

FIITJEE

CBSE FULL TEST – I

ALL XTH STUDYING BATCHES

SCIENCE

Time: 3:00 Hours

Max Marks: 80

Instructions:

(i) The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.

(ii) Section–A -question no. 1 to 20 -all questions and parts there of are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.

(iii) Section–B -question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.

(iv) Section–C -question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.

(v) Section–D –questionno.-34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.

(vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(vii) Wherever necessary, neat and properly labeled diagrams should be drawn.

Name of the Candidate :

Enroll Number :

Date of Examination :

SECTION – A

Very Short Answer type (1 mark each)

1. What are the raw materials required for photosynthesis?
2. Calculate the electrical energy in S.I. unit consumed by a 100W bulb and a 60W fan connected in parallel for 5 minutes.
3. What is refraction of light?
4. Which of the following hydrocarbons undergoes addition reaction?
 C_2H_4 , C_2H_6 , C_2H_2 , C_3H_8
5. Write the equation for reaction of lime with water.
6. Which of the following metal is most reactive in nature.
(A) Al (B) Zn
(C) Cu (D) Ag
7. Define refractive index.
8. Why does the sky appear dark to astronauts?
9. What is the function of digestive enzymes?
10. The IUPAC name of $CH_3 - \overset{\overset{CH_3}{|}}{CH} - CH_2 - CH_3$ is
(A) Isopentane (B) 2-methylbutane
(C) 3-methylbutane (D) Neopentane
11. What are the components of the transport system in highly organised plants?
12. Should the resistance of an ammeter be low or high?
13. A: The pH of $NaHCO_3$ is greater than 7.
R: It is a basic salt.
(A) Both (A) and (R) are true and (R) is the correct explanation of (A).
(B) Both (A) and (R) are true and (R) is not the correct explanation of (A).
(C) (A) is true, but (R) is false
(D) (A) is false, but (R) is true
14. Why do stars twinkle?

Directions (Questions 15 – 16): In the following questions, a statement of Assertion is followed by a statement of Reason.

Mark the correct choice as

- (A) If both Assertion and Reason are true, and Reason is the correct explanation of Assertion
- (B) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (C) If Assertion is true, but Reason is false
- (D) If Reason is true, but Assertion is false
- (E) If both Assertion and Reason are false

15. **Assertion:** Mendel chooses pea plants for his experiment.
Reason: Pea plants were the only plants he could gather for his experiment.
16. **Assertion:** a network of food chains existing together in an ecosystem is known as food web.
Reason: an animal like kite cannot be a part of a food web.
17. Mendel took pea plants with contrasting characteristics tall plant and dwarf (or short) plant. On cross pollination, he got all tall plants in first generation (F_1). But by the self-pollination of F_1 tall plants, the plants of second generation consisted of tall and short plants in the ratio of 3 : 1. On the basis of these experiments, the characteristics appeared in first generation were called dominant (i.e. tall plants) and the characteristics that did not appear were called recessive (dwarf i.e. plants).

Mendel's experiments show that traits are inherited independently through his dihybrid cross experiment. The experiment involved him using two traits – namely, seed shape and seed colour. The colour yellow (YY) is dominant over green (yy), while the round shape (RR) is dominant over the wrinkled shape (rr). The F_2 progeny of the dihybrid cross resulted in a phenotypic ratio of 9:3:3:1; therefore, 9 plants with round yellow (RRYY) seeds, 3 plants with round green (RRyy) seeds and 3 plants with wrinkled yellow (rrYY) seeds and one with wrinkled green seeds (rryy). He further observed that the wrinkled greens and the round yellow are parental combinations while the round green and wrinkled yellow are new. A dihybrid cross between two seeds with dominant traits (RRYY) and non-dominant traits (rryy) resulted in the production of 4 types of gametes (RY, Ry, rY and ry). This means each of the gametes segregate independently of the other; and each with a frequency of 25% of the total gametes produced.

Give answer to any four of the following questions on the basis of the above paragraph.

