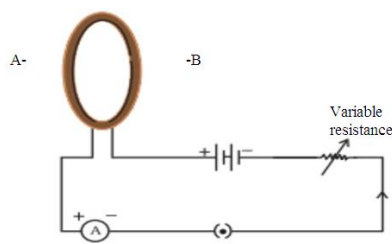


**General Instructions:**

- i. This question paper consists of 39 questions in 5 sections.
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- iii. **Section A** consists of 20 objective type questions carrying 1 mark each.
- iv. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
- v. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words
- vi. **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
- vii. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION A

1. A circular loop placed in a plane perpendicular to the plane of paper carries a current when the key is ON. The current as seen from points A and B (in the plane of paper and on the axis of the coil) is anti-clockwise and clockwise respectively. The magnetic field lines point from B to A. The N-pole of the resultant magnetic on the face close to



- (a) A (b) B
- (c) A if the current is small, and B if the current is large
- (d) B if the current is small and A if the current is large
2. Under which of the following conditions a concave mirror can form an real image larger than the actual object?
 - (a) When the object is kept at a distance equal to its radius of curvature
 - (b) When object is kept at a distance less than its focal length
 - (c) When object is placed between the focus and centre of curvature
 - (d) When object is kept at a distance greater than its radius of curvature
3. In which of the following the identity of initial substance remains unchanged?
 - (a) Curdling of milk (b) Formation of crystals by process of crystallisation
 - (c) Fermentation of grapes (d) Digestion of food
4. Which of the following pair is incorrect?

Reaction	Reaction Name
(a) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$	Combustion reaction and oxidation reaction
(b) $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$	Double displacement and precipitation reaction

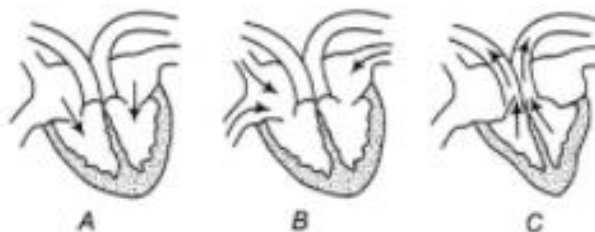
(c) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$	Combination reaction and exothermic reaction
(d) $\text{CuSO}_4 + \text{Zn} \rightarrow \text{ZnSO}_4 + \text{Cu}$	Combination reaction

5. Consider the pH value of the following acidic samples:

S No	Sample	pH value
1.	Lemon juice	2.2
2.	Gastric juice	1.2
3.	Vinegar	3.76
4.	Dil. Acetic acid	3.0

The decreasing order of their H^+ ion concentration is

- (a) $3 > 4 > 1 > 2$ (b) $2 > 1 > 3 > 4$ (c) $2 > 1 > 4 > 3$ (d) $3 > 4 > 2 > 1$
6. The second most abundant metal in the earth's crust is -----
 (a) Oxygen (b) Silicon (c) Aluminium (d) Iron
7. The two metals which are extracted by means of electrolytic reduction of their molten salts are -----
 (a) magnesium and manganese (b) iron and aluminium
 (c) zinc and magnesium (d) magnesium and aluminium
8. Pick the statement which is correct about the non – metal.
 (a) Br is an example of a liquid non – metal
 (b) Graphite is a good conductor of electricity
 (c) Most of the non – metal oxides are acidic (d) All of these
9. The functional group which always occurs in the middle of a carbon chain is
 (a) alcohol group (b) aldehyde group (c) carboxyl group (d) ketone group
10. The figure given below shows three stages in the cardiac cycle.



Which of the following sequence is correct regarding this

- (a) A, B, C (b) B, A, C (c) B, C, A (d) C, A, B
11. Posture and balance of the body is controlled by
 (a) Cerebrum (b) Cerebellum (c) Medulla (d) Pons
12. In a flower, the parts that produce male and female gametes are
 (a) Stamen and Ovary (b) Filament and Stigma
 (c) Anther and Ovary (d) Stamen and Style
13. Food web is the
 (a) Food that a spider collects using its web (b) Network of interlinked trophic levels
 (c) Network of interlinked food chains (d) Display of food items on a website
14. In a food chain, the snake predated a rabbit which fed on fresh green bushes. What percentage amount of the energy accumulated by rabbit, would be acquired by snakes?
 (a) 90% (b) 10% (c) 50% (d) 25%

Question no 15 to 20 is based on Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c) Assertion (A) is true but reason (R) is false.

d) Assertion (A) is false but reason (R) is true.

15. Assertion (A): A normal human eye can clearly see all the objects beyond certain minimum distance.

Reason (R): The human eye has capacity of adjusting the focal length of eye lens.

