2014 III 12 | 1000 | Seat No. | | | | | |

Time: 2½ Hours | SCIENCE (E)

Subject Code

S	0	3	1

K

Total No. Of Questions: 5 | (Printed Pages: 8) | Maximum Marks: 65

INSTRUCTIONS: *(1) The question paper comprises of five questions of 13 marks each.*

(2) All questions are compulsory.

*(3) There is no overall choice; however internal choice has been provided in two questions of **three** marks and two questions of **four** marks category. You have to attempt only **one** option in such questions.*

(4) Begin each question on a fresh page.

(5) Figures to the right indicate full marks.

Q.1 (A) (i) Select the most correct alternative from those given below each statement and write the completed statement: **[1]**

(a) Zinc oxide is an amphoteric oxide because it shows _____.

* Acidic behaviour.
* Basic behaviour.
* Both basic as well as acidic behaviour.
* Neither acidic nor basic behaviour.

(b) Brass is an alloy of _____.

* Copper and Zinc.
* Copper and tin.
* Lead and tin.
* Lead and mercury.

(ii) Name/ Give a term for: [1]

(a) The hormone which promotes cell division in fruits.

(b) The tropism observed when pollen tube grows towards the ovules.

(iii) Ionic compounds do not conduct electricity in solid state. Why? [1]

(iv) Why is the flow of energy in a food chain said to be unidirectional? [1]

(B) (i) Study the given food chain and answer the questions given below it. [2]

Plants $\longrightarrow$ Rat $\longrightarrow$ Snake $\longrightarrow$ Eagle

(a) Why are plants called producers?

(b) A food chain does not generally consist of more than four steps. Why?

(ii) Forests and wildlife are our important natural resources. [2]

(a) Name the stakeholder which owns the land and controls forest resources.

(b) Name the biodiversity hotspot.

(c) What is meant by sustainable management?

(iii) Extraction of metals from their ores involves many steps. [2]

(a) What is gangue?

(b) What is roasting?

(C) (i) The nervous system helps in controlling and coordinating the activities of the body. [3]

(a) Give one point of difference between central nervous system and peripheral nervous system.

(b) Withdrawal of hand from a hot flame, is termed as reflex arc action. Why?

(c) Why is the brain covered by a bony box?

Q.2 (A) (i) Observe the correlation in the first pair and complete the second pair. [1]

(a) Hydra: Budding:: Amoeba:_____
(b) Ovules : Seeds :: Ovary: _____

(ii) Name/ Give a term for: [1]

(a) The functional group having the formula -OH.
(b) Compounds having same molecular formula but different structures.

(iii) C_2H_4, C_3H_6, C_4H_8 are termed as a homologous series. Why? [1]

(iv) The atomic number of an element is 3. [1]

(a) Write the period to which it belongs.
(b) Write the group to which it belongs.

(v) A metal, such as Aluminium with atomic number 13 is said to be electropositive. Why? [1]

(B) (i) Answer the following questions: [2]

(a) Write the structural formula of Butane.

(b) Give one point of difference between alkanes and alkenes with reference to bonding between carbon atoms.

(ii) (a) What are metalloids? [2]

(b) Write one limitation of Dobereiners law of Triads.

(C) (i) (a) Draw a neat diagram to show the germination of pollen grain on stigma and label. [4]

* Pollen tube.
* Stigma.

(b) Give one point of difference between a unisexual flower and a bisexual flower.

(c) A papaya flower cannot be self pollinated. Why?

OR

(C) (i) (a) Draw a neat diagram of the Human Female Reproductive system and label. **[4]**

* Ovary.
* Uterus.

(b) Why should reckless female foeticide be stopped?

(c) The vas deferens in males is blocked by surgery. Give a reason.

Q.3 (A) (i) Observe the correlation in the first pair and complete the second pair. **[1]**

(a) Tallness trait in peas in F1 generation: Dominant trait :: Shortness trait in peas in F1 generation:_____

(b) Arrested flowers: Broccoli :: Sterile flowers:_____

(ii) Name the following: **[1]**

(a) The major constituent of biogas.

(b) The expensive metal used for interconnection of cells in a solar panel.

(iii) Genes inherited from the parents determines the sex of a child. **[1]**

(a) Which sex chromosome is inherited by a girl child from her mother?

(b) Which sex chromosome is inherited by a boy child from his father?

(B) (i) Inbuilt tendency for variations during reproduction is the basis for evolution. **[2]**

(a) What is speciation? (With reference to beetles)

(b) What is genetic drift?