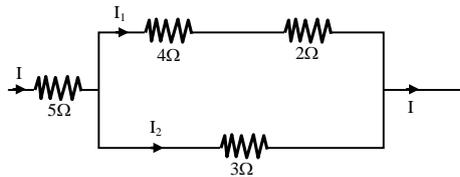
- i. After cross-fertilization of true-breeding tall and dwarf plants, the F_1 generation was self-fertilized. What is the ratio of phenotype in F_2 generation?
 (A) 3:1 (tall : dwarf)
 (B) 1:2:1 (tall : dwarf : tall)
 (C) 1:2 (tall : dwarf)
 (D) 1:1:1:1 (tall : dwarf : medium : tall)
- ii. What are dominant characters?
 (A) characteristics appeared in first generation were called dominant characters.
 (B) the characteristics that did not appear in first generation were called recessive characters
 (C) dominant characters are represented by small letter
 (D) dwarfness is dominant character
- iii. Name the cross by which law of independent assortment inferred.
 (A) dihybrid cross (B) monohybrid cross
 (C) trihybrid cross (D) none of these
- iv. Mendel used _____ plant for his experiments.
 (A) rose (B) pea
 (C) lotus (D) mango
- v. Who is known as father of genetics?
 (A) Gregor Mendel (B) Augustinian friar
 (C) Norman Borlaug (D) M.S Swaminathan

18. A spherical mirror produces an image of magnification 1 on a screen placed at a distance of 50 cm from the mirror.

Give answer to any four of the following questions on the basis of the above paragraph.

- (i) Write type of mirror.
 (A) Concave mirror (B) Convex mirror
 (C) Plane mirror (D) None of these
- (ii) What is the nature of image formed.
 (A) Real , erect (B) Virtual, inverted
 (C) Real , inverted (D) None of these
- (iii) How far is the object located from the mirror.
 (A) 10 cm (B) 20 cm
 (C) 30 cm (D) 50 cm
- (iv) Calculate the distance between object and image.
 (A) 10 cm (B) 50 cm
 (C) 100 cm (D) 200 cm
- (v) Calculate the focal length.
 (A) 5 cm (B) 25 cm
 (C) 50 cm (D) 100 cm

19. In the circuit shown in figure, the $3\ \Omega$ resistance develops $12\ \text{Js}^{-1}$ of heat due to the flow of current through it.



Give answer to any four of the following questions on the basis of the above paragraph.

- (i) The value of I_2 is
 (A) 1 A (B) 2 A
 (C) 3 A (D) 4 A
- (ii) The power dissipated in $4\ \Omega$ resistor is
 (A) 96 W (B) 48 W
 (C) 32 W (D) 4 W
- (iii) The potential difference across the $2\ \Omega$ resistor is
 (A) 2 V (B) 4 V
 (C) 6 V (D) 9 V
- (iv) The value of I is
 (A) 1 A (B) 2 A
 (C) 3 A (D) 4 A
- (v) The potential difference across the $5\ \Omega$ resistor is
 (A) 12 V (B) 15 V
 (C) 60 V (D) 90 V

20. In organic nomenclature, the parent chain is the longest continuous carbon chain. The principal functional group is written as the secondary suffix of the word root alk. And the nature of parent chain may be ane, ene or yne depending on the bonds formed among carbon atoms.

Give answer to any four of the following questions on the basis of the above paragraph.