16. Assertion (A): Sodium oxide is an amphoteric oxide.

Reason (R): Metal oxides which react with both acids as well as bases are known as amphoteric oxides.

17. Assertion (A): Photosynthesis is opposite biochemical reaction of respiration.

Reason (R): Energy is utilised during respiration

18. Assertion (A): Medulla oblongata causes reflex actions like vomiting, coughing and sneezing.

Reason (R): It has many nerve cells which control autonomic reflexes

19. Assertion (A): Urethra in human male acts as the urinogenital tract

Reason (R): Urethra exclusively carries urine and sperms are carried by vas deferens to the exterior.

20. Assertion (A): Certain pesticides and other chemicals used to protect our crops from diseases and pests are non-biodegradable.

Reason (R): They do not get accumulated at various trophic levels.

SECTION B

21. A current of 1 ampere flows in a series circuit containing an electric lamp and a conductor of $5\ \Omega$ when connected to a 10 V battery. Calculate the resistance of the electric lamp.

Or

What would be the effect on the resistance of a metal wire of:

(a) increasing its length ?

(b) increasing its diameter ?

22. Draw a ray diagram showing the path of rays of light when it enters with oblique incidence (i) from air into water; (ii) from water into air.

23. If someone is suffering from the problem of acidity after overeating, which of the following would you suggest as remedy?

Lemon juice, Vinegar, Baking soda solution

Give reason for your choice.

24. (a) Mention the pathway of urine starting from the organ of its formation. (1)

(b) Name four substances which are reabsorbed from the initial filtrate in the tubular part of the nephron. (1)

25. (a) Name the phenomenon by which harmful substances enter into the body of living organism.

(b) Why decomposer are not included in food chain?

26. (a) Name the hormone, which brings change in male humans during the beginning of adolescence.

(b) Which hormone coordinates the level of sugar in blood?

SECTION C

27. Define power of a lens. What is its unit? One student uses a lens of focal length 50 cm and another of -50 cm. What is the nature of the lens and its power used by each of them?
28. Meena draws magnetic field lines of field close to the axis of a current carrying circular loop. As she moves away from the centre of the circular loop she observes that the lines keep on diverging. How will you explain her observation.
29. a) An electric heater draws a current of 10 A from a 220 V supply. What is the cost of using the heater for 5 hours everyday for 30 days if the cost of 1 unit (1 kWh) is Rs. 5.20?
b) Name the commercial unit of electric energy
30. What is meant by ionic bond and covalent bond? Show the bond formation in NaCl. What happens when electricity is passed through aq. Solution of ionic salts?
31. An ore, on treatment with dil. HCl produces brisk effervescence. Name the type of ore with one example. What steps would be required to obtain the metal from enriched ore? Also write the chemical equations of the reactions involved in the process.

Or

- (i) What are amphoteric oxides?
- (ii) Choose the acidic oxides, basic oxides and neutral oxides from the following:
Na₂O, CO₂, CO, SO₂, MgO, N₂O, H₂O
- (iii) Which of the following are amphoteric oxides:
MgO, ZnO, P₂O₃, Al₂O₃, NO₂
32. (a) What is the significance of peripheral nervous system?
(b) What happens at the synapse between two neurons?
(c) How do we detect the smell of an agarbatti?

Or

What are the basic feature of inheritance.

33. Given below are certain situations. Analyse and describe its possible impact on a person. (Give short explanation).
- (i) Testes of a male boy are not able to descend into scrotum during his embryonic development.
- (ii) Vas deferens of a man is plugged.
- (iii) Prostate and seminal vesicles are not functional.
- (iv) Egg is not fertilised in a human female.
- (v) Placenta does not attach to the uterus optimally. (vi) Oestrogen not secreted by ovary.

SECTION D

34. A student focused the image of a candle flame on a white screen using a convex lens. He noted down the position of the candle screen and the lens as under
- Position of candle = 12.0 cm
Position of convex lens = 50.0 cm
Position of the screen = 88.0 cm
- (i) What is the focal length of the convex lens?
- (ii) Where will the image be formed if he shifts the candle towards the lens at a position of 31.0 cm?
- (iii) What will be the nature of the image formed if he further shifts the candle towards the lens?
- (iv) Draw a ray diagram to show the formation of the image in case (iii) as said above.

Or

(i) Draw ray diagrams showing the image formation by a concave lens when an object is placed

(a) at the focus of the lens (b) between focus and twice the focal length of the lens

(c) beyond twice the focal length of the lens

ii) An object is placed at a distance of 100 cm from a converging lens of focal length 40 cm.

(i) What is the nature of image?

