

Series : MKL1N



SET ~ 2

रोल नं.

Roll No.

प्रश्न-पत्र कोड

Q.P. Code

31/1/2

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परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें।

Candidates must write the Q.P. Code on the title page of the answer-book.



विज्ञान SCIENCE

निर्धारित समय : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 80

Maximum Marks : 80

नोट/ NOTE

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(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 23 हैं।

Please check that this question paper contains 23 printed pages.

(II) कृपया जाँच कर लें कि इस प्रश्न-पत्र में 39 प्रश्न हैं।

Please check that this question paper contains 39 questions.

(III) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।

Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

(IV) कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथास्थान पर प्रश्न का क्रमांक अवश्य लिखें।

Please write down the Serial Number of the question in the answer-book at the given place before attempting it.

(V) इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।

15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.



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GENERAL INSTRUCTIONS :

Read the following instructions carefully and follow them:

- (i) *This question paper contains **39** questions. **All** questions are **compulsory**.*
- (ii) *Question paper is divided into **THREE** sections – **A, B** and **C**.*
 - Section A : Biology (30 Marks)**
 - Section B : Chemistry (25 Marks)**
 - Section C : Physics (25 Marks)**
- (iii) *The question paper has MCQs, VSAs, SAs, LAs and C/S-BQs. Marks are given against each question.*
- (iv) *There are **case based** questions (CBQs) with three sub-questions and are of **4** marks each.*
- (v) ***Divide your answer sheet into three sections as per question paper – Section A (Biology), Section B (Chemistry) and Section C (Physics). It is compulsory to answer each question in its respective section. Do not mix answers of one section into the other section.***
- (vi) *Instructions are given with each section and question, wherever necessary.*
- (vii) ***Kindly note that a separate question paper has been provided for visually impaired candidates.***
- (viii) *There is no overall choice in the question paper. However, an internal choice has been provided in few questions. **Only one** of the choices in such questions must be attempted.*

SECTION – A

- 1.** Choose the correct statements with reference to chromosomes : **1**
 - (i) carry hereditary information from parents to next generation.
 - (ii) are thread-like structures located inside the nucleus of an animal cell.
 - (iii) always exist in pairs in human gametes.
 - (iv) are involved in the process of cell division.

Options :

 - (A) (i) and (ii)
 - (B) (iii) and (iv)
 - (C) (i), (ii) and (iv)
 - (D) (ii), (iii) and (iv)
- 2.** Which structure in a leaf is mainly responsible for gaseous exchange ? **1**
 - (A) Xylem
 - (B) Stomata
 - (C) Phloem
 - (D) Cuticle



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3. A farmer wants to grow banana plants genetically similar to the plants already available in the fields. Which of the following method would you suggest for this purpose : 1
- (A) Regeneration
(B) Budding
(C) Vegetative propagation
(D) Sexual reproduction
4. Which of the following group is not 'biodegradable' ? 1
- (A) Vegetable peels, dead leaves, paper
(B) Cow dung, leather bag, water
(C) Polythene bag, rubber band, ball pen
(D) Paper, fruits, bones
5. Human brain has various parts or regions that help in different actions, responses and coordination. From the following, identify the part responsible for precision of voluntary actions : 1
- (A) Cerebrum (B) Cerebellum
(C) Medulla (D) Pons
6. Identify the correct statement for *spirogyra*, *leishmania* and *hydra* : 1
- (A) they reproduce sexually.
(B) they are unicellular.
(C) they are multicellular.
(D) they reproduce asexually.
7. Pancreas secretes pancreatic juice which contain certain enzyme that helps in digestion of food.
Choose the correct option from the following : 1
- (A) Trypsin digests emulsified fats and lipase digests proteins.
(B) Trypsin digests proteins and lipase digests emulsified fats.
(C) Trypsin and lipase both digests fats.
(D) Trypsin digests proteins and lipase digests carbohydrates.

Directions : Question numbers 8 and 9 are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given :



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- (A) Both, Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (B) Both, Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.

