Meghalaya Board of School Education

QUESTION PAPERS

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SCIENCE AND TECHNOLOGY

(FOR CANDIDATES WITH PRACTICAL MARKS)

Full Marks : 80
Pass Marks : 24

(FOR CANDIDATES WITHOUT PRACTICAL MARKS)

Full Marks : 100
Pass Marks : 30

Time : 3 hours

(FOR ALL CATEGORIES OF CANDIDATES)

General Instructions :

(i) This question paper comprises of three Sections A, B and C.

(ii) The Candidates are advised to attempt all questions of Sections A, B and C respectively.

(iii) Allocated marks are indicated against each.

(iv) Question Nos. **1** to **35** are to be answered by all Candidates.

(v) Question No. **36** is to be answered by **Candidates without Practical Marks**.

(vi) Questions meant for Visually Impaired Candidates should be answered by them only.

SECTION—A

(PHYSICS)

(*Marks* : 26)

Choose and write the correct answer from the following : 1×4=4

1. When you stand in front of a mirror, your image is always erect, of the same size and laterally inverted. The mirror may be

(A) plane

(B) convex

(C) concave

(D) concavo-convex

2. The retina consists of

(A) 20000 nerve endings

(B) 200000 nerve endings

(C) 70000 nerve endings

(D) 30000 nerve endings

3. An instrument is connected in series in an electric circuit and has a low resistance. Name the instrument.

(A) Voltmeter

(B) Ammeter

(C) Electric meter

(D) Dioptremeter

4. An electric device which converts electric energy into mechanical energy is called

(A) ammeter

(B) electric generator

(C) electric motor

(D) transformer

Answer the following short answer-type questions : 2×4=8

5. State the laws of reflection of light. 1+1=2

6. Why is red-coloured light used as a universal signal for danger? Explain. 2

7. *(a)* What is induced current? 1

(b) Name the physicist who discovered the phenomenon of electromagnetic induction. 1

8. *(a)* Define the term resistivity of a material. 1

(b) Four resistors of 1 Ω, 2 Ω, 3 Ω and 4 Ω are connected in series. Calculate the resistance of the circuit. 1

Answer the following short answer-type questions : 3×3=9

Answer *either* **PART—A** *or* **PART—B** from each question

PART—A

9. *(a)* State three differences between real and virtual image. 3

PART—B

(b) *(i)* State the relationship between the focal length and the radius of curvature of a convex mirror. 1

(ii) What happens to the magnification when the image is (1) virtual and (2) real? ½+½=1

(c) When light undergoes refraction, what happens to its frequency? 1

PART—A

10. *(a)* Why is tungsten metal selected for making filaments of incandescent bulbs? 3

PART—B

(b) Name two devices which work on the heating effect of electric current. ½+½=1

(c) An electric bulb of resistance 400 Ω draws a current of 0·5 A. Calculate the power consumed by the bulb and potential difference at its ends. 2

PART—A

11. *(a)* How can the intensity of the magnetic field of a solenoid be increased? (Any *three* points) 1+1+1=3

PART—B

(b) If a single coil of large number of turns is used in a motor, it is found that the motion of the coil is not smooth but jerky. Why is it so? How can this jerky motion be converted into a smooth circular motion? 1+2=3

Answer the following long answer-type question : 5

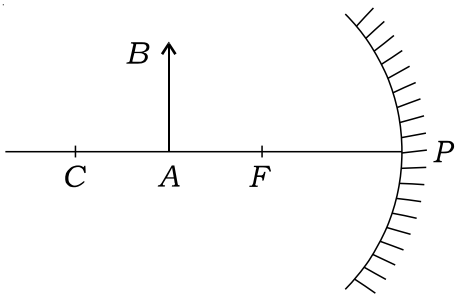
Answer *either* **PART—A** *or* **PART—B** *or* **PART—C**

PART—A

12. *(a)* What is a rainbow? How is a rainbow formed? 1+1=2

(b) What happens to the ray of light when it travels only from rarer to denser medium? 1

(c) Draw the following diagram in your answer-book and show the formation of image of the object *AB* with the help of suitable rays : ½×4=2



[For Visually Impaired Candidates only in lieu of Question No. 12*(c)*]

(c) *(i)* What do you understand by the term accommodation of eye? 1

(ii) What kind of lens is used in the spectacles of a person suffering from myopia? 1

PART—B

(d) How many electrons constitute one unit of electric charge? 1

(e) Name the factors which determine the electric resistance of a conductor. ½×4=2

(f) What is an electromagnet? Give any two uses of electromagnet. 1+½+½=2

PART—C

(g) How can a continuous flow of current be obtained? What are the sources of energy? Name the devices required for continuous flow of current. 1+1+1=3

(h) Name the factors affecting angle of deviation in a prism. ½×4=2

SECTION—B

(CHEMISTRY)

(*Marks* : 26)