(ii) As our demand for energy increases we should look for more sources of energy. **[2]**

(a) Large scale use of nuclear energy is prohibitive. Give any two reasons.

(b) The maintenance cost of wind energy farms is high. Give reason.

(iii) The bottom of a water tank appears to be raised. **[2]**

(a) Name the phenomenon due to which the bottom of a tank appears to be raised.

(b) How does a ray of light bend with respect to the normal, when it enters obliquely from

* rarer to denser medium?
* denser to rarer medium?

(c) In which medium does light travel the fastest?

(C) (i) Attempt the following: [4]

(a) Draw a ray diagram to show the formation of an image when the object is placed beyond $2F_1$, of a convex lens.

(b) Give one point of difference between a concave lens and a convex lens.

(c) Find the focal length of a lens of power +4.OD.

OR

(C) (i) (a) Draw a neat diagram to show the formation of an image when the object is placed between 'C' and 'F' of a concave mirror. [4]

(b) Why are convex mirrors used as rear view mirrors in vehicles?

(c) The radius of curvature of a convex mirror is 28 metres. Find the focal length of the mirror.

Q.4 (A) (i) Observe the correlation in the first pair and complete the second pair - [1]

(a) Current: Ampere :: Potential difference:_____

(b) Series connection: Ammeter :: Parallel connection:_____

(ii) Name the following: [1]

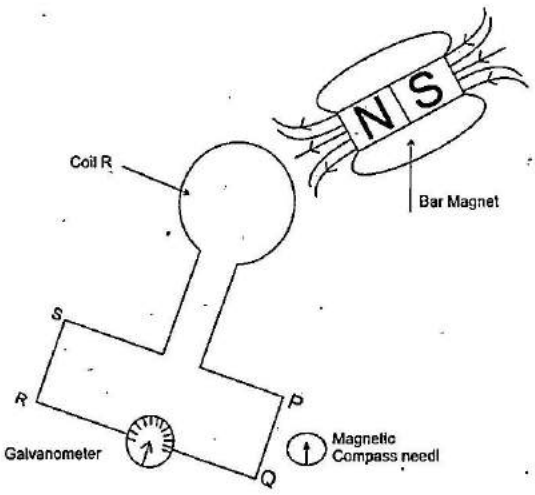
(a) The thin membrane through which light enters the eye.

(b) The phenomenon of splitting of white light into its component colours.

(iii) What is a commutator? [1]

(iv) The metallic body of a microwave is connected to the earth wire. Why? [1]

(B) (i) A coil 'R' is connected to a galvanometer as shown in the figure. The North Pole of a bar magnet is moved near the coil 'R' and a magnetic compass needle is kept near the wire PQ. **[2]**



(a) Why is a deflection seen in the galvanometer, when the North Pole of a bar magnet is moved near the coil 'R'?

(b) What will happen to the compass needle, kept near the wire PQ, when the magnet is moved near the coil 'R'?

(C) (i) The twinkling of stars can be seen on a clear night. **[3]**

(a) Why do stars appear to twinkle at night?

(b) The sky appears dark, to astronauts at very high altitudes. Give reason.

(c) The Sun appears reddish at sunrise. Why?

OR

(C) (i) 15 years old Steffi, holds reading materials much beyond 25 cm for reading comfortably. **[3]**

(a) Write two causes of the defect of vision, Steffi suffers from.

(b) Why do people in the middle age suffer from Presbyopia?

(c) Why are concave lenses prescribed for a certain defect of vision?

(D) (i) Attempt the following: **[4]**

(a) Draw a circuit diagram as described below. Connect three resistors R_1, R_2 and R_3 in series and connect them with a battery, an ammeter and a plug key. Insert a voltmeter across the resistors. Show the direction of the flow of current.

(b) If the resistance of each resistor is 4Ω, 8 Ω and 12 Ω respectively. Find the total resistance in the above circuit.

(c) In a domestic electric circuit, the fans and tube lights are always connected in parallel. Why?

Q.5 (A) (i) Select the most correct alternative from those given below each statement and write the completed statement: **[1]**

(a) Respiration which gives out heat is an example of _____.

* An exothermic reaction.
* An endothermic reaction.
* A combination reaction.
* A displacement reaction.

(b) A reaction in which there is an exchange of ions between reactants is called a _____.

* Combination reaction.
* Decomposition reaction.
* Displacement reaction.
* Double displacement reaction.