- i. The name of the $\text{CH}_3 - \overset{\text{Cl}}{\underset{|}{\text{CH}}} - \text{CH}_2 - \text{OH}$ is
 (A) 2-chloropropanal (B) 2-chloropropanol
 (C) 1-chloropropanol (D) 2-chloropropane
- ii. Which of the following is saturated hydrocarbon?
 (A) $\text{CH}_3 - \text{CH}_2 - \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}$ (B) $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$
 (C) $\text{CH}_3 - \text{CH}_2 - \text{CH}_3$ (D) Both (A) and (C)
- iii. Which of the following is not an alcohol?
 (A) $\text{CH}_3 - \text{CH}_2 - \text{CHO}$ (B) $\text{CH}_3 - \text{CO} - \text{CH}_3$
 (C) $\text{CH}_3 - \text{O} - \text{CH}_3$ (D) None of these
- iv. Which of the following is not a part of homologous series of butanol?
 (A) $\text{C}_3\text{H}_8\text{O}$ (B) $\text{C}_5\text{H}_{12}\text{O}$
 (C) $\text{C}_5\text{H}_{10}\text{O}$ (D) $\text{C}_2\text{H}_6\text{O}$
- v. The correct structure of 2-chloro-3-hydroxy butanoic acid is:
 (A) $\text{CH}_3 - \underset{\text{OH}}{\text{CH}} - \overset{\text{Cl}}{\text{CH}} - \text{COOH}$ (B) $\text{CH}_3 - \overset{\text{Cl}}{\text{CH}} - \overset{\text{OH}}{\text{CH}} - \text{COOH}$
 (C) $\text{CH}_3 - \text{CH}_2 - \overset{\text{OH}}{\underset{\text{Cl}}{\text{C}}} - \text{COOH}$ (D) None of these

SECTION – B

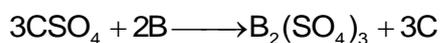
Short Answer type-I (2 marks each)

21. What is an ammeter? How is it connected in a circuit?
22. What is observed when a solution of potassium iodide solution is added to a solution of lead nitrate? Name the type of reaction. Write a balanced chemical equation to represent the above chemical reaction.

23. A substance X, which is an oxide of a metal is used intensively in the cement industry. This element is present in bones also. On treatment with water it forms a solution which turns red litmus blue. Identify X and also write the chemical reactions involved.

OR

A, B and C are three elements which undergo chemical reactions according to the following equations:



Answer the following questions with reasons:

- (a) Which element is the most reactive?
(b) Which element is the least reactive?
24. Give an example of the following:
(a) Organism that breaks food material outside body and then absorb it.
(b) Organism that engulf the food using pseudopodia.
25. What are the final products formed in intestine after digestion of:-
(a) Proteins
(b) Complex carbohydrates

OR

Describe double circulation in human beings.

26. Explain laws of reflection of light.

SECTION – C

Long Answer type-I (3 marks each)

27. Give below are some elements of the modern periodic table:
 ${}_4\text{Be}$, ${}_9\text{F}$, ${}_{14}\text{Si}$, ${}_{19}\text{K}$, ${}_{20}\text{Ca}$
(a) Select the element that has one electron in the outermost shell and write its electronic configuration
(b) Select two elements that belong to the same group. Give reason for your answer.
(c) Select two elements that belong to the same period. Which one of the two has bigger atomic size?
28. Answer the following:
(a) Name the tissue which transports water in plants?
(b) In which form is carbohydrate translocated through phloem tissue in the plant?
(c) Blood pressure is measured with an instrument called _____.
29. Name the following:
(i) Future shoot (ii) Male sex hormone (iii) Sexually transmitted bacterial disease

30. Give the characteristics of magnetic field lines.
31. Answer the following:
- (a) Why is formula of Plaster of Paris written as $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$? How is it possible to have half a water molecule attached to CaSO_4 ?
- (b) Why is sodium hydrogen carbonate an essential ingredient in most antacids?
- (c) When electricity is passed through an aqueous solution of sodium chloride, three products are obtained. Why is the process called chlor-alkali process?

OR

Identify the type of chemical reaction taking place in each of the following:

- (a) Barium chloride solution is mixed with copper sulphate solution and a white precipitate is observed.
- (b) On heating copper powder in air in a China dish, the surface of copper powder turns black.
- (c) On heating green coloured ferrous sulphate crystals, reddish brown solid is left and smell of a gas.
32. (a) What is the molecular formula of alcohol which is derived from pentane?
(b) Write the formula of alkane with 58 hydrogen atoms?
(c) What do you mean by Allotropy?
33. Draw a well labeled diagram of human heart and label the following:
- | | |
|-------------------------|-----------------------|
| (i) Pulmonary arteries, | (ii) Pulmonary veins, |
| (iii) Aorta, | (iv) Vena cava, |
| (v) Septum, | (vi) Right atrium |

OR

What is ozone and how does it affect any ecosystem?

