SPECTRA PRE-BOARD EXAMINATION

SPECTRA CLASSES

CLASS 10TH

SUBJECT-SCIENCE

TIME-3HR. MM:80

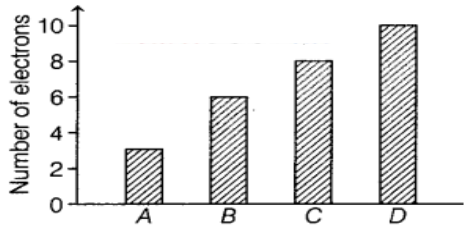
General Instruction:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. 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.
5. 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
6. 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.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section A

Select and write the most appropriate option out of the four options given for each of the questions 1-20.

Question 1. The graph given below depicts a number of electrons in an atom of different elements A, B, C, and D.



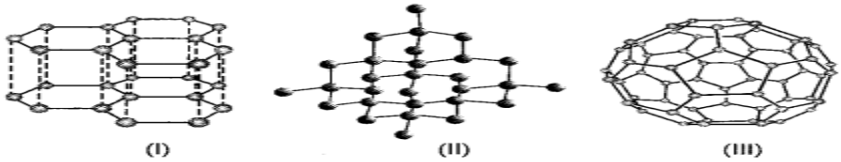
Which of the following element is a metal?

(a) A (b) B (c) C (d) D

Question 2. Which of the following will contain a covalent double bond between its atoms?

(a) H_2 (b) O_2 (c) NaCl (d) Cl_2

Question 3. Which three allotropes of carbon, do the given figures represent?



	I	II	III
(a)	Diamond	Graphite	Buckminster fullerene
(b)	Graphite	Buckminster fullerene	Diamond
(c)	Diamond	Buckminster fullerene	Graphite
(d)	Graphite	Diamond	Buckminster fullerene

Question 4. Which of the following is the correct representation of the electron dot structure of nitrogen?

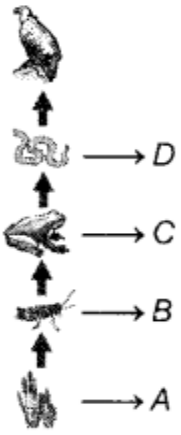
(a) :N⋮⋮N: (b) :N⋮⋮N: (c) :N⋮⋮N: (d) :N⋮⋮N:

Question 5. Alkalis are generally soluble in water, based on this which among the following hydroxides is not an alkali?
(a) Ammonium hydroxide (b) Calcium hydroxide
(c) Copper hydroxide (d) Sodium hydroxide

Question 6. _____ is the first member of the alkyne homologous series.
(a) ethene (b) propyne (c) ethyne (d) methane

Question 7. Ajay took calcium oxide in an iron container. He slowly added some water to it. What would he observe?
(a) The container becomes cold (b) The container becomes hot
(c) Green coloured solution is formed (d) White precipitate is formed

Question 8. In the following given food chain, organisms are labelled as A to D. Match the labelling referred to in Column I with their most suitable feature in Column II.



Column I		Column II
A	1.	Primary carnivore
B	2.	Secondary carnivore
C	3.	Autotrophs
D	4.	Primary consumer

Codes

	A	B	C	D
(a)	3	4	1	2
(b)	4	3	2	1
(c)	3	1	4	2
(d)	3	2	1	4

Question 9. Select the correct option.
(a) Liver – It stores bile
(b) Small intestine – Maximum absorption of water occurs
(c) Stomach – Digestion of proteins begins here
(d) Large intestine – Absorption of digested food takes place

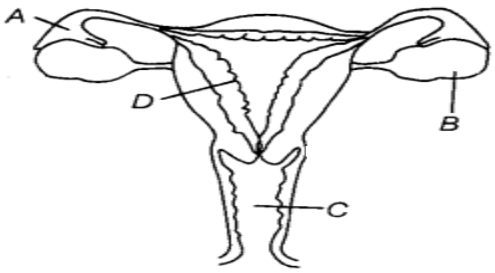
Question 10. The following results were obtained by a scientist who crossed the F1 generation of pure breeding parents for round and wrinkled seeds.

Dominants trait	Recessive trait	Number of F_2 offspring
Round seeds	Wrinkled seeds	7524

From these results, it can be concluded that the actual number of round seeds he obtained was
(a) 1881 (b) 22572 (c) 2508 (d) 5643

Question 11. Which phytohormone is responsible for the growth of the plant when light is shown from one side?
(a) Gibberellins (b) Ethylene (c) ABA (d) Auxin

Question 12. The figure given below shows a female reproductive system in humans with labels A to D.



Match the labelling referred to in Column I and correlate with the function in Column II.

