

Series : KL5NM



SET ~ 1



रोल नं.

Roll No.

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प्रश्न-पत्र कोड
Q.P. Code

31/5/1



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 31 हैं।

Please check that this question paper contains 31 printed pages.

(II) 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.

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

Please check that this question paper contains 39 questions.

(IV) कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथा स्थान 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 परीक्षार्थी 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 candidates will read the question paper only and will not write any answer on the answer-book during this period.



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 CBQs. Marks are given against each question.*
- (iv) *There are Cases 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.*



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SECTION – A**Biology**

1. Identify the part that controls the closing and opening of the stomatal pore in leaves of plants. 1

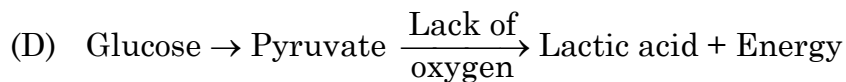
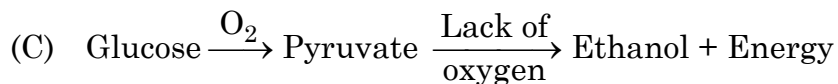
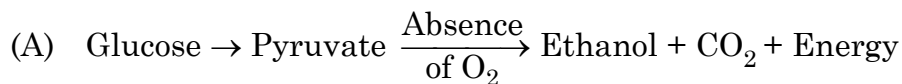
Select the correct option.

- (A) Stomata (B) Epidermal cells
(C) Guard cells (D) Chloroplasts

2. Identify the endocrine gland that regulates the growth of human body. 1

- (A) Pituitary gland (B) Thyroid gland
(C) Pancreas (D) Adrenal gland

3. Choose the equation of reaction that correctly represents anaerobic respiration in muscles : 1



4. In human beings, the implantation of fertilised egg takes place in which part of female reproductive system ? 1

- (A) Oviduct (B) Cervix
(C) Uterus (D) Vagina



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5. When a human egg is fertilized by a sperm having 'Y' chromosome, the zygote has the following combination of chromosomes : 1
- (A) 44 + XX (B) 22 + XX
(C) 44 + XY (D) 22 + XY
6. Which of the following is a non-biodegradable pollutant ? 1
- (A) Paper (B) DDT
(C) Wood (D) Vegetable peel
7. In an ecosystem, the decomposers perform an important role. Select the option indicating the role of decomposers. 1
- (A) Convert inorganic materials to simpler forms
(B) Break down complex organic substances to simple inorganic substances.
(C) Break down inorganic substances into organic substances.
(D) Do not act on organic compounds.

Question No. 8 & 9 consists of **two** statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option from (A), (B), (C) and (D) 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.



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8. **Assertion (A)** : Bacteria that can withstand heat have better chances of survival in a heat wave. 1

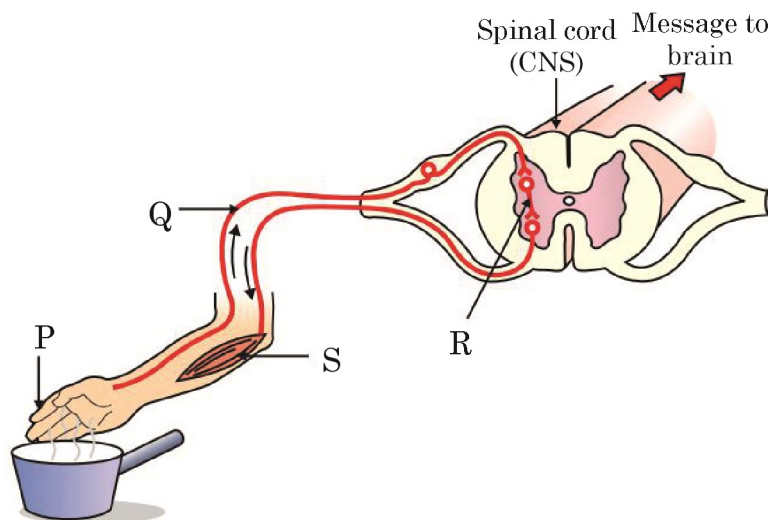
Reason (R) : Accumulation of variations in a species increases the chances of its survival in changing environment.

