

COMMON PRE- BOARD EXAMINATION-2023
SCIENCE (086)
(ANSWER KEY)

31/1/1

MAX MARKS: 80

CLASS: X

TIME: 3 HOURS

SECTION - A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

- | | | |
|----|--|---|
| 1 | (c) (i) and (iii) | 1 |
| 2 | (d) H ₂ S | 1 |
| 3 | (d) Na>Mg>Zn>Cu | 1 |
| 4 | (b) 7.0 to 7.8 | 1 |
| 5 | (d) D | 1 |
| 6 | (b) CaSO ₄ . ½ H ₂ O | 1 |
| 7 | (d) Methanal | 1 |
| 8 | (c) Organisms that derive nutrition from plants or animals without killing them. | 1 |
| 9 | (b) Proteins, fats and carbohydrates | 1 |
| 10 | (d) wrinkle and green | 1 |
| 11 | (b) Cerebellum | 1 |
| 12 | (c) both similarities and variations with parents | 1 |
| 13 | (c) III | 1 |
| 14 | (a) $\angle i$ is more than $\angle r$ but (nearly) equal to $\angle e$ | 1 |
| 15 | (c) real, inverted and enlarged | 1 |
| 16 | (d) Convex lens | 1 |

- 17 (a) Both A and R are true and R is the correct explanation of A 1
- 18 (b) Both A and R are true and R is not the correct explanation of A 1
- 19 (a) Both A and R are true and R is the correct explanation of A 1
- 20 (c) A is true but R is false 1

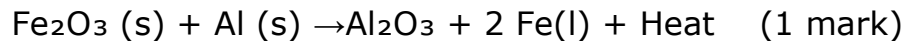
SECTION – B

Q. no. 21 to 26 are very short answer questions.

- 21 X is Zinc oxide. ..(1 mark) 2
 $ZnO + 2HCl \rightarrow ZnCl_2 + H_2O$ (1 mark)

OR

The process of igniting Aluminium and Ferric oxide is called thermite reaction. This is an exothermic reaction. Iron obtained in this process is in molten state.



Thermite reaction used for the welding of rails (joining metals) called as thermite welding.(1 mark)

- 22 When electrical impulse reaches the axonal end of a neuron, it sets off the release of neurotransmitters into the synapse. (1M) 2
 These neurotransmitters enter the dendrite of another neuron to set off electrical signal in that neuron. This is how electrical impulse travels from one neuron to another. (1M)

- 23 (a) Regeneration, example- Hydra/ planaria / Starfish 2
 (½ M + ½ M)
 (b) The specialized cells proliferate and make mass of cells, they undergo changes to become various cell types and tissues in an organized sequence. (1 M)

- 24 (a) Gall bladder secretes bile juice which makes the food reaching intestine alkaline for the pancreatic enzymes to act. 2
 Bile juice has bile salts. These break down large fat globules into smaller globules so that the pancreatic enzymes can easily act on them, known as emulsification of fats.
 Bile juice also makes the medium alkaline and activates lipase.
 (any two - (½ M + ½ M)
 (b) The anaerobic breakdown of glucose leads to the formation of lactic acid in muscles. The accumulation of lactic acid in muscles leads to

muscle cramps.

(1 M)

- 25
- i) Black insulation wire is used for earth wire.
 - ii) Main fuse connected with the neutral wire
 - iii) Insulation of neutral wire is green.
 - iv) In distribution box, neutral wire is distributed for various circuits.
 - v) Earth wire is connected with live wire and neutral wire.
- any four points- ½ mark each.