(ii) Name the following: **[1]**

(a) The gas given out when an acid reacts with a metal.

(b) The substance used by doctors as plaster to support fractured bones.

(iii) Differentiate between acids and bases with respect to formation of ions. [1]

(iv) What is the purpose of making urine? [1]

(B) (i) Study the given chemical equation and answer the question given below it. [2]

$$SO_2 + H_2S \rightarrow H_2O + S$$

(a) Name the reactants in the chemical equation.

(b) Balance the above equation.

(c) Which substance is reduced in the above reaction?

(ii) Answer the following: [2]

(a) Why does lime water turn milky when carbon dioxide is passed through it?

(b) Blue copper sulphate crystals turn white, on heating. Give reason.

(iii) Attempt the following: [2]

(a) Why do the walls of alveoli, contain an extensive network of blood vessels?

(b) Carbon dioxide is mostly transported in the dissolved form. Why?

(C) (i) The muscular walls of the stomach secrete digestive juices. [3]

(a) Why is hydrochloric acid secreted in the stomach?

(b) Gastric glands secrete mucus. Give reason.

(c) Why do herbivores need a longer small intestine?

OR

(C) (i) A proper transport system is essential in animals as well as plants. [3]

(a) Why do arteries have thick elastic walls?

(b) Platelets are present in blood. Why?

(c) Write one point of distinction between xylem and phloem.

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10 pgs

N-9 △ (1)

(K)

March 2014

Std X – Science

Answer key + Marking Scheme

Question No.			Marks
Q1			
A	(i)	a) Both basic as well as acidic behaviour. (Pg 43) ½ b) Copper and zinc (Pg 57) ½	1
	(ii)	a) Cytokinins (Pg 131) ½ b) Chemotropism (Pg 132) ½	1
	(iii)	Because movement of ions in the solid is not possible due to their rigid structure. (Pg 52)	1
	(iv)	Energy captured by - - autotrophs doesnot revert back to the solar input or (Pg 279) - Herbivores does not come back to autotrophs or - various trophic levels is no longer available to previous level or - energy flows from sun to producers to consumers and never backwards (Any one point 1 Mark)	1
B	(i)	a) Plants fix up the solar energy through photosynthesis and make it available for heterotrophs or consumers. Pg 279 1 (OR Plants prepare their own food) b) An average of 10% of food eaten is turned into it's body mass / 10% Law ½ ii) Very little usuable energy remains after four trophic levels. (Pg 279) ½	2

B (ii) a) Forest Dept of the Government (Pg 290) ½
b) Forest (Pg 290) ½
c) i) Forms of growth that meet current basic human needs/use of natural resources without wastage or pollution ½
ii) While preserving the resources for the needs of future generations (Pg 288) ½ — 1 — 2

(iii) a) Impurities such as soil, sand etc which contaminate the ores. (Pg 53) 1
b) i) sulphide ores are converted into oxides ½
ii) By heating strongly in the presence of excess of air (Pg 54) ½ — 1 — 2

C (i) a)

Central Nervous System	Peripheral Nervous System
i) Consists of brain and spinal cord	i) Consists of cranial nerves and spinal nerves. Pg (127) 1

b) i) It is a sudden/quick response ½
ii) It is at the level of the spinal cord ½ (Pg 126) — 1 — 3
c) Provides protection to the brain. 1 (Pg 128)

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Q2

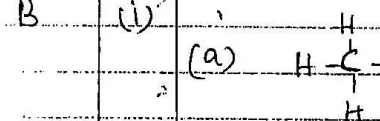
A (i) (a) Binary fission / Multiple fission (Pg 140) ½ — 1
b) Fruit (Pg 146) ½

(ii) a) Alcohols (Pg 170) ½ — 1
b) Structural isomers / Isomers (Pg 69) ½

(iii) i) Any two successive/consecutive members differ in their molecular formula by a $-CH_2-$ group (OR) (Pg 71) — 1
i) They have the same molecular general formula C_nH_{2n} (Any one answer 1 MK)
(OR) Molecular mass of successive members differ by 14u.

