CBSE EXAMINATION PAPER-2022

SCIENCE

(Solved)

Time allowed : 3 hours

Maximum Marks : 70

Practice set total: 44 (includes all OR options)

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **20 questions.** All questions are **compulsory.**

ii. This question paper is divided into **3 sections.**

iii. **Section A** – questions number **1 to 2** are case based questions

iv. **Section B** – questions number **3 to 12** are very short answer

v. **Section C** – questions number **13 to 20** are short answer

vi. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

vii. Use of calculator is NOT allowed.

Section A

Question 1. The mechanism by which the sex of an individual is determined is called sex-determination. In human beings, sex of a newborn is genetically determined, whereas in some others it is not. There are 46 (23 pairs) chromosomes in human beings. Out of these, 44 (22 pairs) control the body characters and 2 (one pair) are known as sex chromosomes. The sex chromosomes are of two types X chromosome and Y chromosome. At the time of fertilisation, depending upon which type of male gamete fuses with the female gamete, the sex of the newborn child is decided.

(1) Out of male or female, which of them has a perfect pair of sex chromosomes? In case of a perfect pair, will the gametes produced be of the same kind or of a different kind?

[1 Marks]

(2) Name two animals whose sex is not genetically determined. Explain the process of their sex determination.

[2 Marks]

(3) Why is a pair of sex chromosomes in human beings called a mismatched pair in terms of type and size?

[1 Marks]

(4)

With the help of a flowchart only, show how sex is genetically determined in human beings.

[2 Marks]

Question 2. A student fixes a sheet of white paper on a drawing board using some adhesive materials. She places a bar magnet in the centre of it and sprinkles some iron filings uniformly around the bar magnet using a salt-sprinkler. On tapping the board gently, she observes that the iron filings have arranged themselves in a particular pattern.

(1) Draw the magnetic field lines of a bar magnet showing the poles of the bar magnet as well as the direction of the magnetic field lines.

[1 Marks]

(2) Draw a diagram to show this pattern of iron filings.

[1 Marks]

(3) How is the direction of magnetic field at a point determined using the field lines? Why do two magnetic field lines not cross each other?

[2 Marks]

(4)

How are the magnetic field lines of a bar magnet drawnusing a small compass needle ? Draw one magnetic field line each on both sides of the magnet.

[2 Marks]

Section B

Question 3.

(a) Write the molecular formula of the following carbon compounds :

(i) Methane

(ii) Propane

(b) Carbon compounds have low melting and boiling points. Why ?

[2 Marks]

Question 4.

The electrons in the atoms of two elements X and Y are distributed in

three shells having 1 and 7 electrons respectively in their outermost

shells.

(a) Write the group numbers of these elements in the Modern Periodic Table.

(b) Write the molecular formula of the compound formed when X and Y combine with each other.

(c) Which of the two is electropositive ?

[2 Marks]

Question 5.

(a) Which of the following flowers will have higher possibility of self-pollination ?

Mustard, Papaya, Watermelon, Hibiscus

(b) List the two reproductive parts of a bisexual flower.

[2 Marks]

Question 6.

Which one of the two multicellular organisms Spirogyra and Planaria reproduces by regeneration and why ? Give an example of any other organism which can also reproduce by the same process.

[2 Marks]

Question 7.

What is variation ? List two main reasons that may lead to variation in a population.

[2 Marks]

Question 8.

(i) In a cross between violet flowered plants and white flowered plants, state the characteristics of the plants obtained in the F_1 progeny.

(ii) If the plants of F_1 progeny are self-pollinated, then whatwould be observed in the plants of F_2 progeny ?

(iii) If 100 plants are produced in F_2 progeny, then how many plants will show the recessive trait ?

[2 Marks]

Question 9.

(i) Name and state the rule to determine the direction of force experienced by a current carrying straight conductor placed in a uniform magnetic field which is perpendicular to it.

(ii) An alpha particle while passing through a magnetic field gets projected towards north. In which direction will an electron project when it passes through the same magnetic field ?