OR

a)

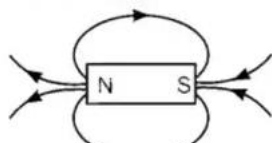


Figure (1)

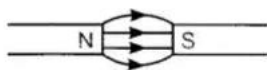
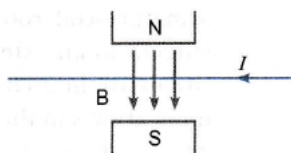


Figure (2)

----- ½ + ½

b) Perpendicular to the plane of paper upward. ----- ½ mark



Fleming's left hand rule. ----- ½

- 26
- (a) Seven, 50 J
(½ M + ½ M) 2

(b)

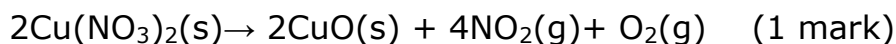
Plants	⇌	Insects	⇌	Spider	⇌	Frog	⇌	Snakes	⇌	Hawk
--------	---	---------	---	--------	---	------	---	--------	---	------

 (1M)

SECTION – C

Q.no. 27 to 33 are short answer questions.

- 27
- (i) Copper (II) nitrate decomposes to form copper oxide, nitrogen dioxide gas, and oxygen gas as products, therefore, this is a decomposition reaction 3
 - (ii) The brown gas X is formed is Nitrogen dioxide. (½ mark) Since Nitrogen dioxide is acidic, the pH range of Nitrogen dioxide is less than 7. (½ mark)
 - (iii) The balanced chemical equation of the reaction is,



- 28 (i) The chemical formula of calcium chloride is CaCl_2 . The chemical formula of 3

chloride of lime is CaOCl_2 , i.e., bleaching powder. Hence, the chemical formula, chemical properties and physical properties of both are different. (1 mark)

(ii) When chloride of lime (CaOCl_2) reacts with sulphuric acid, it gives calcium sulphate and calcium chloride. The reaction is:



(c) Two uses of chloride of lime (bleaching powder) are:

- i. It is used to disinfect water and kill germs present in the water.
- ii. It is also used for bleaching dirty clothes in the laundry. (Any two uses $\frac{1}{2} + \frac{1}{2}$)

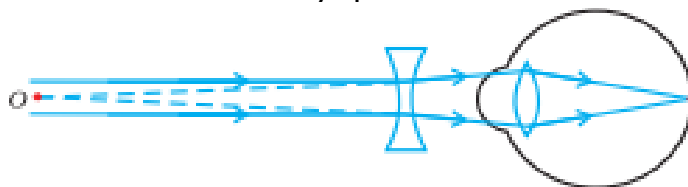
- 29 (a) i) Such separation allows a highly efficient supply of oxygen to the body. 3
 ii) Fulfill the high energy needs.
 iii) Constant use of energy to maintain a body temperature.
 'A' ----- Pulmonary Artery (1/2 M + 1/2 M + 1/2 M + 1/2 M)
 (b) To pump blood to various organs.
 To prevent the backflow of the blood when atria or ventricles contract. (1/2 M + 1/2 M)

OR

Observe the figure given below and answer the following questions:

- (a) **B** - Glomerulus
E - Collecting duct
 (1/2 M + 1/2 M)
 (b) How much **excess water there is in the body** and how much of **dissolved waste there is to be excreted.** (1/2 M + 1/2 M)
 (c) Glucose, amino acids, salts and a major amount of water. (Any two 1/2 M + 1/2 M)

- 30 a) The least distance at which a person can see without strain to the eye is called least distance of distinct vision----- 1/2 mark
 Normal vision range for humans is 25 cm to infinity. ----- 1/2 + 1/2 marks
 b) Defect of vision- Myopia ----- 1/2 mark

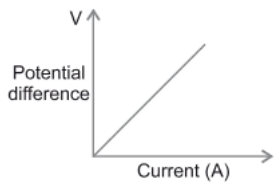


----- concave lens - 1/2 mark + virtual image position- 1/2 mark

- 31 a) Power = Potential Difference (V) × Current (I) 3
 => 800 = 200 × Current
 => Current (I) = 800/200
 => Current (I) = 4 A ----- ½ mark for equation, ½ mark for substitution, ½ mark for answer.
 b) Resistance (R) = V/I { By Ohm's law }
 => R = 200/4
 => Resistance (R) = 50 Ω ----- ½ mark for equation, ½ mark for substitution, ½ mark for answer

OR

- a) statement ----- 1 mark (reduce ½ mark if constant temperature is not mentioned)



