

Time: 3 hours

Maximum Marks : 80

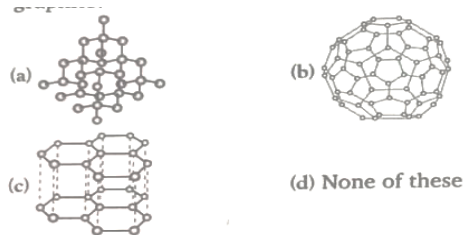
1. All questions are compulsory.
2. The question paper consists of 47 questions, divided into five sections: A, B, C, D and E.
3. (i) Section A comprises 30 questions of 1 mark each.
 (ii) Section B comprises 7 questions of 2 marks each.
 (iii) Section C comprises 6 questions of 3 marks each.
 (iv) Section D comprises 2 case studies of 4 marks each.
 (v) Section E comprises 2 questions of 5 marks each.

I. Multiple Choice Questions:

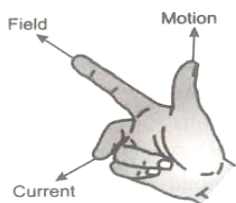
1. Which of the following involves a combination of two elements?
 - (a) $N_2(g) + 3H_2(g) \longrightarrow 2 NH_3(g)$
 - (b) $CaO(s) + CO_2(g) \longrightarrow CaCO_3(s)$
 - (c) $2SO_3(g) + O_2(g) \longrightarrow 2SO_2(g)$
 - (d) $NH_3(g) + HCl(g) \longrightarrow NH_4Cl(s)$
2. The mode of nutrition found in fungi is:
 - (a) Parasitic nutrition
 - (b) Holozoic nutrition
 - (c) Autotrophic nutrition
 - (d) Saprotrophic nutrition
3. Select the balanced equation for the reaction between dilute sulphuric acid and zinc granules.
 - (a) $H_2SO_4 + Zn \rightarrow ZnSO_4 + H_2$
 - (b) $2H_2SO_4 + Zn \rightarrow ZnSO_4 + 2H_2$
 - (c) $H_2SO_4 + 2Zn \rightarrow 2ZnSO_4 + H_2$
 - (d) $2H_2SO_4 + 3Zn \rightarrow 3ZnSO_4 + 2H_2$
4. Carbon forms four covalent bonds by sharing its four valence electrons with four univalent atoms, eg., hydrogen. After the formation of four bonds, carbon attains the electronic configuration of:
 - (a) Helium
 - (b) Neon
 - (c) Argon
 - (d) Krypton
5. In a nerve pathway, the following events take place in a coordinated order.
 - (i) Activation of muscle
 - (ii) Activation of receptor
 - (iii) Passage of impulses along a motor neuron
 - (iv) Passage of impulses along a sensory neuron
 Read the events given and identify the correct order of these events from the table given below:

	First	Last
(a)	(ii) (iii)	(iv) (i)
(b)	(ii) (iv)	(iii) (i)
(c)	(iv) (i)	(iii) (ii)
(d)	(iv) (ii)	(i) (ii)
6. In humans if gene B gives brown eyes and gene b gives blue eyes, what will be the colour of eyes of the persons having combinations:
 - (i) Bb
 - (ii) BB
 - (a) (i) Blue and (ii) Brown
 - (b) (i) Brown and (ii) Blue
 - (c) (i) Brown and (ii) Brown
 - (d) (i) Blue and (ii) Blue
7. Which among the following are not the functions of testes at puberty?
 - (i) Formation of germ cells.
 - (ii) Secretion of testosterone.
 - (iii) Development of placenta.
 - (iv) Secretion of estrogen.
 - (a) (i) and (ii)
 - (b) (i) and (iii)
 - (c) (ii) and (iv)
 - (d) (iii) and (iv)
8. Which one of the following is not one of the direct conclusions that can be drawn from Mendel's experiment?
 - (a) Only one parental trait is expressed
 - (b) Two copies of each trait is inherited in sexually reproducing organism
 - (c) For recessive traits to be expressed, both copies should be identical.
 - (d) Natural selection can alter frequency of an inherited trait.
9. A light ray travelling obliquely from a denser medium to a rarer medium bends:
 - (a) Away from the normal.
 - (b) Towards the normal
 - (c) Does not bend at all
 - (d) none of the above

