MODEL EXAMINATION II (2019–2020)

GRADE: X
SCIENCE

Time Allowed: 3 Hours **Max. Marks: 80**

GENERAL INSTRUCTIONS:

i) The question paper comprises of three **Sections – A, B and C**. Attempt all the sections.
ii) All questions are compulsory.
iii) All questions in **Section-A** are **one**-mark questions comprising *MCQ, VSA* type and assertion-reason type questions. These are to be answered in one word or in one sentence.
iv) All questions in **Section-B** are **three** mark, short-answer type questions. These are to be answered in about
50 – 60 words each.
v) All questions in **Section-C** are **five** mark, long-answer type questions. These are to be answered in about **80 – 90** words each.
vi) This question paper consists of a total of 30 questions.
vii) Question paper will have no overall choice. However, internal choices will be provided in all the three sections of paper.

SECTION –A

I. Answer the following:

1. What are the qualities of an ideal fuel?

2. State Ohm's law.

3. **Answer question numbers 3(a) -3(d) on the basis of your understanding of the following paragraph and the related studied concepts.**

Compounds which contain only carbon and hydrogen are called hydrocarbons. Among these the compounds containing all single covalent bonds are called saturated hydrocarbons while the compounds containing at least one double or triple bond are called unsaturated hydrocarbons. Saturated hydrocarbons after combustion give a clean flame while unsaturated hydrocarbons give a yellow sooty flame. Unsaturated hydrocarbons are more reactive than saturated hydrocarbons. Unsaturated hydrocarbons add hydrogen in the presence of catalysts such as palladium or nickel to give saturated hydrocarbons. The chemical reaction is as follows:

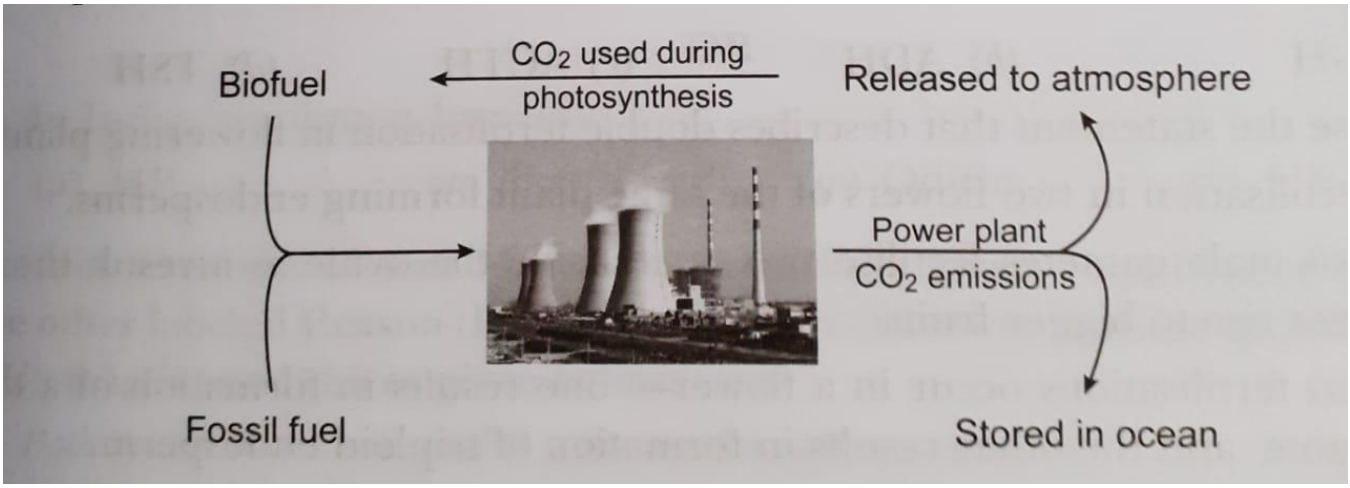
$$CH_3CH_2CH{=}CH_2 \xrightarrow[H_2]{\text{nickel catalyst}} CH_3CH_2CH_2CH_3$$

a) Write two differences between saturated and unsaturated hydrocarbons.
b) Between $CH_3CH_2CH_3$ and $CH_3CH{=}CH_2$, which is more reactive?
c) Give the IUPAC names of the reactant and product of the reaction given above.
d) The reaction given in the passage is known as
i) Combustion ii) Oxidation iii) Hydrogenation iv) Substitution

4. **Answer the question numbers 4(a) - 4(d) on the basis of your understanding of the following paragraph and the related studied concepts.**

Many power plants burn carbon based fuels and emit carbon dioxide (CO_2). CO_2 released into the atmosphere has a negative impact on global climate. Engineers have used different strategies to reduce the amount of CO_2 Released into the atmosphere. One such strategy is to burn biofuels instead of fossil fuels. While fossil fuels come from long- dead organisms, biofuel comes from plants that lived and died recently.

Another strategy involves trapping a portion of the CO_2 emitted by power plants and storing it deep underground or in the ocean. This strategy is called carbon capture and storage.