9. **Assertion (A)** : The peristaltic movements occur all along the gut. 1

Reason (R) : The lining of the gut has muscles that contract rhythmically to push the food in regulated manner.

10. Give a diagrammatic representation of nutrition in Amoeba. 2

11. (A) Observe the given figure and identify the labelled parts P, Q, R and S : 2



OR



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- (B) Which of the plant hormones are responsible for the following processes ?
- (i) Promote cell division
 - (ii) Inhibition of growth
 - (iii) Detection of light
 - (iv) Wilting of leaves
12. Briefly mention the steps in double-circulation through human heart. 2
13. Based on Mendel's experiment show the cross between round, yellow seeds of pea plant (RRYY) with wrinkled and green seeds of pea plant (rryy) upto F_2 generation. Write the number of seeds/plants with following genetic (Genotype) makeup in F_2 generation : 3
- (i) RRYY
 - (ii) rryy
14. (a) Mention any one harmful effect of using plastic bags on the environment. Suggest better alternatives to the usage of plastic bags. 3
- (b) Paddy fields require a large amount of water. The pesticides and chemical fertilizers used are washed down into the soil or waterbodies. How do these chemicals reach our bodies ? What is this phenomenon known as ?
15. Kidneys help to regulate the volume of fluid and various metabolites waste products in the body. 4
- Normally, kidney filter about 180 L of fluid daily but the volume actually excreted out is only a litre or two a day.



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Patients with kidney failures can be saved by dialysis and kidney transplant.

- (a) Write the structure and function of Bowman's capsule. 1
- (b) Although kidneys filter a large amount (about 180 L daily) of fluids, still the excretion from the body is only about a litre or two. Why ? 1
- (c) What is excretion ? Why is it necessary for any living organism ? 2

OR

- (c) State two similarities between lungs and kidneys. 2

16. (A) (i) In an angiospermic flower, fertilization is said to take place when male gametes carried in the pollen tube fuse with the female gamete, present in the embryo sac. This results in lot of changes in different parts of the flower. State the changes taking place in the following structures of flower post fertilization : 5

- (a) Zygote
- (b) Ovule
- (c) Ovary
- (d) Sepals

- (ii) Define germination.

OR

- (B) (i) Sugarcane does not produce seeds so name the process through which it will be able to reproduce.
- (ii) List any two advantages of this method.
- (iii) Besides sugarcane, give two more examples of plants that reproduce by this method.
- (iv) Why regeneration is not possible in all the types of animals ?



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खण्ड – ख

रसायन शास्त्र

17. जल के वैद्युत-अपघटन के दौरान मुक्त हाइड्रोजन तथा ऑक्सीजन गैसों का आयतन अनुपात है : 1
- (A) 1 : 2
- (B) 2 : 1
- (C) 1 : 3
- (D) 4 : 1
18. निम्न में से कौन सा यौगिकों का समुच्चय एक ही समजातीय श्रेणी का सदस्य नहीं है ? 1
- (A) CH_4 तथा C_4H_{10}
- (B) C_2H_6 तथा C_3H_8
- (C) C_3H_8 तथा C_5H_{12}
- (D) C_4H_8 तथा C_5H_{12}
19. निम्न में से कौन उभयधर्मी ऑक्साइड है ? 1
- (A) Na_2O
- (B) K_2O
- (C) CO_2
- (D) Al_2O_3



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SECTION – B**Chemistry**

17. The volume ratio of hydrogen and oxygen gases liberated during electrolysis of water is : 1
- (A) 1 : 2
- (B) 2 : 1
- (C) 1 : 3
- (D) 4 : 1
18. Which of the following set of compounds does not belong to same homologous series ? 1
- (A) CH_4 and C_4H_{10}
- (B) C_2H_6 and C_3H_8
- (C) C_3H_8 and C_5H_{12}
- (D) C_4H_8 and C_5H_{12}
19. Which of the following is an amphoteric oxide ? 1
- (A) Na_2O
- (B) K_2O
- (C) CO_2
- (D) Al_2O_3



