Grade 9 Final Exam Model Paper 3

MODEL PAPER

Full marks 75 · 3 hours

Name _____ Class _____ Roll no. ____ Date _____ Marks _____ / 75

All questions are compulsory. Time: 3 hours.

A practice paper by Science Playground, made to CDC's Specification Grid 2078, Grade 9 Science and Technology; not an official CDC or exam board paper. Mark it yourself online: the QR code below opens the paper with its answers.

Section A

10 × 1 = 10

1. Choose the correct option for each of the following questions.

a. Why is a mushroom placed in kingdom Fungi and not in kingdom Plantae?

(i) It grows from the ground and has a stem.
(ii) It has no chlorophyll, its cell wall is made of chitin, and it absorbs food from dead matter.
(iii) It has only one cell, with no nucleus.
(iv) It makes its food by photosynthesis in the dark.

b. The platypus of Australia lays eggs, like a reptile, but it has hair and feeds its young on milk, like a mammal. What does it show?

(i) that mammals evolved into reptiles
(ii) that it is a connecting link between reptiles and mammals
(iii) that its organs are vestigial
(iv) that acquired characters are inherited

c. Why does the blood of a person whose pancreas makes too little insulin have too much sugar in it?

(i) Insulin lets the body's cells take in sugar from the blood and stores the extra in the liver, so without it the sugar stays in the blood.
(ii) Insulin turns stored food in the liver into sugar.
(iii) Insulin makes the kidneys remove salt from the blood.
(iv) Insulin makes the heart beat faster.

d. A car of mass 1,200 kg speeds up with an acceleration of 2 m/s². What is the net force on it?

(i) 600 N (ii) 1,202 N (iii) 2,400 N (iv) 4,800 N

e. Why is the efficiency of a real machine always less than 100%?

(i) because its mechanical advantage is always more than its velocity ratio
(ii) because some of the input work is used up against friction and in moving its parts
(iii) because a machine makes energy of its own
(iv) because the load is always heavier than the effort

f. Which instrument measures the potential difference across a bulb, and how is it connected?

(i) an ammeter, in series with the bulb (ii) an ammeter, in parallel with the bulb
(iii) a voltmeter, in series with the bulb (iv) a voltmeter, in parallel with the bulb

g. In which year was NepaliSat-1, Nepal's first satellite, launched?

(i) 1957 (ii) 2015 (iii) 2019 (iv) 2023

h. An atom of element X has 7 protons. Which of these is true?

(i) X loses 5 electrons to form the ion X^{5+}.
(ii) Two X atoms share one pair of electrons to form X_2.
(iii) Two X atoms share three pairs of electrons, forming X_2 with a triple bond.
(iv) Two X atoms join by an electrovalent bond.

i. A goldsmith in Patan beats a small piece of gold into a sheet thin enough to see light through. Which property of metals does this show?

(i) malleability (ii) ductility (iii) sonority (iv) luster

j. A statement and two arguments are given below.

Statement: Carbon forms millions of compounds, more than any other element.

Argument 1: Carbon atoms can join one another in long chains, branches and rings.

Argument 2: Carbon has a valency of 2, so it can form two bonds at a time.

(i) The statement and argument 1 are correct, but argument 2 is incorrect.
(ii) The statement and argument 2 are correct, but argument 1 is incorrect.
(iii) The statement is correct, but both arguments are incorrect.
(iv) The statement and both arguments are correct.

Section B

9 × 1 = 9

2. Write very short answers to the following questions.

a. Why must a hypothesis be tested by an experiment before it is reported as a result?

b. What is elasticity?

c. A tuning fork vibrates 425 times a second. If sound travels at 340 m/s in air, what is the wavelength of its sound?

d. A thick copper wire has less resistance than a thin copper wire of the same length. Why?

e. After checking her email at a cyber café, Shristi always signs out of her account. Why is this important?

f. Arjun finds the date of the Grade 9 final exam on two websites: cdc.gov.np and a site called bestnotes-nepal.com, and the dates are different. Which should he trust first? Why?

g. Write the names of the chemicals used to prepare nitrogen gas in the laboratory.

h. A thermometer breaks in the school laboratory. A student wants to wash the drops of mercury down the drain. Why should this never be done?

i. Why do farmers spread agricultural lime on acidic soil?

Section C

14 × 2 = 28

Write short answers to the following questions.

