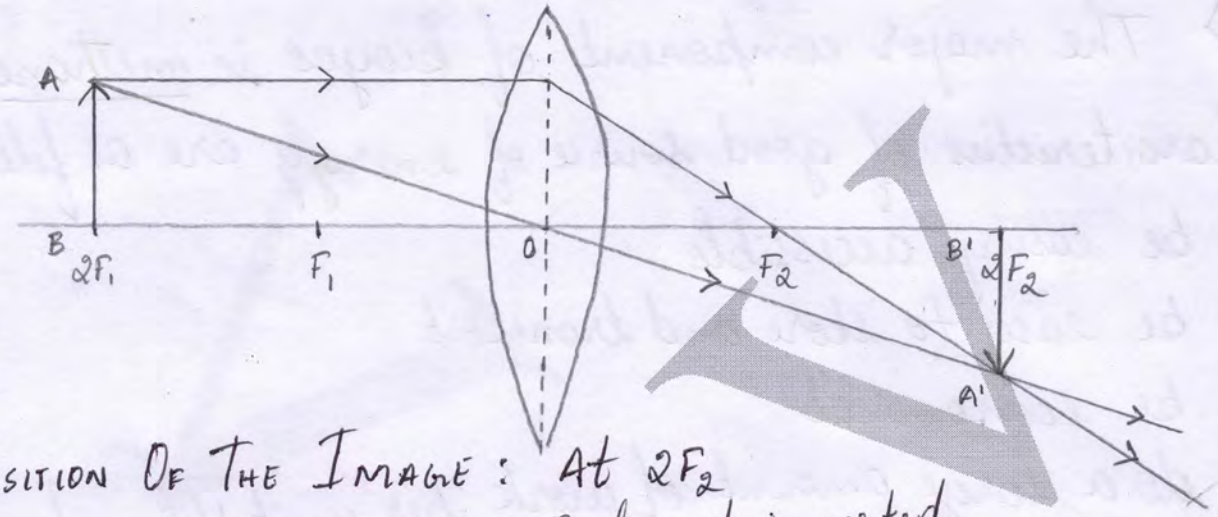
(10)



POSITION OF THE IMAGE : At $2F_2$

NATURE OF THE IMAGE : Real and inverted

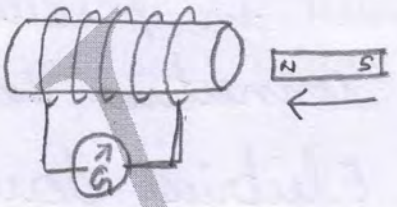
(11) Function of an earth wire : It ensures that any leakage of current to the metallic body of the appliance keeps its potential to that of the earth and the user may not get a severe shock.

* Safety device

The metallic body is connected to the earth wire, which provides a low resistance conducting path for the current by keeping the potential to earth and preventing severe shock.

(OR)

FARADAY'S EXPERIMENT RELATED TO ELECTROMAGNETIC INDUCTION



* Take a coil of wire AB having a large number of turns.
* Connect the ends of coil to Galvanometer
* Take a strong bar magnet and move its north pole towards the end B of coil; Momentary deflection in the needle of the galvanometer (To right) is observed.
* the deflection beomes zero the moment the motion of the magnet stops.
* Withdraw the north pole of the magnet away from the coil, the galvanometer is deflected to left.
* CONCLUSION : Dlfletion is observed only when Magnet or coil is in motion. Thus it is clear that motion of a magnet with respect to the coil produces an induced potential difference, which sets up induced electric current in circuit.

DIRECT CURRENT	ALTERNATING CURRENT
* Always flows in one direction	* Reverses its direction periodically

V)

12. a) The advantages of connecting electrical devices in parallel in an electric circuit instead of connecting them in series are as follows.

(*) Electrical devices need currents of widely different values to operate properly.