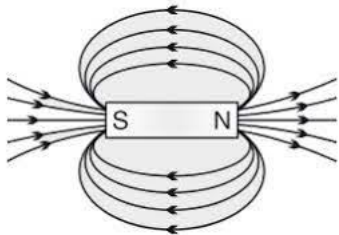
----- ½ mark

- b) $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ ----- ½ mark

$$\frac{1}{R_p} = \frac{1}{6} + \frac{1}{10} + \frac{1}{15} = \frac{5+3+2}{30} = \frac{10}{30} = \frac{1}{3} \text{ ----- ½ mark}$$

$R_p = 3 \Omega$ ----- ½ mark

- 32 a) 3



----- 2 marks (marking of poles – ½, correct direction – ½ mark, neat diagram – 1 mark)

b)

- i) increasing the number of turns on the coil.
- ii) increasing the current.
- iii) placing an iron core inside the solenoid. ---- any two points – (½ + ½)

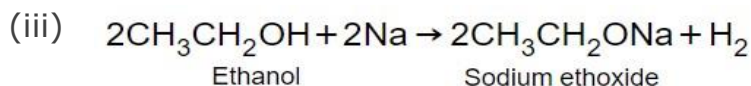
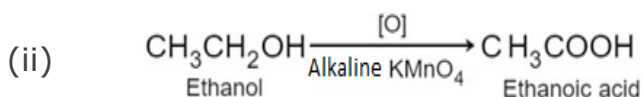
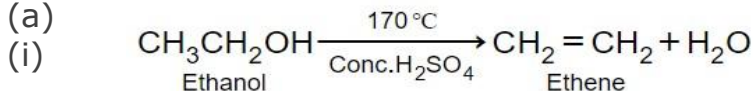
- 33 (a) Biological Magnification : the process by which a compound (such as a pollutant or pesticide) increases its concentration in the tissues of organisms as it travels up the food chain. (½ M + ½ M) 3
- (b) Pesticides are sprayed on the crop plants to protect them from the attack of pests. These pesticides when washed away into the soil or water bodies get absorbed by the plants.
 When plants are consumed as food by man or other animals, the

pesticides enter the food chain. Since the pesticides are non-biodegradable, these chemicals get accumulated progressively and enter our body. (1 M + 1M)

SECTION - D

Q.no. 34 to 36 are Long answer questions.

34 (a)



----- One mark each (1 +1+1)

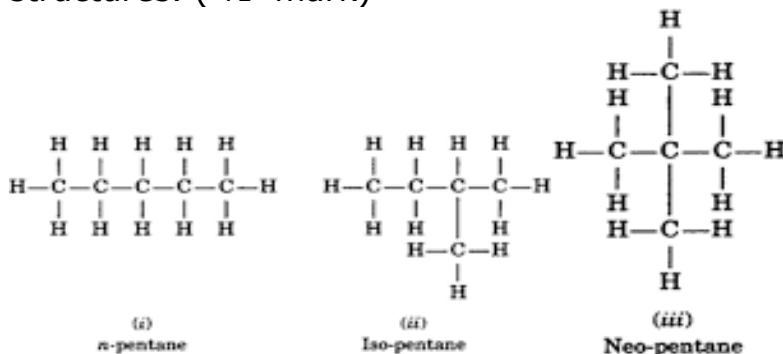
(b)

Soaps	Detergents
i. Soaps work well in soft water.	Detergents work well in both soft and hard water.
ii. Soaps cannot perform a cleansing action.	Detergents are broadly used in cleaning purpose.
iii. These are sodium or potassium salts of fatty acids.	These are sodium alkyl sulphonates or sodium alkyl benzene sulphonates.
iv. In hard water, calcium and magnesium salts of higher fatty acids are formed which are insoluble in water.	In hard water, sulphonates are water soluble.
v. They get precipitate and form scum.	They do not precipitate like soap. Scum is not formed

(Any two points of difference 2 marks)

OR

(a) Isomers are compounds having same molecular formula but different structures. (1/2 mark)



5

(b) C_3H_6 , C_2H_2 and C_2H_4 undergo addition reaction (1 mark)

(c) Cleansing mechanism of soap.