(iv) a) 2nd Period (E.C - 2, 1) (Pg 94) ½ — 1
b) Group 1 (Pg 94) ½

(v) i) ~~Aluminium (Z=13) has electronic configuration 2, 8, 3~~ ½
ii) It tends to lose 3 electrons to ~~form bonds~~ ions (1½) ½ — 1
(Application question - concept Pg 97)

B (i)
(a)  (Pg 69) — 1

2

(b) Alkanes — Alkenes
(i) Single bond (ii) Double bond — 1
(ii) C - C ii) C = C
(Any one point 1 Mark) (Pg 70)

(ii) a) Elements which exhibit some properties of both metals and non-metals. (Pg 96) : 1

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B (ii) (b) He could identify only three triads from the elements known at that time. 1 — 2

C (i) (a) Correct diagram Fig 8.8 (Pg 145) D=1
Each correct labelling ½ Mark L = ½+½ } 2

(b)

Unisexual	Bisexual
i) - contains either stamens or carpels	i) Contains both stamens and carpels
ii) Male or female reproductive parts present	ii) Male and female reproductive parts present.
iii) Self pollination not possible	iii) Self pollination possible

(Any one correct pt 1 Mk) Pg 149 — 1 — 4

C i) Papaya is unisexual / contains only male or female reproductive parts / Only stamens, anther or pollen grains present / Only stigma or carpel present. (Any one pt 1 Mk) 1
(Application question, concept Pg 149)

C (i) (a) Correct diagram Fig 8.11 (Pg 148) D=1
Each correct labelling ½ Mark L = ½+½ } 2

(b) i) Child sex ratio is declining at an alarming rate. *
ii) The female - male sex ratio should be maintained for a healthy society * } 1 — 4
(Pg 150) any one point 1 mk

(c) To prevent transfer of sperms. 1
(or any other correct ans) (Pg 150)

Q.3

A (i) a) Recessive trait (Pg 156) ½] 1
b) Cauliflower (Pg 168) ½

(ii) (a) Methane ½] 1
(b) Silver ½

(iii) (a) "X" Chromosome ½] 1
(b) "Y" Chromosome ½

B (i) (a) A group of beetles splits into two populations which cannot reproduce or interbreed with each other thus creating two independent species. (Pg 162) 1]
(b) Accidents in small populations can change the frequency of some genes in a population, even if they give no survival advantage. (Pg 160) 1] 2
Or Accidents can increase some variations in a population without giving any survival advantage.
(Any one answer 1 Mark)

(ii) (a) i) High cost of installation of nuclear power plant.
ii) High risk of environmental contamination (Pg 271)
iii) Limited availability of uranium.
(~~refer~~ shortcomings) (Any two points) ½ + ½ → 1]
OR storage and disposal of wastes leads to contamination. 2
(b) The towers and blades are exposed to vagaries of nature like rain, sun storm, cyclones or rough weather. 1
Pg 266

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(iii) a) Refraction of light. (Pg 185) ½
b) • Towards the normal. (Rarer to denser) (Pg 187) ½
• Away from the normal. (Denser to rarer) ½ (2)
c) Vacuum (Pg 188) ½

C (i) (a) Correct diagram 10.16(b) Pg 195 1½
Showing arrows correctly. ½] 2

Note
[Drawing lens, principal axis, F_1, F_2, $2F_1$, $2F_2$ ½
Drawing object at right position ½
Drawing rays and image. ½]

(b) (b) Concave lens — Convex lens
i) Curves inwards — (i) Curves outwards
ii) Thinner at centre — (ii) Thicker at centre (4)
iii) Diverging lens — (iii) Converging lens
iv) Diminished image — (iv) Mostly enlarged image
v) Power of lens +ve — (v) Power of lens +ve
vi) Only virtual image — (vi) Virtual or real image
(Any one correct point 1 Mark) (Pg 191) 1

(c) $P = \frac{1}{f(m)}$ formula with Substitution ½ mk

$\therefore f = \frac{1}{P} = \frac{1}{4}$ ½

$= 0.25m$ ½ mk (Pg 198)

OR

C (i) (a) Correct diagram Fig 10.7 (d) Pg 179 1½
showing arrows ½] 2
(b) (i) gives erect and diminished image ½
ii) Gives a wider view. ½] 1 (4)
(c) $f = \frac{R}{2}$
$\therefore f = \frac{28}{2}$ ½ $f = 14m$ ½ 1

Q 4 A (i) a) Volt (Pg 218) ½
b) Voltmeter. (Pg 218) ½ — 1

(ii) a) Cornea ½
b) Dispersion of light ½ — 1

(iii) A device which reverses the direction of flow of current through a circuit. — 1

(iv) i) In case of leakage of current into the metallic body of the appliance the current flows through a low resistance path to the earth ½ — 1
ii) Prevents the user from getting an electric shock ½