8. Assertion (A) : In human beings, the respiratory pigment is haemoglobin present in red blood cells.

Reason (R) : Haemoglobin has a very high affinity for carbon dioxide. **1**

9. Assertion (A) : Plants have hormones that do not control directional growth.

Reason (R) : Absciscic acid inhibits growth. **1**

10. (a) State two differences between the act of chewing food and salivation on sight of food. **2**

OR

(b) State two differences between pollination and fertilization. **2**

11. A squirrel in a scary situation requires its body to prepare for either 'fight or flight' to save itself. State the immediate changes that will take place in its body so that it can face the situation. **2**

12. Give differences between the following : **2**

(a) Sensory nerve and motor nerve

(b) Consumers and decomposers

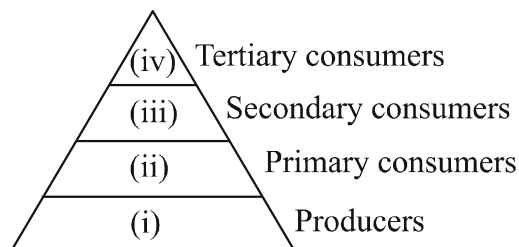
13. (a) A couple are parents to 4 daughters in a sequence, and do not have any son. Does this indicate that the husband does not produce Y-chromosome bearing sperms ? Explain. **3**

(b) What are the chances of this couple bearing yet another daughter ? Show with the help of a cross.



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14. Given below is a pyramid showing various trophic levels in an ecosystem : 3



- (a) From the organisms listed below, identify which one is to be placed at which trophic level ?
Deer, Grass, Lion, Snake, Rabbit
- (b) Discuss the reason why primary consumers will have more energy as compared to secondary consumers ?
- (c) Why is the base of the pyramid broad ?
15. Mendel took garden pea plants with different characteristics, such as height to study the inheritance pattern of factors (genes). He crossed tall pea plant with short pea plant and obtained all the tall plants in the F_1 generation.

Answer the following questions :

- (a) Why only tall pea plants were observed in F_1 progeny ? 1
- (b) By which method did Mendel obtain F_2 progeny ? 1
- (c) (i) Write one difference between dominant and recessive trait. 2

OR

- (c) (ii) Write two observations made by Mendel about F_1 progeny. 2
16. (a) Given below are certain situations. Analyse and describe what would happen when : 5
- (i) Spores are liberated from blob-like structures of the bread mould?
- (ii) Leaves of bryophyllum fall on wet soil ?
- (iii) A pollen from different species land on the stigma of totally unrelated species ?
- (iv) Copper-T is placed in the uterus of a human female ?
- (v) *Spirogyra* breaks into smaller fragments upon maturation ?

OR



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(b) Given below are certain situations. Analyse each and describe its possible impact :

5

- (i) A population of bacteria living in temperate waters whose temperature increased by global warming.
- (ii) The sperm encounters the egg when it reaches the oviduct in human females.
- (iii) Self pollination does not occur in a flower that contains only pistil.
- (iv) Egg does not get fertilised in a human female.
- (v) When the seed is placed under appropriate condition of water and air in the soil ?

SECTION – B

17. When an element 'X' reacts with water, it starts floating. Identify the element 'X' :

1

- (A) Potassium (B) Calcium
- (C) Sodium (D) Iron

18. The natural sources of oxalic acid, lactic acid and methanoic acid respectively are :

1

- (A) tomato, curd, ant-sting
- (B) tomato, orange, nettle-sting
- (C) orange, milk, ant-sting
- (D) orange, sour milk, nettle-sting

19. Which of the following is a poor conductor of electricity ?

1

- (A) Pb (B) Cu
- (C) Ag (D) Al

20. Which of the following functional group is for carboxylic acid ?

1

- (A) $-\text{OH}$
- (B) $\begin{array}{c} -\text{C}-\text{OH} \\ || \\ \text{O} \end{array}$
- (C) $\begin{array}{c} -\text{C}- \\ || \\ \text{O} \end{array}$
- (D) $\begin{array}{c} -\text{C}-\text{H} \\ || \\ \text{O} \end{array}$



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21. The gases evolved on heating lead (II) nitrate crystals are : 1
(A) NO and O₂ (B) N₂ and NO₂
(C) NO₂ and H₂ (D) NO₂ and O₂