Despite the advantages of biofuels for the environment, fossil fuels are still widely used. The following table compares the energy and CO_2 released when petroleum and ethanol are burned. Petroleum is a fossil fuel, while ethanol is a biofuel.

Fuel Sources	Energy released (KJ of energy/g of fuel)	CO_2 released (mg of CO_2/KJ of energy produced)
Petroleum	43.6	78
Ethanol	27.3	59

(a) Using biofuels does not have the same effect on atmospheric levels of CO_2 as using fossil fuels, what can the reason be?
(b) According to table 1, why might someone prefer using petroleum instead of ethanol, even if their cost is the same?
(c) According to Table1, what is the environmental advantage of using ethanol instead of petroleum?
(d) Which amongst the following is not useful in reducing the use of fossil fuels:
i. Using fluorescent tubes.
ii. Using petrol in vehicles.
iii. Using solar devices.
iv. Improving the fuel efficiency of personal transport.

5. Rusting of iron is an example of
a) reduction b) ionization c) oxidation d) dissociation

6. It was found that water from a river was contaminated with Coliform bacteria. Which one of the following pollutant might have got mixed with the water?
a) Fertiliser run off b) Industrial waste c) Pesticides d) Human faecal matter

OR

In the given food chain, suppose the amount of energy at fourth trophic level is 5kJ, what will be the energy available at the producer level?

Grass → Grasshopper → Frog → Snake → Hawk

a) 5 kJ b) 50 kJ c) 500 kJ d) 5000 kJ

7. S.I unit of specific resistance is
a) Ω b) Ω m c) Ω m^{-1} d) Ω m^{-2}

8. Which of the following metal forms an amphoteric oxide.
a) Sodium b) Potassium c) Aluminium d) Gold

OR

Which of the following salts does not contain water of crystallisation?
a) Blue Vitriol b) Baking soda c) Washing soda d) Gypsum

9. Which one of the following phenomena contributes significantly to the reddish appearance of the sun at sun rise or sun set?
a) Dispersion of light b) Scattering of light
c)Total internal reflection of light d) Reflection of light from the earth.

10. Khadins, Bundhis, Ahars and Kattas are ancient structures that are examples for
a) Grain storage b) Wood storage c) Water harvesting d) Soil conservation

11. What is the maximum resistance which can be made using five resistors each of 1/5 Ω?
a) 1/5 Ω b) 10 Ω c) 5 Ω d) 1 Ω

OR

A ray of light enters water, then the ray of light
a) bends towards the b) bends away from the normal
c) passes undeviated d) suffers lateral displacement.

12. Choose the incorrect statement from the following regarding the magnetic field lines.
a) The direction of the magnetic field at a point is taken to be the direction in which the north pole of magnetic compass needle points.
b) Magnetic field lines are closed curves.
c) If magnetic field lines are parallel and equidistant it implies zero field strength.
d) Relative strength of magnetic field is shown by the degree of closeness of the field lines.

For question numbers 13 and 14, two statements are given – one labelled assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i). (ii), (iii) and (iv) as given below:

i) Both A and R are true and R is the correct explanation of A.
ii) Both A and R are true but R is not the correct explanation of A.
iii) A is true but R is false.
iv) A is false but R is true.

13. Assertion(A): Genetic variation is disadvantageous to a population.
Reason(R): It enables individuals to adapt to environment.

14. Assertion(A): A resistor of resistance R is connected to an ideal battery. If the value of R is decreased the power dissipated in the circuit will increase.
Reason(R): The power dissipated in the circuit is inversely proportional to the resistance of circuit.

SECTION B

15. What is an oxidation reaction? Give an example of oxidation reaction. Is oxidation an exothermic or an endothermic reaction ?

16. Draw a diagram of human Alimentary Canal and label:
(a) Organ which transports food from mouth to stomach.
(b) Organ which secretes bile juice.
(c) Organ which stores bile juice.

OR

Draw a diagram of human Respiratory System and label:
a) Organ that is surrounded by cartilaginous rings.
b) Structure where exchange of gases takes place.
c) Muscular structure which flattens during inhalation.

17. An organic compound 'A' of molecular formula C_2H_6O on oxidation with dilute alkaline $KMNO_4$ solution gives an acid 'B' with the same number of carbon atoms. Compound 'A' is often used for sterilisation of skin by doctors.
a) Name the compounds 'A' and 'B'. 1
b) Write the chemical equation involved in the formation of 'B' from 'A'. 2

OR

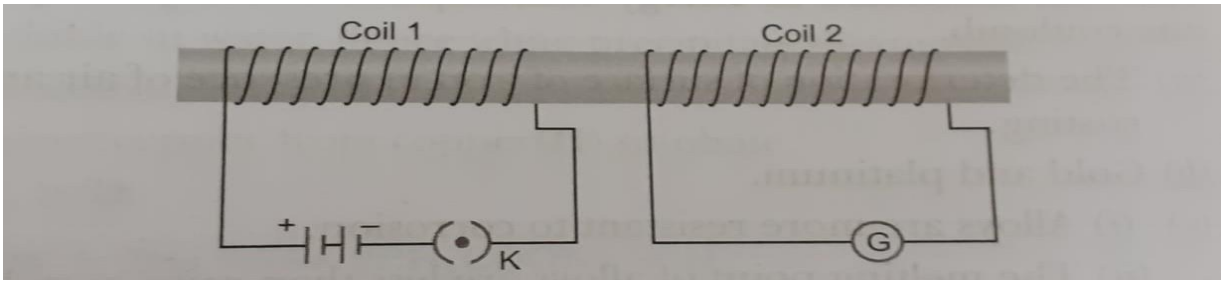
Elements have been arranged in the following sequence on the basis of the following atomic masses:
F, Na, Mg, Al, Si, P, S, Cl, Ar, K

a) Pick two sets of elements which have similar properties. 2
b) Which law of classification of elements does the given sequence represent? 1