SECTION – D

Long Answer type-I (5 marks each)

34. Draw a well labeled diagram of human alimentary canal labeling the following:
- (a) Site of pepsin secretion
(b) Site of synthesis of bile
(c) Site of absorption of water

Also explain why peristaltic movement necessary in alimentary canal?

35. Two elements M and N belong to groups I and II respectively and are in the same period of the periodic table. How do the following properties of M and N vary?
- Sizes of their atoms
 - Their metallic characters
 - Their valencies in forming oxides
 - Molecular formula of their chlorides

OR

Metal	Iron (II) sulphate	Copper (II) sulphate	Zinc sulphate	Silver Nitrate
A	No reaction	Reddish brown deposit	–	–
B	Grey deposit	–	No reaction	–
C	No reaction	No reaction	No reaction	White shining deposit
D	No reaction	No reaction	No reaction	No reaction

Answer the following questions based on the above observations:

- Which is the most active metal and why?
 - What would be observed if B is added to a solution of copper (II) sulphate and why?
 - Arrange the metals A, B, C and D in order of increasing reactivity.
 - Container of which metal can be used to store both zinc sulphate solution and silver nitrate solution.
 - Which of the above solutions can be easily stored in a container made up of any of these metals?
36. An object is placed at (i) 15 cm, (ii) 5 cm in front of a concave mirror of radius of curvature 20 cm. Find the position, nature and magnification of the image in each case.

[2.5 + 2.5]

OR

Three incandescent bulbs of 100 W each are connected in series in an electric circuit. In another circuit another set of three bulbs of the same wattage are connected in parallel to the same source.

[3 + 2 = 5]

- Will the bulb in the two circuits glow with the same brightness? Justify your answer.
- Now let one bulb in both the circuits get fused. Will the rest of the bulbs continue to glow in each circuit? Give reason.

HINTS AND SOLUTIONS

1. Raw materials are required for photosynthesis are CO_2 and water.
2. Total power = $100 + 60 = 160 \text{ W}$
Electrical energy = $pt = 160 \times 5 \times 60 = 48000 \text{ J}$
3. It is bending of light ray when light enters into different medium.
4. C_2H_4 and C_2H_2 , as they contain π bonds.
5. $\text{CaO(s)} + \text{H}_2\text{O} \longrightarrow \text{Ca(OH)}_2 + \text{heat}$
6. A
7. It is ratio of speed of light in vacuum to speed of light in other medium.
8. Because there is no atmosphere to reflect light.
9. Digestive enzymes help in the breaking down of the complex food particles into simple ones.
10. B
11. The components of the transport system are xylem and phloem in highly organized plants.
12. When the ammeter resistance is low, almost all the current in the circuit is allowed to pass through the ammeter.
13. A
14. Due to atmospheric refraction.
15. C
- Sol. Assertion is true but reason is false.
16. C
- Sol. Assertion is true but reason is false.

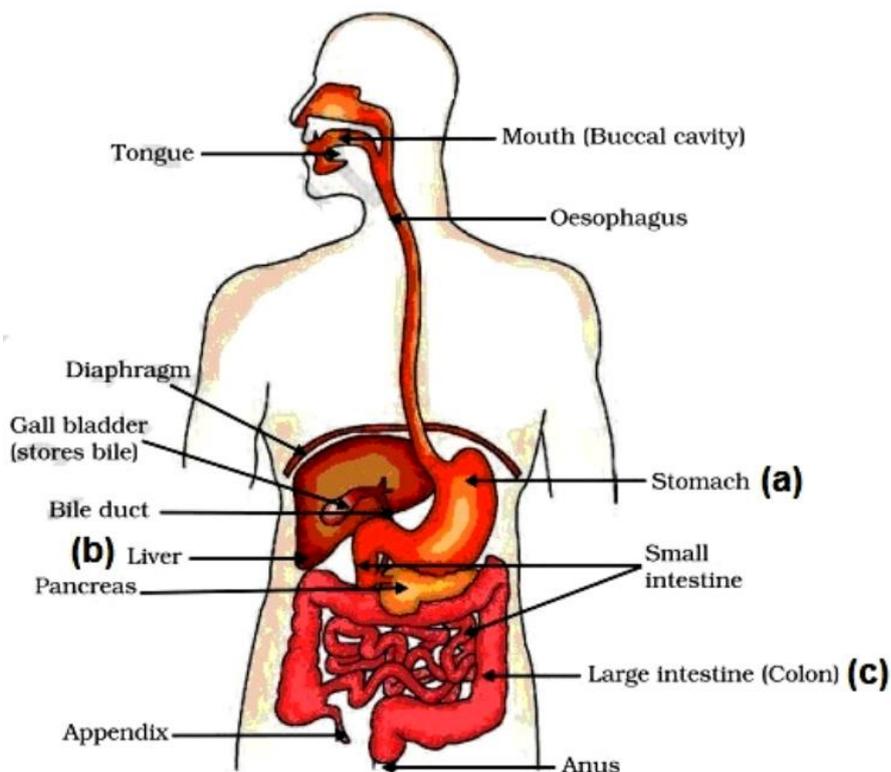
17.
 - i. A
 - ii. A
 - iii. A
 - iv. B
 - v. A