22. Which one of the following can be used as an acid-base indicator by a visually impaired (blind) student ? 1
(A) Turmeric (B) Vanilla essence
(C) Methyl orange (D) Litmus

23. (i) $\text{AgNO}_3 + \text{NaCl} \longrightarrow \text{NaNO}_3 + \text{AgCl}$
(ii) $\text{K}_2\text{SO}_4 + \text{BaCl}_2 \longrightarrow \text{BaSO}_4 + 2\text{KCl}$
Which of the following options clearly describes both the reactions ? 1
(A) (i) is double displacement, (ii) is displacement reaction.
(B) Both, (i) and (ii) are displacement reactions and precipitation reactions.
(C) Both, (i) and (ii) are double displacement reactions and precipitation reactions.
(D) (i) is displacement, (ii) is double displacement reaction.

Directions : For question number 24, two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to this question from the codes (A), (B), (C) and (D) as given below :

- (A) Both, Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(B) Both, Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

24. **Assertion (A) :** Carbon shares its valence electrons with other atoms of carbon or with atoms of other elements.

Reason (R) : The shared electrons belong to the outermost shells of both the atoms and lead to both atoms attaining the noble gas configuration. 1

25. How is tooth decay related to pH ? How can it be prevented ? 2

26. (a) Explain chlor-alkali process with chemical equation. Name the products formed at anode and cathode. 3

OR



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(b) Write the preparation of following compounds with balanced chemical equation :

3

- (i) Baking soda
- (ii) Bleaching powder
- (iii) Plaster of Paris

27. Translate the following statements into chemical equation and then balance them :

3

- (a) Water is added to quicklime
- (b) Burning of natural gas
- (c) Thermal decomposition of ferrous sulphate

28. Read the following passage and answer the questions given below :

Most of metals occur in combined state in form of ores. Carbonate ores are converted into oxides by calcination and sulphide ores by roasting. Oxides are reduced with suitable reducing agent like carbon to get free metal. Highly reactive metals like – Al, Mg are also used as reducing agents to obtain metal from their oxides. Most reactive metals are obtained by electrolytic reduction of their molten ores. Alloying is a very good method of improving the properties of a metal. We can get desired properties by this method. The electrical conductivity and melting point of an alloy is less than that of pure metals.

- (a) Why carbonate or sulphide ores are converted to oxides before extraction of metal from it ?
- (b) Write a reaction in which Aluminium is used as a reducing agent to obtain metal from its oxide.
- (c) (i) How is copper obtained from its ore (Cu_2S) ? Give equations of the reactions.

1

1

2

OR

- (c) (ii) (I) Why highly reactive metals cannot be obtained from their oxides by using carbon as a reducing agent ?
- (II) Why solder, an alloy of lead and tin, is used for welding electrical wires together ?

1

1



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29. (a) (i) Give reasons for the following : 3

- (I) Covalent compounds are poor conductor of electricity.
- (II) Soap does not form lather in hard water.
- (III) Carbon shows catenation but silicon does not.

(ii) Write chemical equations for the following : 2

- (I) Oxidation of ethanol by acidified $K_2Cr_2O_7$.
- (II) Hydrogenation of ethene.

OR

(b) Mohan heated ethanol with a compound 'X' in the presence of a few drops of conc. H_2SO_4 and observed a sweet smelling compound 'Y' is formed. When 'Y' is treated with sodium hydroxide it gives back ethanol and a compound 'Z'.

5

- (i) Identify 'X', 'Y' and 'Z'.
- (ii) Write the role of conc. H_2SO_4 in the reaction.
- (iii) Write the chemical equations involved and name the reactions.

SECTION – C

30. When you look at an object very close to your eyes, the : 1

- (A) Ciliary muscles of your eye contract and the eye lens becomes thick.
- (B) Ciliary muscles of your eye get relaxed and the eye lens becomes thick.
- (C) Ciliary muscles of your eye contract and the eye lens becomes thin.
- (D) Ciliary muscles of your eye get relaxed and the eye lens becomes thin.