Soaps are sodium salts which are made by the salts of fatty acids. They are used in cleaning oil and dirt. When soap is added to dirty water then the hydrophobic part of the soap gets attached to the dirt while the hydrophilic part remains in contact with the water molecules. Due to this arrangement the soap molecules form micelles and trap the dirt at the center. This forms a colloidal solution and the trapped dirt can be easily rinsed off. This is how the mechanism of cleansing action of soap works. (2 marks)

35 (a) Methods of contraception :

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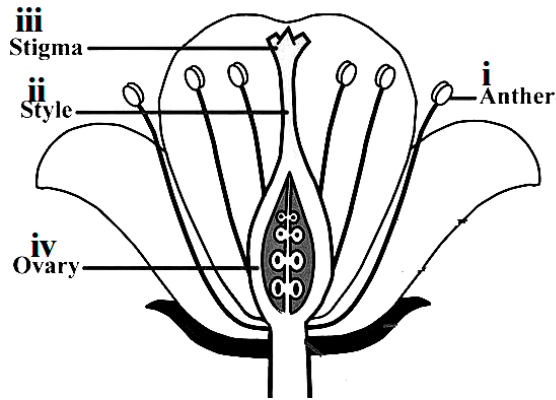
- (i) Barrier method or mechanical method/ Condom/ Diaphragm, to prevent the meeting of sperms and ova.
- (ii) Chemical method/ Oral pills: Changes the hormonal balance of the female partner so that the eggs are not released.
- (iii) Surgical method: to block the vas deferens in males/ vasectomy or the fallopian tube (oviduct) in females/ tubectomy, to prevent the transfer of sperms or egg and hence no fertilisation takes place.
- (iv) IUCDs/ Loop or the copper-T placed in the uterus- To prevent pregnancy. (Any two 1 M + 1M)

(b) Bacterial infections include- gonorrhoea, and syphilis.
Viral infections include - (HIV/AIDS), warts and Hepatitis B.
(Any one disease $\frac{1}{2}$ M + $\frac{1}{2}$ M)

- (c) i) The lining of the uterus thickens and is richly supplied with blood to nourish the growing embryo.
- ii) The disc embedded in the uterine wall called placenta contains villi on the side of the embryo and blood spaces surrounding the villi on the mother's side providing large surface area
- iii) The embryo receives glucose and oxygen from the mother through the placenta.
Removal of wastes also takes place in the mother's blood through the placenta.
- iv) The development of the foetus inside the mother's body takes approximately 9 months. ($\frac{1}{2}$ M + $\frac{1}{2}$ M + $\frac{1}{2}$ M + $\frac{1}{2}$ M)

OR

(a) labels - 2marks and 1mark for the drawing.



(b) Differentiate between pollination and fertilisation.

Pollination	Fertilisation
Pollination is the process of transferring pollen grains on the stigma of a flower.	Fertilization is the process wherein the male and female germ cells of a flower fuse to produce a zygote .
The site of pollination is the stigma of the flower.	The site of fertilization is the ovary of the flower.
Pollination sometimes requires external pollinating agents like birds, insects etc.	Fertilization requires no such external agents.
Pollination takes place at the early stages of reproduction.	Fertilization takes place after pollination.

(Any two differences 2marks)

36 The focal length of the convex lens is, $f = +10\text{cm}$

5

The image distance is, $v = +30\text{cm}$

The height of the object, $h_o = 2\text{cm}$

As the image distance is positive, thus, the image formed will be real and inverted.