3. A hydropower plant produces 456 MW, and a virus is about 100 nm across. Write the power in watts and the size in meters, both in scientific notation. **[2]**

4. Write any two characteristics of kingdom Protista. **[2]**

5. Yubaraj has come back from working abroad. He has no farmland, but he can rent a room in his village and get paddy straw cheaply. Is growing oyster mushrooms a good choice for him? Give two reasons. **[2]**

6. What did Lamarck mean by the use and disuse of organs? Why was the idea that such changes are inherited rejected? **[2]**

7. A nursery in Kathmandu wants thousands of identical orchid plants quickly from a few small pieces of one plant. Name the method it can use, and the two plant hormones added to the jelly. Which of the two should be increased to make the plantlets grow roots? **[2]**

8. Write the equation of motion that relates initial velocity, final velocity, acceleration and time, and write what each symbol stands for. **[2]**

9. The table shows the velocities of two buses, A and B, as they start from a bus park. **[2]**

Time (s)	0	2	4	6
Velocity of A (m/s)	0	4	8	12
Velocity of B (m/s)	0	6	9	10

Rizwan says, "Bus B has the greater acceleration." Analyze the table and say whether he is right.

10. The parking sensor of a car sends out ultrasound and hears its echo from a wall 0.01 s later. If sound travels at 340 m/s, how far is the wall? **[2]**

11. How is a star born? Explain. **[2]**

12. Why does a radio station put the sound on a high-frequency carrier wave instead of broadcasting the audio signal itself? **[2]**

13. Before flying abroad to study, Bibek wants to post a photo of his passport, his air ticket and the date of his flight on his public social media account. Write two reasons why he should not. **[2]**

14. The atomic number of sulfur is 16. Write its electronic configuration and its valency, and the molecular formula of the compound it forms with hydrogen. **[2]**

15. The balanced equation for burning hydrogen is $2H_2 + O_2 \rightarrow 2H_2O$. Rojina says, "4 g of hydrogen gives 36 g of water, so 32 g of mass has been created in the reaction." Do you agree? Explain. (H = 1, O = 16) **[2]**

16. In the laboratory, hydrogen is collected over water, by downward displacement of water. Hydrogen is lighter than air, so it could also be collected in an upside-down jar by displacing air. Why is collecting it over water better? Give two reasons. **[2]**

Section D

7 × 4 = 28

Write long answers to the following questions.

17. Write one function each of the cerebrum, the cerebellum, the medulla oblongata and the spinal cord. **[4]**

18. Read the given passage and answer the questions that follow. **[4]**

> In a pond near Rajkumar's village in Bardiya, tiny phytoplankton make food from sunlight. Zooplankton eat the phytoplankton, small fish eat the zooplankton, and kingfishers eat the small fish. Villagers have started washing clothes in the pond with detergent.

i. Name the producer and the tertiary consumer in this food chain. (1)

ii. If the phytoplankton store 10,000 kJ of energy, how much of it reaches the kingfishers? Show how. (1)

iii. The detergent kills many of the phytoplankton. What will happen to the kingfishers? Give a reason. (1)

iv. Bacteria and fungi in the mud at the bottom of the pond are also important. Why? (1)

19. Read the given passage and answer the questions that follow. **[4]**

> Lakpa lists the sources of energy used in his district: electricity from a hydropower plant, firewood, diesel for the buses, a wind turbine on a ridge, and the hot spring at Tatopani, where people bathe. He says, "The Sun is the source of all of them."

i. Show how the energy of hydroelectricity comes from the Sun. (1)

ii. Diesel is said to be "stored sunlight". Why? (1)

iii. Is Lakpa right about every source on his list? Give a reason. (1)

iv. Name the reaction that produces the Sun's energy, and write one condition it needs. (1)

20. i. Arrange these in order of increasing frequency: X-rays, radio waves, visible light, microwaves. (1) **[4]**

ii. Ultraviolet rays are used to purify drinking water. Why? (1)

iii. Explain how ultrasonography makes a picture of a baby inside its mother. Why is it preferred to X-rays for this? (2)

21. In a school experiment, Sabina measured the current through a resistor at different potential differences: **[4]**

Potential difference V (V)	1.5	3.0	4.5	6.0
Current I (A)	0.3	0.6	0.9	1.2

i. Calculate the resistance of the resistor. (1)

ii. Which law does the table show? State it. (1)

iii. What current will flow when the potential difference is 9 V? (1)

iv. Calculate the power used by the resistor at 6 V. (1)

22. i. What are cations and anions? Explain with one example of each. (2) **[4]**

ii. What is variable valency? Explain with the example of iron. (2)

23. Read the given passage and answer the questions that follow. **[4]**

> Durga farms on a hill slope in Palpa. Her soil test report says the soil is acidic and low in organic matter. Every year, rain washes soil from her sloping fields, and after the harvest her neighbors burn the crop stubble on their fields.

i. What should she add to her acidic soil? (1)

ii. How can she stop the rain from washing away the soil of her sloping fields? (1)

iii. Suggest one way to add organic matter to her soil, and how it helps. (1)

iv. Should she burn the stubble like her neighbors? Give a reason. (1)