31. A convex lens of focal length 15 cm, is forming a real image. If the size of image is same as the size of object, then position of object and position of image will be, respectively : 1

- (A) – 15 cm and – 15 cm from lens
- (B) – 15 cm and + 15 cm from lens
- (C) – 30 cm and + 30 cm from lens
- (D) – 30 cm and – 30 cm from lens



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Directions : For question number 32, two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to this question from the codes (A), (B), (C) and (D) as given below :

- (A) Both, Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (B) Both, Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.

32. Assertion (A) : When rays of white light pass through a prism, on emerging they give spectrum of seven colours.

Reason (R) : It is due to the scattering of light that red light bends minimum and violet light bends the maximum.

1

33. (a) The resistance of a wire of 0.01 cm radius and 1.0 cm length is $7\ \Omega$. Calculate its resistivity.

2

OR

(b) An electric heater is rated 220 V; 11 A. Calculate the power consumed if the heater is operated at 200 V.

2

34. A mirror always forms a virtual, erect and diminished image. Identify the mirror and draw a labelled ray diagram for image formation by this mirror.

2

35. (a) Describe an activity to show that a current carrying conductor, placed in an external magnetic field experiences a force.

3

(b) Imagine that you are sitting in a chamber with your back to one wall. An electron beam, moving horizontally towards the front wall from the back wall, is deflected by a strong magnetic field to your right side. Find the direction of the magnetic field.

36. (a) The pattern of magnetic field due to a current carrying wire depends upon the shape made by that wire. Justify.

3



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- (b) A current carrying straight wire AB is shown in the given diagram. Out of X, Y and Z on which point will the strength of magnetic field be maximum and why ?

37. (a) What is Tyndall effect ? 3
(b) What happens when sunlight is scattered from the particles of very large size ?
(c) 'Danger' signals are always red in colour. Why ?

38. Read the following passage and answer the questions given below :

Lenses can form different types of images depending upon their focal length and position of object. A convex lens can create real, inverted or virtual, erect images, while a concave lens forms only virtual and diminished images. The focal length determines the power of lens. Convex lenses have positive focal length while concave lenses have negative focal length by convention. When lenses are placed together, their combined power is determined by the sum of their individual powers. Ray diagrams help to visualize how light converges or diverges through lens to form an image.

- (a) A convex lens of focal length 20 cm is used to form an image. If an object is placed at 40 cm from the lens, what will be the position and nature of image ? 1
(b) Illustrate the formation of image with the help of ray diagram, when the object is placed between the optical centre and principal focus of concave lens. 1
(c) (i) A lens combination consists of a convex lens of focal length 30 cm and a concave lens of focal length 15 cm placed together. Find the equivalent focal length and power of this lens combination. 2

OR



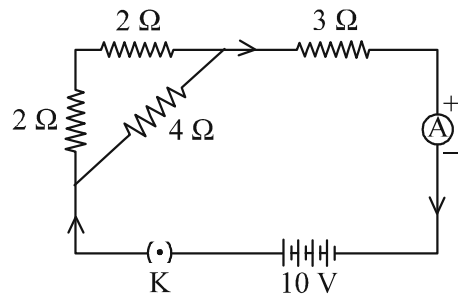
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- (c) (ii) Two lenses are placed in contact. One is a concave lens with focal length 2 m and the other is a convex lens with focal length 1.5 m. What type of lens will the combination behave as (convex or concave) ? Give reason.

2

39. (a) (i) Consider the following electric circuit :

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Calculate the values of the following :

- (I) Total resistance of the circuit.
- (II) The total electric current drawn from the source.
- (III) Potential difference across 3 Ω resistor.

- (ii) Two bulbs, rated as 100 W ; 220 V and 60 W ; 220 V are connected in parallel to an electric main supply of 220 V. Calculate the electric current drawn from the mains.

OR

- (b) (i) State Ohm's law and draw V-I graph for a conductor which follows Ohm's law. Show that the slope of V-I graph gives resistance of conductor.
- (ii) Derive an expression for the equivalent resistance of a series combination of three resistors having resistances R_1 , R_2 and R_3 .

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