(*) Each gadget has different resistance so there is a need of different current

(*) In series circuit, when one component fails the circuit is broken and none of the components works.

(*) The total resistance in a parallel circuit is decreased as per the equation $1/R_P = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

(b) Ammeter is connected in series. It measures electric current

Voltmeter is connected in parallel. It measures potential difference (VOLTAGE)

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VI)

(13) a) The bending of a light ray on moving from one medium to another having different densities is called refraction of light

LAWS OF REFRACTION

(*) the incident ray, the refrated ray and the normal to the interface of two transparent media at the point of incidence, all lie in the same plane

(*) the ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of given colour and for the pair of media.

b) The extent of the change in the direction of light ray when it it travels from medium to other is called refractive index.

The refractive of diamond is 2.42 which means that the speed of light in diamond will reduce by a factor of 2.42 as compared to its speed in air.

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VII PART - B [CHEMISTRY]

(14) B) Hydrogen

(15) D) 3

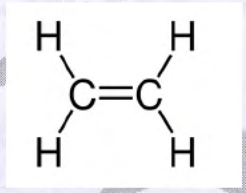
VIII

(16) Modern periodic law states that "Properties of elements are a periodic function of their atomic number"

(17) Uses of plaster of paris as follows.

* Making of toys * Materials for decoration

(18)



ETHENE

(19) (i) C is oxidised

(ii) ZnO is reduced

IX

(20)

	pH
A	5
B	6
C	7

The solution of A is more acidic in nature As the pH decreases. Acidic character increases.

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(21) REFER : PAGE - 48 CHAPTER - 03
Metals and Non-Metals.

(22) a) Metals are good conductors of heat

b) Sodium metal react so vigorously that they catch fire if kept in open, to protect them they are kept immersed in kerosene oil.

OR

a) Calcium metal reacts with water, the liberated hydrogen gas does not catch fire. as the bubbles of hydrogen gas formed stick to the surface of the metal.

b) Ionic compounds have high M.P and B.P because a considerable amount of energy is required to break the strong inter-ionic attraction.

(23) ATOMIC SIZE: The distance between the centre of the nucleus and the outermost shell of an isolated atom. Also called as atomic radius.

Atomic size decreases in moving from left to right along a period due to increase in nuclear charge which tends to pull the electrons closer to the nucleus and reduces the size of the atom.

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(23) Atomic size increases down the group. This is because new shells are being added as we go down the group. This increases the distance between the outermost electrons and the nucleus. So that the atomic size increases in spite of the increase in nuclear charge.

(24) Refer Page NO: 19 chapter 02 Acids, Bases and Salts.

(25) (i) $CaCO_3 \xrightarrow{Heat} CaO + CO_2$

(ii) $H_2 + Cl_2 \longrightarrow 2HCl$

(iii) $Mg + 2HCl \longrightarrow MgCl_2 + H_2$

(26) OR

Displacement reaction takes place when an iron nail is dipped in copper sulphate solution

Iron is more reactive than copper.

$Fe_{(s)} + CuSO_{4(aq)} \longrightarrow FeSO_{4(aq)} + Cu_{(s)}$

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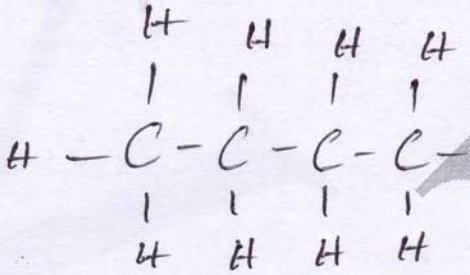
(26) a) the compounds with identical molecular formula but different structures are called structural isomers.

BUTANE



STRUCTURAL FORMULA

C_4H_{10}

MOLECULAR FORMULA

b) Carbon has the unique ability to form bonds with other atoms of carbon, giving rise to large molecules. This property is called catenation.

GENERAL FORMULA FOR ALKENES

C_nH_{2n}