Column I	Column II
A	1. Produce ovum
B	2. Site of fertilisation
C	3. Site of implantation
D	4. Blood and mucus comes out

Codes

	A	B	C	D
(a)	1	3	2	4
(b)	2	1	4	3
(c)	2	4	1	3
(d)	2	1	3	4

Question 13. An object is placed at a distance of 10 cm in front of a plane mirror, then the distance of the image from the mirror will be
(a) 5 cm (b) 10 cm (c) 20 cm (d) 0

Question 14. If a beam of red light and a beam of violet light are incident at the same angle on the inclined surface of a prism from an air medium and produce angles of refraction r and v respectively, which of the following is correct?
(a) r = v (b) r > v (c) r = 1v (d) r < v

Question 15. The arrangement of organisms into a series of groups based on physiological, biochemical, anatomical, and other relationships is
(a) hierarchy (b) categorization (c) taxonomy (d) classification

Question 16. The maleness of a child is determined by
(a) X-chromosome in the zygote
(b) Y-chromosome in the zygote
(c) the cytoplasm of germ cells which determines the sex
(d) sex is determined by chance

Direction (Q. Nos. 17-20) These consist of two Statement – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

Question 17.
Assertion (A): HCl produces hydronium ions (H_3O^+) and chloride ions (Cl^-) in aqueous solution.
Reason (R): In the presence of water, bases give H^+ ions.

Question 18.
Assertion (A): In human beings, the respiratory pigment is haemoglobin.
Reason (R): It is a type of protein that has a high affinity for CO_2.

Question 19.
Assertion (A): The uterus prepares itself every month to receive a fertilized egg.
Reason (R): The ovary releases one egg every month.

Question 20.
Assertion (A): The magnetic field produced by a current-carrying solenoid is independent of its length and cross-sectional area.
Reason (R): The magnetic field inside the solenoid has a variable value.

Section B

Questions No. 21 to 26 are Very Short Answer Questions.

Question 21. Give a test that can be used to differentiate between butter and cooking oil.

Question 22. Write a short note on male and female chromosomes.

OR

How is the sex of a child determined in human beings?

Question 23. Draw a diagram showing the correct positions of the pancreas, thyroid gland, pituitary gland, and adrenal gland in human beings.

Question 24. A student-focussed the image of a candle flame on a white screen by placing the flame at various distances from a convex lens. He noted his observation in the following table.

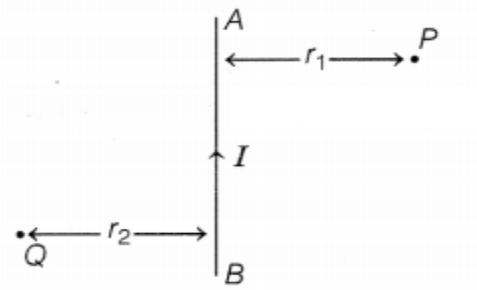
S.No.	Distance of the Screen from Lens (cm)	Distance of the Flame from Lens (cm)
I	20	60
II	24	40
III	30	30
IV	40	24
V	70	12

Analyze the above table and give the answers to the following questions.
(i) What is the focal length of a convex lens?
(ii) Which set of observations is incorrect and why?

Question 25. What is meant by electric current? Write its SI unit. Calculate the amount of charge that flows through a conductor when a current of 5A flows through it for 2 min.

OR

AB is a current-carrying conductor in the plane of the paper as shown in the figure. What are the directions of magnetic fields produced by it at points P and Q?



Given $r_1 > r_2$, when will the strength of the magnetic field be larger?

Question 26. How are water and minerals transported in plants?

Section C
Questions No. 27 to 33 are short answer questions.

Question 27.

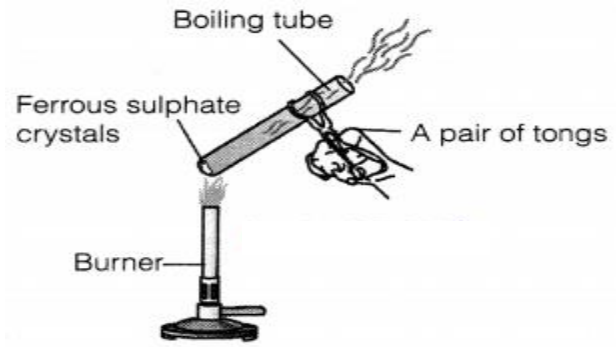
A, CH_2A, C_2H_4A

Define the given series. State any two characteristics of this series.

OR

Choose the kind of chemical bonding (ionic bond, covalent bond, both ionic and covalent bonds) present in the following compounds. Potassium chloride, magnesium oxide, sulphuric acid, ammonium hydroxide, zinc sulphide, and phosphorus trichloride (PCl_3).

Question 28.