18. List four functions of the human heart. Why is double circulation necessary in the human body?

19. Distinguish between ionic and covalent compounds under the following properties:
a) Strength of forces between constituent elements
b) Solubility of compounds in water
c) Electrical conduction in substances.

20. Two circular coils P and Q are kept close to each other, of which coil P carries a current Q and is connected with galvanometer as shown below. State your observation in the galvanometer:



i) When key K closed;
ii) When key K is opened;
iii) Give reason for your observations.

21. A 2.0 cm tall object is placed perpendicular to the principal axis of a concave mirror of focal length 10 cm. The distance of the object from the mirror is 15cm. Find the nature, position and size of the image formed. Represent the situation with the help of a ray diagram.

22. Compare and contrast nervous and hormonal mechanisms for control and coordination in animals.

23. Due to gradual weakening of ciliary muscles and diminishing flexibility of the eye lens, a certain defect of vision arises. Write the name of this defect. Name the type of lens required by such persons to improve the vision. Explain the structure and function of such a lens.

OR

With the help of ciliary muscles, the human eye can change its curvature and thus alter the focal length of its lens. State the changes that occur in the curvature and focal length of the eye lens while viewing
a) a distant object b) nearby objects
Explain, why a normal eye is not able to see the objects placed closer than 25 cm distinctly, without putting any strain on the eye.
24. In a pea plant, the trait of flowers bearing purple colour(PP) is dominant over white colour (pp). Explain the inheritance pattern of F1 and F2 generations with the help of a cross following the rules of inheritance of traits. State the visible characters of F1 and F2 progenies.

SECTION C

25. a) What is contraception? List four different methods. State four reasons for adopting contraceptive methods. 3

b) What changes are observed in the uterus subsequent to implantation of young embryo? 2

OR

a) How are nitrogenous wastes and water excreted in Amoeba? 1

b) Explain the process of regeneration in Planaria. How is this process different from reproduction? 2

c) How does binary fission differ from multiple fission? Write any four points. 2

26. a) Write Joule's law of heating. 1

b) Two lamps, one rated 100W; 220V, and the other 60W; 220V, are connected in parallel to electric mains supply. Find the current drawn by two bulbs from the line, if the supply voltage is 220V. 2

c) A 100 W electric bulb is lighted for 3hr daily and four 60 W electric bulbs are lighted for 2h daily. Calculate the units of energy consumed in a month of 30 days. 2

27. a) An endocrine gland 'P' is located below the stomach in human body. The gland 'P' secretes a hormone 'H'. The deficiency of hormone 'H' in the body leads to rise in blood sugar due to which a disease 'D' is caused.

i) Name the gland P and the hormone H and state the function of hormone H and name the disease D.

ii) Suggest two precautions to be taken by the person who is suffering from the disease D. 2

b) How do auxins promote the growth of tendril around the support? 2

c) What is the difference between a reflex action and walking? 1

28. i) The modern periodic table has been evolved through the early attempts of Dobereiner, Newland and Mendeleev. List one advantage and one limitation of all three attempts. 3

ii) Name the scientists who first of all showed that atomic number of an element is more fundamental property than its atomic mass. 1

iii) State Modern periodic law. 1

OR

a) Why did Mendeleev leave gaps in his periodic table? 1

b) State any three limitations of Mendeleev's classification. 2

c) How does electronic configuration of atoms change in period with increase in atomic number? 2

29. A student had focused the image of a candle flame on a white screen using a concave mirror. The situation is given below:

Length of the flame =1.5cm

Focal length of the mirror = 12 cm

Distance of the flame from the mirror=18 cm.

If the flame is perpendicular to the principal axis of the mirror, then calculate the following:

i)Distance of the image from the mirror. 2

ii)Length of the image 1

If the distance between the mirror and flame is reduced to 10 cm, then what would happen? Justify your answer for this situation. 2

OR

a) Draw a ray diagram to explain the term 'angle of deviation'. 2

b) Why do the component colours of incident white light split into a spectrum while passing through a glass prism, explain. 2

c) Draw a labelled ray diagram to show the formation of a rainbow. 1

30. a) For making a cake baking powder is taken. If at home your mother uses baking soda instead of baking powder in cake; 3

i) How will it affect the taste of the cake and why?

ii) How can baking soda be converted into baking powder?

iii) What is the role of tartaric acid added to baking soda?

b) What is POP? Write the applications of POP in our daily life. 2

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