B (i) a) An induced current is produced in the coil / Electricity is produced in the coil (1 Mark for any one pt) 1
(b) A deflection will be observed in the compass needle. 1 — (2)
(Application question - Concept (Pg 240/251))

C (i) (ii) (a) Due to atmospheric refraction. (Pg 210) 1
(b) Scattering is not prominent at such heights. (Pg 212) 1
(c) i) At sunrise the sun is near the horizon, most of the blue light of shorter wavelength is scattered away. ½
ii) Only light of longer wavelength that is red reaches our eyes. ½ — (3)

C (i) (a) i) Focal length of the eye lens is

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two long ½
ii) Eyeball has become too small ½] 1

b) i) Power of accomodation is reduced ½ (any one pt 1mk)
ii) Gradual weakening of ciliary muscles ½] 1
iii) Diminishing flexibility of eye lens ½
(Any two points 1 Mark)

(c) i) Person is suffering from myopia / short sightedness / near sightedness ½] 1 (Any one pt 1 mk) 3
ii) Concave lens diverges the light to produce the image onto the retina ½] 1
Pg (205)

D (1) a) Correct circuit diagram Fig 12.6 on Pg 226 - Showing arrows ½] 2

(b) $R_S = R_1 + R_2 + R_3$
$= 4\,\Omega + 8\,\Omega + 12\,\Omega$ ½] 1
$= 24\,\Omega$ ½

(c) i) Parallel circuit divides the current through the electrical gadgets / ½] 1 (4)
ii) Total resistance is decreased as each gadget has diff resistances or (½)
iii) They need different currents (1mk) to operate properly. (Pg 232) ½
(Any two points 1 Mark)
(iii) 3rd pt 1 mk)

Q5 A (i) a) exothermic reaction (Pg 8) ½
b) Double displacement (Pg 12) ½ — 1

(ii) a) Hydrogen ½
b) Plaster of Paris/Calcium sulphate Hemihydrate / $CaSO_4 \cdot \frac{1}{2}H_2O$ (Pg 34) ½ — 1

(iii)

Acids	Bases
Forms H_3O^+ ions /	Forms $OH^-(aq)$ ions /
Forms $H^+(aq)$ ions /	Forms Hydroxyl ions /
Forms Hydronium ions /	Forms Hydroxide ions
Forms Hydrogen ions.	(Any one pt) (Pg 25) — 1

(iv) i) To filter out waste products ½ — 1 mk
ii) From the blood ½
OR To throw out nitrogenous waste such as urea and uric acid.

B (i) a) Sulphur dioxide and Hydrogen sulphide / SO_2 and H_2S ½
(Application Ques - concept Pg 2) — (2)
b) $SO_2 + 2H_2S \longrightarrow 2H_2O + 3S$ 1
c) Sulphur dioxide / SO_2 Pg 13 ½
(Application question)

(ii) a) i) ~~Lime water is~~ $Ca(OH)_2$ ½
ii) Reacts with CO_2 to form white precipitate of $CaCO_3$ ½ — (2)
(1 mk)
b) Due to loss of water of crystallisation. 1
(Pg 34)

(iii) a) To help in exchange of gases. (Pg 112) ½ — (2)
b) CO_2 is more soluble in water. ½ 1 mk

C (i) a) i) To create an acidic medium ½
any one ii) to facilitate action of enzyme pepsin ½
first from OR to kill germs which may enter with
1 mk or helps in digestion of food. ½

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C (i) (b) (i) To protect the inner lining of the stomach from the action of acid ½
(ii) under normal conditions (Pg 107) ½ 1 (3)

(c) The long small intestine allows the plant cellulose to be digested (Pg 107) 1

OR

C (i) (a) i) Blood emerges from the heart ½ 1
ii) Hence comes under high pressure ½ (Pg 115)

(b) i) To clot the blood and ½ anyone pt 1
ii) Prevent loss of blood at the point of injury. Pg 116) ½

(c) (3)

Xylem	Phloem
i) Moves water and minerals	i) Transports products of photosynthesis/amino acids and other substances. 1
ii) Consists mostly of dead cells	ii) Consists mostly of living cells.
iii) Helps in transpiration	iii) Helps in translocation
iv) Consists of vessels, tracheids, xylem parenchyma and xylem fibres	iv) Consists of sieve tubes, companion cells, phloem parenchyma and phloem fibres.

(Any one pt of distinction 1 Mk Pg 116/117)