18.
 - (i) A
Concave mirror
 - (ii) C
Real, inverted
 - (iii) D
Object is at a distance of 50 cm (at centre of curvature)
 - (iv) C
 $u = v = 50 \text{ cm} \quad \Rightarrow u + v = 100 \text{ cm}$
 - (v) B
 $R = 2f \quad \Rightarrow f = 50/2 = 25 \text{ cm}$

19.
 - (i) B
 $P = (I_2)^2 \times 3 = 12 \quad \Rightarrow I_2 = 2\text{A}$
 - (ii) D
 $P = (I_1)^2 \times 4 = 4\text{W}$
 - (iii) A
 $V = I_1 \times 2 = 1 \times 2 = 2\text{V}$
 - (iv) C
 $I = I_1 + I_2 = 3\text{A}$
 - (v) B
 $V = I \times R = 3 \times 5 = 15\text{V}$

- 20.

34.



- (a) Stomach
- (b) Liver
- (c) Large intestine

Peristaltic movement is necessary in alimentary canal in order to move food in regulated manner along oesophagus and push it into stomach.

- 35.
- (i) $N < M$
 - (ii) $M > N$
 - (iii) 1 & 2
 - (iv) MCl and MCl_2

OR

- (a) B is most active metal as it reacts with Iron (II) sulphate.
- (b) $B + CuSO_4 \rightarrow$ Blue colour will disappear as B displace $Cu(II)$ ion,
- (c) $B > A > C > D$
- (d) Container of D can be used
- (e) $ZnSO_4$ can be stored

36. The focal length $f = -20/2 \text{ cm} = -10 \text{ cm}$

(i) The object distance $u = -15 \text{ cm}$. Then using, $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

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

or $v = \frac{10 \times 15}{-5} = -30 \text{ cm}$

$$m = -\frac{(-30)}{(-15)} = -2$$

(ii) The object distance $u = -5 \text{ cm}$. Then using, $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

or $v = \frac{5 \times 10}{5} = 10 \text{ cm}$

or $m = -\frac{(10)}{(-5)} = 2$

OR

- (a) Let V = Potential difference of source and
 R = resistance of each bulb.

Current (I_s) in series through each bulb = $\frac{V}{R_{eq.}}$

$\Rightarrow I_s = \frac{V}{R+R+R} = \frac{V}{3R}$

Total current in parallel combination (I) = $\frac{V}{\frac{R}{3}} = \frac{3V}{R} \quad \therefore$

Current (I_p) through each bulb in parallel combination = $\frac{3V}{R} \div 3 = \frac{V}{R}$

Since, $I_p > I_s$, thus bulbs connected in parallel will glow brightly ($\because p = I^2R$)
Hence bulbs in two circuits have different brightness.

- (b) In series circuit, other bulbs will stop glowing as circuit is broken due to one of the fused bulb but in parallel circuit other bulbs will keep glowing with same brightness as different current passes through each bulb.