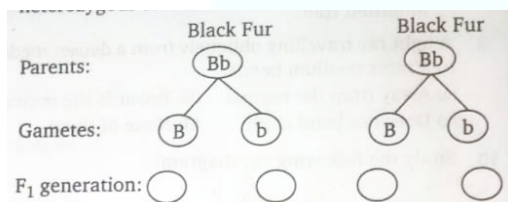
21. Which of the following shows the structure of graphite?



22. Which rule is shown in the figure?

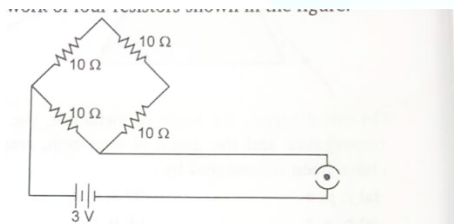


23. In a certain species of animal black fur (B) is dominant over brown fur (b). Predict a genotype and phenotype of the offspring when both parents are Bb or have heterozygous black fur.



(i) What will be the genotype of F₁ generation?
 (ii) Find out the phenotype of F₁ generation.

24. Find the current drawn from the battery by the network of four resistors shown in the figure.



IV. Very Short Questions:

25. What is meant by a chemical reaction?
26. What is fertilisation?
27. What is meant by the term "functional group"?
28. Give an example of a plant hormone that promotes its growth. Where is it synthesised?
29. Which lens is used to correct myopia?
30. Write a balanced chemical equation for the process of photosynthesis.

Section B (2 marks each)

31. Two solutions A and B are kept in a beaker in a laboratory. The pH of solution A is 6 and pH of solution B is 8. Which solution has more hydrogen ion concentration? Which of these is acidic and which one is basic?
32. The pH of a salt used to make tasty and crispy pakoras is 14. Identify the salt and write a chemical equation for its formation. List its two uses.
33. How do auxins promote the growth of a tendril around a support?
34. A student is viewing under a microscope, a permanent slide showing various stages of asexual reproduction by budding in yeast. Draw diagrams of what he observes (in proper sequence).
35. (i) What are the various steps in a food chain called?
 (ii) Write the full name of the group of compounds mainly responsible for the depletion of the ozone layer.
36. Define electromagnetic induction.
37. The refractive indices of glass and water with respect to air are 3/2 and 4/3, respectively. If the speed of light in glass is 2×10^8 m/s, find the speed of light in water.

SECTION C (3 marks each)

38. Differentiate between saturated and unsaturated hydrocarbons.
39. Draw a neat diagram of excretory system of human beings and label the following:
 - i. Kidney
 - ii. Ureter
 - iii. Urinary bladder
 - iv. Urethra
40. An object is placed at a distance of 15 cm from a concave lens of focal length 30 cm. List four characteristics (nature, position, etc.) of the image formed by the lens.
41. A blue colour flower plant denoted by BB is crossbred with that of white colour flower plant denoted by bb.
 - (i) State the colour of flower you would expect in their F₁ generation plants.

- (ii) What must be the percentage of white flower plants in the F_2 generation if flowers of F_1 plants are self-pollinated?
 - (iii) State the expected ratio of the genotypes BB and Bb in the F_2 progeny.
42. Define a solenoid. Compare the magnetic field produced by a solenoid with that of a bar magnet.
43. How can you help in reducing the problem of waste disposal? Give any two methods.

SECTION D (4 marks each)

Read the case given below and answer any four question

Section A: Contains multiple choice questions. Answer any two questions from section A.

Section B: Contains very short answer type questions. Answer any two questions in your own words from section B.