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20. Study the following table and select the correct option :

1

	Salt	Acid used	Base used	Nature of Salt
(A)	NaCl	HCl	NaOH	Basic
(B)	Na_2CO_3	H_2CO_3	NaOH	Neutral
(C)	Na_2SO_4	H_2SO_4	NaOH	Acidic
(D)	CH_3COONa	CH_3COOH	NaOH	Basic

21. Which of the following will not undergo addition reaction ?

1

- (A) C_4H_8 (B) C_2H_2
(C) C_3H_8 (D) C_2H_4

22. Four solutions, namely fructose, ethanol, hydrochloric acid and sodium hydroxide filled in four separate beakers are connected one by one in an electric circuit with a bulb. The solutions in which the bulb will glow when current is passed are :

1

- (A) ethanol and hydrochloric acid
(B) fructose and ethanol
(C) fructose and sodium hydroxide
(D) hydrochloric acid and sodium hydroxide

23. Which gas is evolved when magnesium metal reacts with very dilute HNO_3 ?

1

- (A) Oxygen (B) Nitrogen
(C) Hydrogen (D) Nitrogen Dioxide



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24. In the question **two** statements are given – one labelled as Assertion (A) and other labelled as Reason (R). Answer this question selecting the appropriate option from (A), (B), (C) and (D) given below :

1

Assertion (A) : Reaction of quick lime with water is an exothermic reaction.

Reason (R) : A large amount of heat is evolved on the reaction of quick lime and water.

- (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.
25. Define the following terms :
- (i) Olfactory indicator
- (ii) Water of crystallization

1+1

26. What happens when

- (i) lead (II) nitrate is heated ?
- (ii) iron (II) sulphate is heated ?
- (iii) silver chloride is exposed to sunlight ?

Write balanced chemical equations of the reactions involved in support of your answer.

3×1



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27. (A) (a) Give the chemical name and formula of Plaster of Paris.

3

(b) Write the chemical equation of its preparation.

(c) Give any two uses of it.

OR

(B) (a) Name the acid present in ant's sting.

(b) Give reason :

(i) While diluting an acid, it is recommended that the acid should be added to water.

(ii) Baking soda is used as an antacid.

28. Alcohol forms a homologous series with general formula $C_nH_{2n+1}-OH$ and $-OH$ group as functional group. Ethanol is commonly called alcohol and is used in alcoholic drinks. It is good solvent, used in medicines, cough syrups, tonics etc.

1+1+2

(a) Write structural formula and name of 4th member of alcohol homologous series.

(b) What happens when ethanol is heated with alkaline $KMnO_4$? Write chemical equation involved.

(c) Write the chemical equation of reaction of ethanol with ethanoic acid in the presence of concentrated H_2SO_4 . Write the name of this reaction.

OR

(c) What happens when ethanol is heated with excess concentrated sulphuric acid at 443 K ? Write chemical equation involved. What is the role of concentrated sulphuric acid in this reaction ?



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29. Attempt **either** option (A) or (B) :

(A) (i) Give reasons for the following :

(I) Ionic compound have generally high melting points and boiling points.

(II) Solder, an alloy of lead and tin, is used for welding electrical wires.

(III) Carbon cannot reduce the oxides of Na or Mg.

(ii) The reaction of compound 'X' with aluminium is used to join railway tracks :

(I) Identify the compound 'X'.

(II) Name the reaction.

(III) Write the balanced chemical equation of the reaction of compound 'X' with aluminium.

3+2

OR

(B) (i) Write the balanced chemical equations when :

(I) A mixture of Cu_2O and Cu_2S is heated.

(II) ZnS is heated in the presence of oxygen.

(ii) Give reasons for the following :

(I) The wires carrying current in homes have a coating of PVC.

(II) To make hot water tanks, copper is used and not steel.

(iii) Show the formation of ionic compound CaO with electron dot structure.