(a) Identify the gases that evolved.
(b) Name the type of reaction shown in the figure.
(c) What is the formula of crystalline ferrous sulphate? Write the equation involved.

Question 29. How does the embryo get nourishment inside the mother's body?

Question 30. Observe the following cross between tall plants having round seeds and dwarf plants having wrinkled seeds. The individuals obtained in the F_1 generation were thereafter self-crossed.

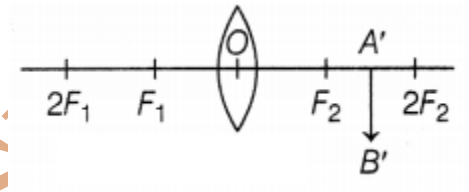
TTRR (Tall, Round) × ttrr (Dwarf, Wrinkled)
↓
TtRr

TtRr × TtRr (F_1-generation self-crossed)

(Tall, Round) (Tall, Round)

(i) What would be the phenotypes of the individuals obtained in the F_2 generation? Give their ratios.
(ii) Why do you think all the individuals of the F_1 generation were tall with round seeds?

Question 31.



The above figure shows an incomplete ray diagram of an object, where the image A' B' is formed after refraction. All the rays parallel to the principal axis pass through the principal focus of the lens. O is the optical center of the lens.

(a) Based on the text and the data given in the above paragraph, what is the position of the object AB in front of the lens?
(b) What will be the size of image A B' concerning the size of the object AB?
(c) What is the sign of linear magnification produced by the lens?

Question 32. An electric lamp of 100 Ω, a toaster of 50 Ω, and a water filter of resistance 500 Ω are connected in parallel to a 220 V source.
(a) What is the resistance of an electric iron connected to the same source that takes as much current as all three appliances?
(b) What is the current through it?

Question 33. Justify.
(a) Two circular coils A and B are placed close to each other. If the current in coil A is changed, will some current be induced in the coil B? Give a reason.
(b) When magnetic field lines are drawn around a current-carrying circular loop, it has been observed that they are close to its axis. But these lines keep on diverging as we move away from the center. Explain this observation.

Section D
Questions No. 34 to 36 are Long Answer Questions.

Question 34. Arshdeep took two iron salts. First iron salt A reacts with NaOH to form a green precipitate. Another iron salt B reacts with NaOH to form a brown precipitate. Identify the iron salts, A and B alongwith their colours, and write the reactions involved.

OR

(a) A student mixes sodium sulphate powder in barium chloride. What change would the student observe in mixing the two powders? Justify your answer and explain how he can obtain the desired change. (2)
(b) List two observations you would record in your 30 minutes after adding iron filings to copper sulphate solution.

Question 35. (a) Write the equations and steps involved in photosynthesis. In which way are the steps of photosynthesis different in desert plants?
(b) What is 'translocation'? Why is it essential for plants? Where in plants are the following synthesized?
(i) Sugar
(ii) Hormones

OR

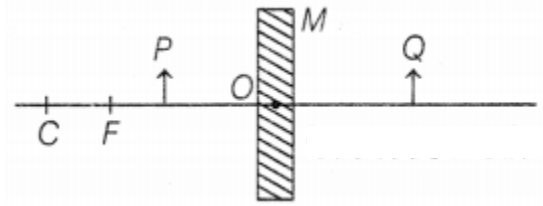
Give reasons:
(a) The placenta is essential for fetal development.
(b) Blocking of vas deferens prevents pregnancy.
(c) Wind acts as a pollinating agent.
(d) Use of condoms prevents pregnancy.

(e) Blocking of Fallopian tubes prevents pregnancy.

Question 36. (a) Define the following terms in the context of spherical mirrors.
(i) Pole
(ii) Centre of curvature
(iii) Principal axis
(iv) Principal focus

(b) Draw a ray diagram to show the principal focus of a
(i) concave mirror and
(ii) convex mirror

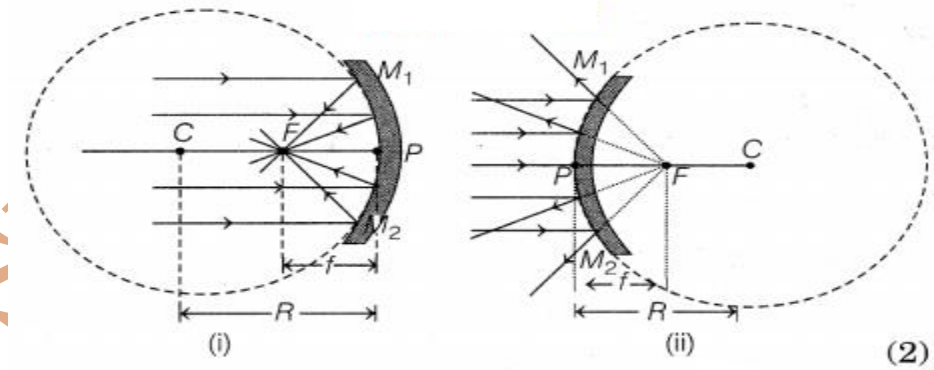
(c) Consider the following diagram in which M is a mirror and P is an object 1 and Q is its magnified image formed by the mirror.