[2 Marks]

Question 10.

(i) What is a solenoid ?

(ii) Draw the pattern of magnetic field lines of the magnetic field produced by a solenoid through which a steady current flows.

[2 Marks]

Question 11.

What is ozone ? How is it formed in the upper layers of the Earth's atmosphere ? How does ozone affect our ecosystem ?

[2 Marks]

Question 12.

(i) List two human-made ecosystems.

(ii) "We do not clean a pond in the same manner as we do in an aquarium." Give reason to justify this statement.

[2 Marks]

Section C

Question 13.

(a) List two advantages of adopting the atomic number of an element as the basis of classification of elements in the Modern Periodic Table.

(b) Write the electronic configurations of the elements X (atomicnumber 13) and Y (atomic number 20).

[3 Marks]

Question 14.

Draw two different possible structures of a saturated hydrocarbon having four carbon atoms in its molecule. What are these two structures of the hydrocarbon having same molecular formula called ? Write the molecular formula and the common name of this compound. Also write the molecular formula of its alkyne.

[3 Marks]

Question 15.

(i) Write the molecular formula of benzene and draw its structure.

(ii) Write the number of single and double covalent bonds present in a molecule of benzene.

(iii) Which compounds are called alkynes ?

[3 Marks]

Question 16.

(a) Mention one function each of the following organs in human male reproductive system :

(i) Testis

(ii) Scrotum

(iii) Vas deferens

(iv) Prostate gland

(b) Name the type of germ cell which (i) is motile, and (ii) stores food.

[3 Marks]

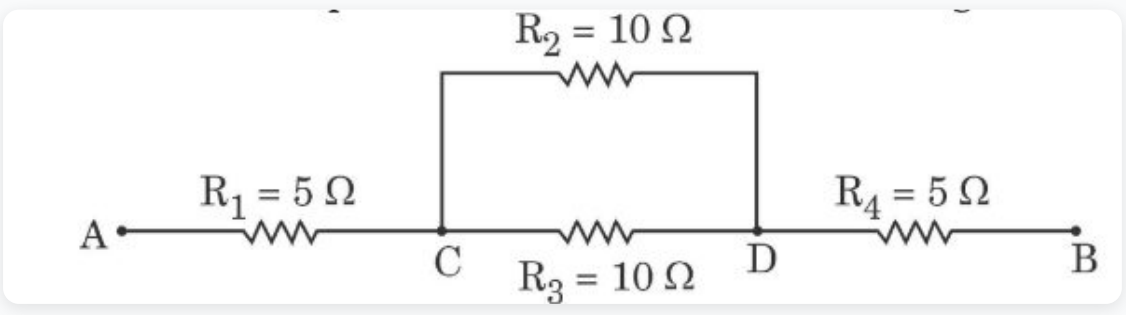
Question 17.

Three resistors R_1, R_2 and R_3 are connected in parallel and the combination is connected to a battery, an ammeter, a voltmeter and a key. Draw suitable circuit diagram to show the arrangement

of these circuit components along with the direction of current flowing.

(b) Calculate the equivalent resistance of the following network :

[3 Marks]



Question 18.

(i) Define Electric Power and write its SI unit.

(ii) Two bulbs rated 100 W; 220 V and 60 W; 220 V areconnected in parallel to an electric mains of 220 V. Find the current drawn by the bulbs from the mains.

[3 Marks]

Question 19.

(i) State Joule's law of heating. Express it mathematically when an appliance of resistance R is connected to a source of voltage V and the current I flows through the appliance for a time t.

(ii) A 5Ω resistor is connected across a battery of 6 volts. Calculate the energy that dissipates as heat in 10 s.

[3 Marks]

Question 20.

(a)Name the group of organisms which form in the first trophic level of all food chains. Why are they called so ?

(b)Why are the human beings most adversely affected by bio-magnification ?

(c)State one ill-effect of the absence of decomposers from a natural ecosystem.

[3 Marks]