[Atomic number : $\text{Ca} = 20$, $\text{O} = 8$]

2+2+1



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SECTION – C**Physics**

30. Rays from the sun converge at a point 25 cm behind a convex lens. The distance at which an object be placed in front of the lens to get a virtual image, is :

1

- (A) 20 cm (B) 40 cm
(C) 50 cm (D) More than 50 cm

31. To restore clear vision in persons whose size of the eye ball has reduced, he/she is suggested to use suitable

1

- (A) Converging lens (B) Diverging lens
(C) Bifocal lens (D) Cylindrical lens

For question number **32**, **two** statements are given – one labelled as Assertion (A) and the other 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)** : The needle of a magnetic compass kept in strong external magnetic field, always aligns itself in north-south direction on the earth.

1

Reason (R) : Behaviour of the needle of a compass is same as that of a freely suspended bar magnet.

33. (a) Relate the speed of light in the given medium with its optical density.

2

- (b) Using the information given in the table below, arrange the medium A, B and C in the ascending order of their optical density.

Medium	Speed of light (m/s)
A	2.25×10^8
B	2×10^8
C	2.08×10^8



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34. (A) (i) How does the change in curvature of the eye lens helps us in the process of seeing the nearby objects clearly ?
- (ii) State the range of the power of accommodation of a normal human eye.

2

OR

- (B) Draw a ray diagram to show the correction of eye defect of an old man who can not see an object placed closer than 1 m from his eye, clearly.
35. (a) Draw the ray diagram for refraction of light through a glass prism and mark angle of refraction and angle of deviation.
- (b) When the path of a light ray refracted through a glass prism is reversed how will the angle of deviation change ? Explain.
36. (a) A ray of light after reflection from a concave mirror becomes parallel to its principal axis. Draw a labelled ray diagram to show this.
- (b) (i) Differentiate between the virtual images formed by a convex mirror and concave mirror.
- (ii) "The value of magnification ' m ' for a mirror is -2 ." Calculate the height of object if the height of image is 20 cm.
37. (a) Why does an electric bulb become dim when an electric heater in parallel circuit is switched ON ?
- (b) How to connect three resistors each of resistance $8\ \Omega$, so that the equivalent resistance of the combination is $12\ \Omega$? Draw diagram of the combination and justify your answer.

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38. Three students Shweta, Ayesha and Samridhi were performing an experiment to understand the factors on which the resistance of a conductor depends. Each one of them completed electric circuit with the help of a cell, an ammeter, a plug key and wire. 4

Shweta put nichrome wire of length ' l ' in the circuit and after plugging the key, noted current in the ammeter.

Ayesha put nichrome wire of same thickness but twice the length i.e. ' $2l$ ' in the circuit and after plugging the key, noted current in the ammeter.

Samridhi took copper wire of length ' l ' and same thickness in the circuit and after plugging the key, noted current in the ammeter.

- (a) If the ammeter reading is X ampere with nichrome wire of length ' l ', then what will be the ammeter reading if the length of nichrome wire is doubled with same area of cross-section ?
- (b) What happens to the ammeter reading if the area of cross-section of nichrome wire is doubled, keeping the length of wire ' l ' the same ?
- (c) Define 'resistivity'. Write its SI unit. Compare the resistivity of an alloy with its constituents metals.

OR

- (c) Give reason :
 - (i) Tungsten is used almost exclusively for making the filament of electric lamps.
 - (ii) Conductors of bread-toasters are made of an alloy rather than a pure metal.



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39. (A) (i) Draw a diagram showing the magnetic field lines around a bar magnet. Write any two characteristics of magnetic field lines. **5**

(ii) Write the statement of Right hand thumb rule.

(iii) The concentric circles representing the magnetic field around a current carrying straight wire become larger and larger as we move away from the wire. How does magnetic field change on these concentric circles ?

OR

(B) (i) Draw a diagram, showing the magnetic field lines in and around the current carrying solenoid. Write any two salient features of these lines.

(ii) What is an electromagnet and how is it made ?



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