State the type of the mirror M and one characteristic property of the image Q.

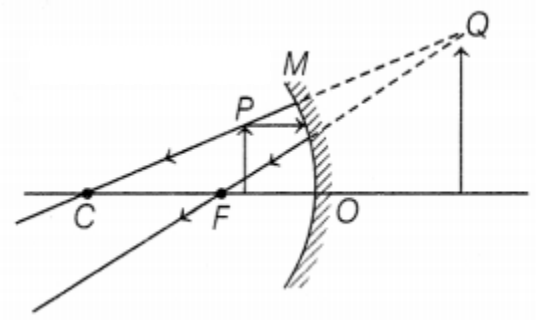
OR

A 6 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 25 cm. The distance of the object from the lens is 40 cm. By calculation determine
(a) the position and
(b) the size of the image formed.
(i) The pole of the spherical mirror is the mid-point of its reflecting surface.
(ii) Centre of Curvature of a spherical mirror is the center of the imaginary sphere of which, the mirror is a part,
(iii) Principal Axis of a spherical mirror is the line joining the pole and center of curvature.
(iv) The Principal Focus of a concave mirror is a point on the principal axis of the mirror at which the light rays coming parallel to the principal axis, after reflecting meet.
(c)



(2)

(d) The given diagram in the question can be redrawn as

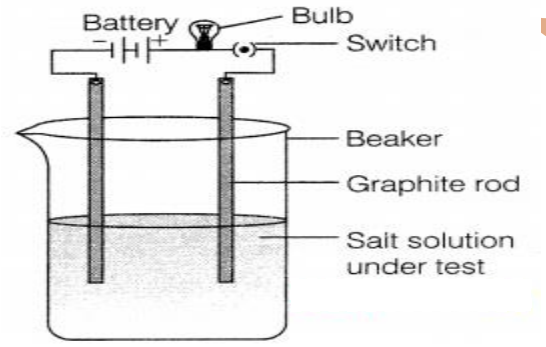


So, M is a concave mirror and the image Q formed is enlarged.

Section E

Questions No. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

Question 37. A student decided to observe the conductive nature of ionic compounds in, different physical states. He took two samples of compounds. In the first case, solid common salt was taken to make a circuit in which the bulb did not glow. Secondly, he dissolved the same salt in water and completed the circuit as given in the figure. In this case, the bulb glows.

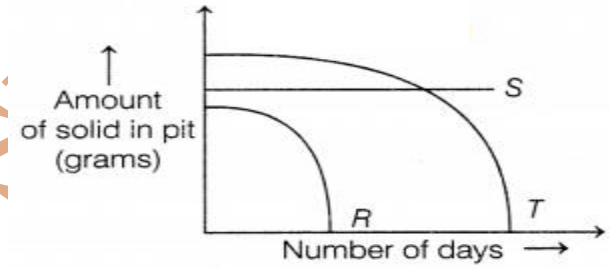


(a) What conclusion can you draw from this activity?
(b) Why does salt conduct electricity in an aqueous solution but not in the solid state?

OR

If we take the sugar solution in water and test the conductivity, will the bulb glow?

Question 38. Sheenu took three different types of solid wastes R, S, and T. She buried them under the soil in a pit, as she wanted to study their rate of decomposition. Her findings are shown in the given graph.

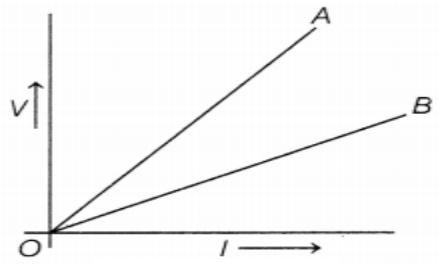


(a) Among R, S, and T, which of the following wastes will not decompose at all?
(b) What are the safe methods of disposal of the non-biodegradable waste?
(c) What type of solid waste comes under the category of R?

OR

What are the other artificial methods of waste disposal?

Question 39.



The V-I graphs for two wires A and B are shown in the figure above. This graph is based on Ohm's law. The slope of the V-I graph gives resistance to the conductor.
(a) If wires A and B are of the same materials having equal length, then which wire is thicker?
(b) If wires A and B are of the same materials and have the same diameter, then which wire is shorter?
(c) If both wires are of the same length and the same diameter, then which wire has maximum resistivity?

OR

If the temperature of wire A is more than the temperature of wire B, then which one has the least resistance?