Choose and write the correct answer from the following : 1×3=3

13. What is the ratio of hydrogen to oxygen in water?

(A) 2 : 1

(B) 1 : 2

(C) 1 : 3

(D) 3 : 1

14. Plaster of Paris on mixing with water forms fine crystals of

(A) gypsum

(B) anhydrous calcium sulphate

(C) calcium hydrogen sulphate

(D) anhydrous sodium carbonate

15. Which one of the following does not increase while moving down the group of the periodic table?

(A) Atomic radius

(B) Metallic character

(C) Valency

(D) Number of shells in an element

Answer the following short answer-type questions : 2×3=6

16. Balance the following chemical reactions :

(a) $ZnCO_3 + HNO_3 \rightarrow Zn(NO_3)_2 + H_2O + CO_2$ 1

(b) $Cu + H_2SO_4 \rightarrow CuSO_4 + H_2O + SO_2$ 1

17. *(a)* State the modern periodic law. 1

(b) Name two metalloids. ½+½=1

18. Give the general name of the class of compounds having the general formula C_nH_{2n-2}. Write the name of the first member of this homologous series. 1+1=2

Answer the following short answer-type questions : 3×4=12

Answer *either* **PART—A** *or* **PART—B** from each question

PART—A

19. *(a)* What happens chemically, when quicklime is added to water? Give the chemical equation. 1+1=2

(b) Complete the equation : 1

$$Ca(OH)_2 + CO_2 \rightarrow ?$$

PART—B

(c) *(i)* What is a neutralization reaction? Give one example in the form of an equation. 1+1=2

(ii) State two ways to prevent the rusting of iron. 1

PART—A

20. *(a)* *(i)* Why does tooth decay start, when the pH of mouth is lower than 5·5? 2

(ii) An aqueous solution has a pH value of 7·0. Is this solution acidic, basic or neutral? ½

(iii) Write the name of the acid present in apples. ½

PART—B

(b) *(i)* What are basic salts? 1

(ii) What is the chemical name and formula of washing soda crystals? What happens when washing soda crystals are exposed to air? 1+1=2

PART—A

21. *(a)* *(i)* Give any two names of strategic metals. ½+½=1

(ii) Define metallurgy. 1

(iii) What is anodizing? 1

PART—B

(b) Draw the geometric diagram for the formation of NaCl from sodium and chlorine by transfer of electrons. 3

[For Visually Impaired Candidates only in lieu of Question No. 21*(b)*]

(b) Write any three properties of ionic compounds. 3

PART—A

22. *(a)* *(i)* Write the structural formulas of ethanol and propanoic acid. ½+½=1

(ii) Write the IUPAC names of the following : ½×4=2

1. CH_3OH
2. CH_3COOH
3. HCHO
4. CH_3COCH_3

PART—B

(b) How do acetic acid and ethyl alcohol react when warmed together in the presence of a small quantity of concentrated sulphuric acid? Write the chemical equation for the reaction taking place. Also write the role of concentrated sulphuric acid in the above reaction. 1+1+1=3

Answer the following long answer-type question : 5

Answer *either* **PART—A** *or* **PART—B** *or* **PART—C**

PART—A

23. *(a)* *(i)* What is observed when a solution of potassium iodide is added to a solution of lead nitrate in a test tube? 1

(ii) What type of reaction is this? 1

(iii) Write a balanced chemical equation to represent the above reaction. 1

(b) What are the constituents of bronze? Write its one use. 1½+½=2

PART—B

(c) An element *P* belongs to group 2 and an another element *Q* belongs to group 17 of the long form of the periodic table.

Answer the following questions : ½+½+½+½+1=3

(i) How many valence electrons are there in *P*?

(ii) What is the valency of *P*?

(iii) How many valence electrons are there in *Q*?

(iv) What is the valency of *Q*?

(v) Write the chemical formula of the compound of *P* and *Q*.

(d) *(i)* Why does nitric acid not produce hydrogen when treated with metals? 1

(ii) Why should water be never added dropwise to concentrated sulphuric acid? 1

PART—C

(e) *(i)* What is concentration of ore? 1

(ii) Describe, with a labelled diagram, the method of concentration of a sulphide ore. 2½+1½=4

[For Visually Impaired Candidates only in lieu of Question No. 23*(e)(ii)*]

(ii) 1. What is allotropy? Name two allotropes of carbon. 1+1=2

2. Give two uses of ethanol. 1+1=2

SECTION—C

(BIOLOGY)

(*Marks* : 28)

Choose and write the correct answer from the following : 1×3=3

24. If salivary amylase is lacking in the saliva, which of the following processes in the mouth cavity will be affected?

(A) Proteins breaking down into amino acids

(B) Starch breaking down into sugars

(C) Fats breaking down into fatty acids and glycerol

(D) Absorption of vitamins

25. The movement of shoot towards light is

(A) geotropism

(B) hydrotropism

(C) chemotropism

(D) phototropism

26. Which of the following acts as blueprint of life?

(A) DNA

(B) RNA

(C) Nucleus

(D) Chromosome

Answer the following short answer-type questions : 2×4=8

27. *(a)* What are autotrophs? 1

(b) Name any two autotrophic plants which also show heterotrophic mode of nutrition. 1