(ii) What is the position of image?

35. A saturated organic compound 'A' belongs to the homologous series of alcohols. On heating with conc. H_2SO_4 at 443 K, it forms unsaturated compound 'B' with molecular mass 28 u. The compound 'B' on addition of one mole of H_2 in presence of nickel changes to a saturated hydrocarbon 'C'.

i) Identify 'A', 'B' and 'C'

ii) Write the chemical equations for conversion of 'A' to 'B'.

iii) What happens when 'C' undergoes combustion?

iv) Name one industrial application of hydrogenation reaction.

v) Name the products formed when compound 'A' reacts with sodium.

Or

(i) Giving their structures, state the number of single bonds, double bonds and triple bonds (if any) in the following compounds:

(a) ethyne

(b) ethene

(c) benzene

(ii) Write the molecular formula and structure of cyclohexane. How many covalent bonds are there in a molecule of cyclohexane?

36. Explain what happens when:

a) Flower is not pollinated?

b) Pollen grain falls on the stigma of the flower.

c) Egg fuses with a sperm cell.

d) Planaria is cut into many pieces.

e) Buds are formed on the notches of the Bryophyllum leaf.

SECTION E

37. The heating effect of current is obtained by transformation of electrical energy in heat energy. Just as mechanical energy used to overcome friction is covered into heat, in the same way, electrical energy is converted into heat energy when an electric current flows through a resistance wire. The heat produced in a conductor, when a current flows through it is found to depend directly on (a) strength of current (b) resistance of the conductor (c) time for which the current flows.

The mathematical expression is given by $H = I^2 R t$.

The electrical fuse, electrical heater, electric iron, electric geyser etc. all are based on the heating effect of current.

(i) What are the properties of heating element?

(a) High resistance, high melting point

(b) Low resistance, high melting point

(c) Low resistance, low melting point

(d) High resistance, low melting point

(ii) What are the properties of electric fuse?

(a) Low resistance, low melting point

(b) high resistance, low melting point

- (c) High resistance, high melting point (d) Low resistance, high melting point
- (iii) When the current is doubled in a heating device and time is halved, the heat energy produced is
- (a) doubled (b) halved (c) four times (d) one fourth times

- (iv) A fuse wire melts at 5 A. It is desired that the fuse wire of same material melt at 10 A. The new radius of the wire is
- (a) 4 times (b) 2 times (c) 11 times (d) 8 times

Or

- (iv) When a current of 0.5 A passes through a conductor for 5 min and the resistance of conductor is 10 ohm, the amount of heat produced is
- (a) 250 J (b) 5000 J (c) 750 J (d) 1000 J

38. Chemically, plaster of paris (POP) is calcium sulphate hemihydrate, i.e., containing half molecule of water of crystallisation. It is represented by the formula, $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$. Half molecule of water of crystallisation means that one water molecule is shared by two formula units of CaSO_4 . Hence, we also represent its formula as $(\text{CaSO}_4)_2 \cdot \text{H}_2\text{O}$. The name, Plaster of paris, was given to those compound because for the first time, it was made from gypsum which was mainly found in Paris.

- (i) The difference of water molecules in gypsum and plaster of Paris is
- (a) $5/2$ (b) 2 (c) $1/2$ (d) $3/2$
- (ii) Plaster of Paris hardens by
- (a) giving off CO_2 (b) changing into CaCO_3 (c) combining with water (d) giving out water
- (iii) Which of the following statements is incorrect?
- (a) Plaster of Paris is used to ornate designs on walls and ceilings
- (b) On heating gypsum above 373 K, CaSO_4 is obtained
- (c) Dead burnt plaster is $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- (d) Setting of plaster is due to its hydration into gypsum
- (iv) Select the incorrect statement with respect to gypsum
- (a) It is slightly soluble in water (b) It is also known as alabaster
- (c) On heating gypsum at 373 K, it loses water molecules and becomes calcium sulphate hemihydrate (d) Chemical formula of gypsum is $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$

Or

- (iv) Plaster of Paris is obtained by
- (a) adding water to calcium sulphate
- (b) adding sulphuric acid to calcium hydroxide
- (c) heating gypsum to a very high temperature (d) heating gypsum to 100°C

39. A green stemmed rose plant denoted by GG and a brown stemmed rose plant denoted by gg are allowed to undergo a cross with each other. List your observations regarding-

- (i) Colour of the stem in their F_1 , progeny
- (ii) Percentage of brown stemmed plants in F_2 progeny if F_1 plants are self-pollinated
- (iii) Ratio of GG and Gg in the F_2 progeny
- (iv) Based on the findings of this cross, what conclusion can be drawn?