Lens formula,

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \text{ ----- } \frac{1}{2} \text{ mark}$$

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

Substitute the values in the above equation.

$$\frac{1}{u} = \frac{1}{30} - \frac{1}{10} = \frac{1-3}{30} = \frac{-2}{30} \text{ ----- } 1 \text{ mark}$$

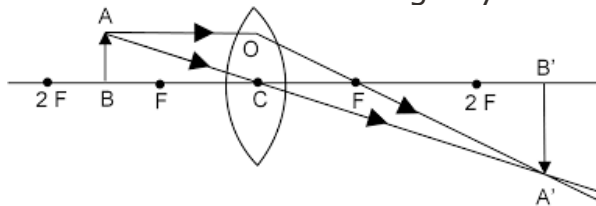
$$\therefore u = -30/2 = -15 \text{ cm.} \text{ ---- } \frac{1}{2} \text{ mark}$$

Therefore, the object distance is 15 cm.

$$\frac{h_i}{h_o} = \frac{v}{u} \quad \text{----- } \frac{1}{2} \text{ mark}$$

$$h_i = \frac{v}{u} \times h_o = \frac{30}{-15} \times 2 = -4 \text{ cm} \quad \text{----- } \frac{1}{2} \text{ mark}$$

The formation of the image by drawing a ray diagram is given as follows.



---- neat diagram- $\frac{1}{2}$ mark, position of object & image - $\frac{1}{2}$ mark, marking of arrows - $\frac{1}{2}$ mark, labelling of F, 2F, O - $\frac{1}{2}$ mark

SECTION - E

Q.no. 37 to 39 are case -based/data -based questions with 2 to 3 short sub - parts.
Internal choice is provided in one of these sub-parts.

- 37 (i) an alloy has a higher resistance than a pure metal. The alloys also do not melt easily at high temperatures. ----- $\frac{1}{2} + \frac{1}{2}$ marks 4

(ii) The resistance of a conductor is inversely proportional to its area of cross section. ... $\frac{1}{2}$ mark

As the amount of current flowing at constant voltage increases with increase in cross sectional area, resistance decreases ---- $\frac{1}{2}$ mark

(ii) $R = V / I$ ----- $\frac{1}{2}$ mark

Also, $V = W/Q = 100 / 20 = 5 \text{ V}$. ---- $\frac{1}{2}$ mark for substitution + $\frac{1}{2}$ answer

$\therefore R = 5/2 = 2.5 \Omega$.----- $\frac{1}{2}$ mark

OR

$t = 10 \times 60 = 600 \text{ sec}$ ----- $\frac{1}{2}$ mark

$I = Q/t = 500 / 600 = 5/6 = 0.83 \text{ A}$ ---- $\frac{1}{2}$ mark for substitution + 1 mark for answer with unit.

- 38 (i) alloys are homogeneous ($\frac{1}{2}$ mark) 4

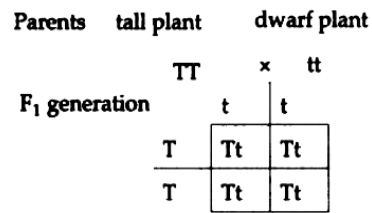
(ii) a) stainless steel = Fe+C+Ni+Cr ($\frac{1}{2}$ mark) b) Bronze=Cu+Sn ($\frac{1}{2}$ mark)

(iii) Solder. Alloys are more physically durable, reactive and have better physical and chemical characteristics than the pure metal. (1 mark)

(iv) Galvanization is coating a layer of zinc over the metal. (1 mark)

39 (a) Purple and White flower , Round and Wrinkled seed

(b) All tall

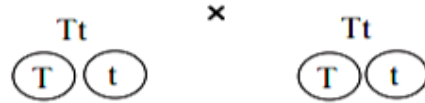


(c)

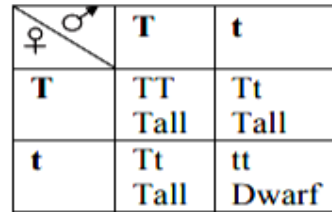
Selfing of F₁ hybrid



Gametes



F₂ generation



Phenotypic ratio → 3 : 1 (3 tall : 1 dwarf)

Genotypic ratio → 1 : 2 : 1 (1 pure tall : 2 hybrid tall : 1 pure dwarf)

(1M+1M+2M)

OR

(d) Dihybrid cross

9:3:3:1

(1M+1M)