44. Some harmful non-biodegradable chemicals, i.e pesticides (e.g, DDT) and heavy metals (e.g, mercury arsenic, cadmium, etc.) enter the bodies of organisms through the food chain and go on concentrating at each trophic level. This phenomenon is called biomagnification or biological magnification.

Section A: [Answer any two]

I. Refer to the given food chain.

Phytoplankton → Zooplankton → Small fish → Large fish → Fish eating birds

If concentration of DDT in small fish is estimated to be 0.5 ppm, then amount of DDT in zooplankton and large fish would be, respectively:

- (a) 0.04 ppm, 2 ppm
- (b) 2 ppm, 0.04 ppm
- (c) 0.04 ppm, 0.04 ppm
- (b) 2 ppm, 0.04 ppm

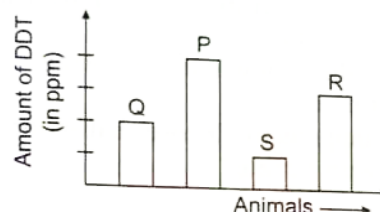
II. Refer to the given table.

Organisms	Amount OF Cadmium
A	0.5ppm
B	25ppm
C	0.003ppm
D	2 ppm
E	0.04ppm

According to the given data, the correct order in a food chain will be:

- (a) E → C → D → A → B
- (b) B → D → A → E → C
- (c) C → E → A → D → B
- (d) C → E → A → B → D

III. A group of scientists analysed samples of five different animals from a river for possible accumulation of DDT in the animal body due to biomagnification. The result obtained is shown in the given graph.



The correct order of the food chain operating in ai river is:

- (a) S → P → Q → R
- (b) S → Q → R → P
- (c) P → R → Q → S
- (d) P → Q → S → R

IV. Higher amounts of DDT disturb calcium metabolism of birds. This results in:

- (a) Thickening of their egg shells
- (b) Premature breaking of eggs
- (c) Death of their embryos
- (d) Both (b) and (c)

Section B: (Answer any two)

I. Define biomagnification.

II. Which mineral element is first reported as the example of biomagnification?

III. Which organism is more affected due to biomagnification?

IV. Name some chemicals which are known to cause biomagnification.

Read the case given below and answer any four questions:

Section A: Contains multiple choice questions.

Answer any two questions from section A.

Section B: Contains very short answer type questions. Answer any two questions in your own words from section B.

45. Baking soda is a leavening agent used in baked goods like cakes, muffins and cookies. Baking soda becomes activated when it is combined with both an acidic ingredient and a liquid. Upon activation, a gas is produced, which allows baked goods to rise and become light and fluffy.

Section A: (Answer any two)

I. Which gas is produced by the reaction of baking soda and acid?

- (a) Carbon monoxide (b) Carbon dioxide
(c) Hydrogen (d) Oxygen

II. What is the chemical name for baking soda?

- (a) Sodium carbonate (c) Calcium carbonate
(b) Sodium bicarbonate (d) Calcium bicarbonate

III. The pH of baking soda solution is:

- (a) More than 7
(b) Less than 7
(c) Equal to 7
(d) Less than 7 but more than 3

IV. When baking soda is heated.....is formed.

- (a) Sodium sulphate and carbon dioxide gas
(b) Sodium carbonate and water
(c) Sodium carbonate, carbon dioxide and water
(d) Sodium oxide, carbon dioxide and water

Section B: (Answer any two)

I. Write the chemical formula of baking powder.

II. What is the difference between baking powder and baking soda?

III. What happens when baking powder is heated or mixed in water?

IV. How does sodium hydrogen carbonate is helpful in causing relief in acidity?

SECTION E (5 marks each)

46. (i) Draw the structure of a nephron and label the following on it:

Glomerulus, Bowman's capsule, Renal artery, Collecting duct.

(ii) What happens to glucose that enters the nephron along with filtrate?

47. (i) What is Plaster of Paris? How is it formed in the laboratory?

(ii) Write two uses of Plaster of Paris.