28. Define chemotropism with an example. 2

29. Give two differences between arteries and veins. 2

30. Define the following : 1+1=2

(a) Genetics

(b) Evolution

Answer the following short answer-type questions : 3×4=12

Answer *either* **PART—A** *or* **PART—B** from each question

PART—A

31. *(a)* List any three differences between pollination and fertilization. 3

PART—B

(b) State any two points of differences between inherited and acquired traits, and give one example for each type. 2+1=3

PART—A

32. *(a)* *(i)* What are villi? Where are they present? What is their function? ½+½+1=2

(ii) What is excretion? 1

PART—B

(b) Explain Mendel's law of independent assortment. 3

PART—A

33. *(a)* Draw a diagram showing germination of pollen on stigma of a flower and label the following on it : 1+½+½+½+½=3

Pollen grain, Male germ cells, Pollen tube and Female germ cell

[For Visually Impaired Candidates only in lieu of Question No. 33*(a)*]

(a) Name the three types of blood cells present in plasma. Write the function of each. ½×6=3

PART—B

(b) *(i)* We suddenly withdraw our hand when a pin pricks. Name the type of response involved in this action and define it. 1+1=2

(ii) Which structure in a neuron helps to conduct a nerve impulse—

1. towards the cell body;

2. away from the cell body? ½+½=1

PART—A

34. *(a)* State the role of the following in the human respiratory system : 1+1=2

(i) Diaphragm

(ii) Alveoli

(b) Name the conducting tissues of plants. ½+½=1

PART—B

(c) *(i)* What are plant hormones? 1

(ii) Name the four plant hormones. ½×4=2

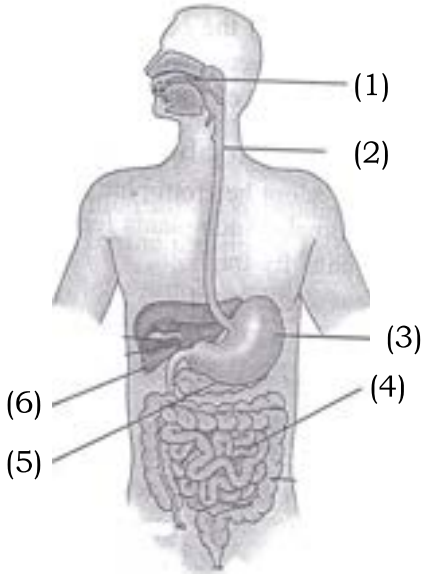
Answer the following long answer-type question : 5

Answer *either* **PART—A** *or* **PART—B** *or* **PART—C**

PART—A

35. *(a)* Enumerate any two functions of blood. 1+1=2

(b) In the given diagram, name the parts (1), (2), (3), (4), (5) and (6) : ½×6=3



[For Visually Impaired Candidates only in lieu of Question No. 35*(b)*]

(b) Given below are six organisms. Mention their modes of nutrition : ½×6=3

Frog, Tapeworm, Amoeba, Man, Mango tree, Decomposing bacteria

PART—B

(c) *(i)* What are the six main points of Darwin's theory of natural selection? ½×6=3

(ii) Write the full forms of IUCD and STDs. 1+1=2

PART—C

(d) Which animal or plant hormone is associated with each of the following? ½×4=2

(i) Increased sugar level in blood

(ii) Changes at puberty in boys

(iii) Inhibits growth of plants

(iv) Rapid development of fruits

(e) *(i)* Which are the two main types of reproduction in living organisms? 1

(ii) Classify the following under these two types : ½×4=2

Plasmodium, Flowering plants, Earthworm, Yeast

[For Candidates without Practical Marks]

36. I. Answer any *three* of the following questions : 2×3=6

(a) Write any two functions of vitreous humour. 1+1=2

(b) What is a solenoid? 2

(c) Define non-luminous bodies. Give two examples of non-luminous bodies. 1+1=2

(d) Define resistance. Give its SI unit. 1+1=2

(e) What is hypermetropia? How can it be corrected by the use of lens? 1+1=2

(f) State Fleming's left-hand rule. 2

II. Answer any *three* of the following questions : 2×3=6

(a) What is chemical decomposition reaction? Give one example. 1+1=2

(b) *(i)* What is saponification? 1

(ii) Give the general formula for soap. 1

(c) What are hydrocarbons? Give an example. 1+1=2

(d) State the differences between rusting and rust. 1+1=2

(e) Give two uses of bleaching powder. 1+1=2

(f) The atomic numbers of sodium and potassium are 11 and 19 respectively. Write the electronic configuration of each of them. 1+1=2

III. Answer any *four* of the following questions : 2×4=8

(a) Give two differences between respiration in plants and respiration in animals. 1+1=2

(b) Define the following : 1+1=2

(i) Variation

(ii) Offspring

(c) *(i)* What is neuron? 1

(ii) Name the covering in brain and the fluid present in between. ½+½=1

(d) Write any two functions of auxin. 1+1=2

(e) Define multiple fission with an example. 2

(f) Name the four whorls of a flower. ½×4=2

(g) Name four basic requirements of photosynthesis other than sunlight. ½×4=2

(h) Define the term analogous organs. Give an example. 1+1=2

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