Grade 9 Optional Science Model Paper 1

MODEL PAPER

Full marks 75 · 2.25 hours

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

All questions are compulsory. Time: 2.25 hours.

A practice paper by Science Playground, made to CDC's Specification Grid 2076, Science (Optional); not an official CDC or exam board paper. Mark it yourself online: the QR code below opens the paper with its answers.

A full practice run of the Optional Science paper: 75 marks in 2 hours 15 minutes, 39 questions, every one compulsory, in four sections. Section A asks for very short answers (1 mark each), Section B short answers (2 marks), Section C answers of 3 marks and Section D long answers (4 marks). Write your answers on paper as in the exam hall, then open each answer and give yourself the marks its scheme allows.

Section A

16 × 1 = 16

1. Write very short answers to the following questions.

a. Which cell organelle is called the "suicide bag" of the cell?

b. What is a bacteriophage?

c. How many autosomes are there in a body cell of a human being?

d. Define ecosystem.

e. What is a vaccine?

f. Who discovered the neutron?

g. State Boyle's law.

h. What is an electrolyte?

i. What is catenation?

j. What is an alloy?

k. Write the SI unit of the moment of a force.

l. What is a radioisotope?

m. Define critical angle.

n. State Coulomb's law.

o. What is the SI unit of capacitance?

p. What is the epicenter of an earthquake?

Section B

13 × 2 = 26

Write short answers to the following questions.

2. Write any two differences between a prokaryotic cell and a eukaryotic cell. **[2]**

3. *Mucor* growing on bread forms sporangiospores while food lasts, and zygospores when food runs short. Write any two differences between a sporangiospore and a zygospore. **[2]**

4. In a paddy field the food chain is rice → grasshopper → frog → snake. People catch most of the frogs for food. What will happen to the number of grasshoppers and to the rice crop? Explain. **[2]**

5. Write any two differences between active immunity and passive immunity. **[2]**

6. Isotopes of an element have the same chemical properties, though their masses differ. Give reason. **[2]**

7. A dented table tennis ball regains its round shape when it is put into hot water. Explain with the help of a gas law. **[2]**

8. Solid sodium chloride does not conduct electricity, but its solution in water does. Why? **[2]**

9. Write any two characteristics of a homologous series. **[2]**

10. Door handles are fixed at the edge of the door, far from the hinges. Why? **[2]**

11. Alpha particles have the greatest ionizing power but the least penetrating power among the three radiations. Why? **[2]**

12. A swimming pool looks shallower than it really is. Why? **[2]**

13. Write any two differences between electric lines of force and magnetic lines of force. **[2]**

14. Write any two differences between the magnitude and the intensity of an earthquake. **[2]**

Section C

7 × 3 = 21

Answer the following questions.

15. In a laboratory at Dharan, 50 *E. coli* bacteria are put into a fresh nutrient broth at 37 °C, where they divide every 20 minutes. Assuming they keep doubling, how many bacteria will there be after 2 hours? **[3]**

16. Kopila puts 40.0 g of dried sal leaves in a mesh bag on the forest floor in Chitwan in June. When she dries and weighs them again in December, 18.0 g remain. **[3]**

i. What percentage of the leaves' mass was lost? (2)

ii. Would the same bag lose more or less mass in the same months at a cold, dry place such as Jumla? Give a reason. (1)

17. A sample of a gas has a volume of 500 cm³ at 27 °C and 750 mmHg. What will its volume be at STP? **[3]**

18. Roshni puts a wet red hibiscus petal and a dry one into two jars of dry chlorine gas. Only the wet petal loses its color. Explain this with chemical equations. **[3]**

19. A hunting rifle of mass 5 kg fires a bullet of mass 20 g at 300 m/s. Calculate the velocity with which the rifle recoils. **[3]**

20. A ray of light passes from air into a glass block of refractive index 1.5 at an angle of incidence of 45°. Find the angle of refraction and the speed of light in the glass. (Speed of light in air = 3×10^8 m/s, sin 45° = 0.707) **[3]**

21. A seismograph at Pokhara records the S waves of an earthquake 25 seconds after its P waves. If P waves travel at 6 km/s and S waves at 3.5 km/s, how far is the focus from Pokhara? **[3]**

Section D

3 × 4 = 12

Write long answers to the following questions.

22. The cells of the pancreas make digestive enzymes, which are proteins, and send them out of the cell into the gut. **[4]**

i. Name, in order, the parts of the cell through which such a protein passes, from where it is made to where it leaves the cell. (2)

ii. These cells have many mitochondria. Why? (1)

iii. What would happen to such a cell if its lysosomes burst? (1)

23. Mingma wants to coat an iron key with copper by electrolysis. **[4]**

i. What should he use as the cathode, the anode and the electrolyte? (1)

ii. Write the reactions at the cathode and at the anode. (1)

iii. The blue color of the solution does not fade during the plating. Why? (1)

iv. His first coat came out rough and powdery and rubbed off. What should he change, and why? (1)

24. Tsering places a bar magnet on a sheet of paper with its N pole pointing to geographic north and plots its lines of force with a small compass. **[4]**

i. Where will he find the neutral points? (1)

ii. Why does the compass needle not point in any particular direction at a neutral point? (1)

iii. Why is there no neutral point just beyond the N pole of the magnet in this arrangement? (1)

iv. He turns the magnet round so that its N pole points south. Where will the neutral points be now? (1)