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Your JEE Guide

CBSE Class X · Science (086)

Sample Question Paper 2 · Session 2026-27

Time allowed: 3 hours **Maximum marks: 80**

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This is an original practice paper written to the official CBSE 2026-27 design; it is not issued by CBSE.

General instructions:

1. This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of the alternatives in such questions.

Section A — Biology

1.	The correct path of air into the lungs is: (A) nostrils → larynx → pharynx → bronchi → trachea → alveoli (B) nostrils → trachea → pharynx → larynx → bronchi → alveoli (C) nostrils → pharynx → larynx → trachea → bronchi → alveoli (D) nostrils → pharynx → trachea → larynx → alveoli → bronchi	1
2.	Organisms that break down food outside the body and then absorb it show: (A) saprotrophic nutrition (B) parasitic nutrition (C) autotrophic nutrition (D) holozoic nutrition	1
3.	The hormone that regulates the blood sugar level is: (A) thyroxine (B) growth hormone (C) adrenaline (D) insulin	1
4.	The main thinking part of the human brain is the: (A) medulla (B) forebrain (C) hindbrain (D) midbrain	1
5.	Planaria can grow into new individuals from cut body pieces. This is called: (A) regeneration (B) budding (C) spore formation (D) binary fission	1
6.	After fertilisation, the part of a flower that develops into the fruit is the: (A) ovule (B) ovary (C) stamen (D) petal	1
7.	Which of the following is non-biodegradable? (A) paper (B) cotton cloth (C) plastic bag (D) vegetable peel	1

8.	**Assertion (A):** The ozone layer in the upper atmosphere protects life on Earth. **Reason (R):** Ozone absorbs harmful ultraviolet radiation from the Sun. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. (B) Both A and R are true but R is not the correct explanation of A. (C) A is true but R is false. (D) A is false but R is true.	1
9.	**Assertion (A):** Variations are useful for the survival of a species over time. **Reason (R):** All variations that arise in a species are inherited by the next generation. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. (B) Both A and R are true but R is not the correct explanation of A. (C) A is true but R is false. (D) A is false but R is true.	1
10.	State the role of (i) saliva and (ii) hydrochloric acid in the digestion of food.	2
11.	Describe binary fission in Amoeba with the help of labelled diagrams. **OR** What is vegetative propagation? Give two advantages of it.	2
12.	Why is the flow of energy in an ecosystem said to be unidirectional?	2
13.	Describe how urine is formed in a nephron.	3
14.	What is phototropism? Explain how auxin makes a shoot bend towards light. **OR** Give three differences between nervous and hormonal coordination in animals.	3
15.	**Case study.** Mendel crossed pea plants with round, green seeds (RRyy) with plants having wrinkled, yellow seeds (rrYY). Round (R) is dominant over wrinkled (r), and yellow (Y) is dominant over green (y). The F1 plants were self-pollinated to give the F2 generation. (i) What did the seeds of the F1 plants look like? *[1]* (ii) Write the genotype of the F1 plants. *[1]* (iii) Write the phenotypes in the F2 generation and their ratio. *[2]* **OR** (iii) What does the appearance of round green and wrinkled yellow seeds in F2 show? *[2]*	4

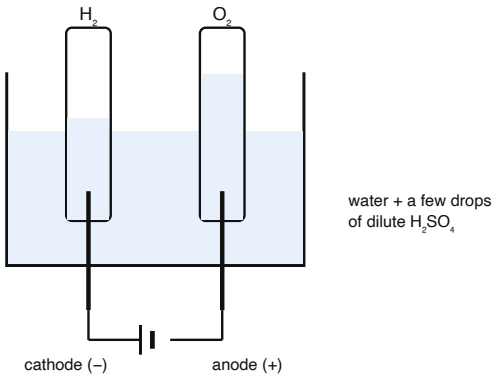
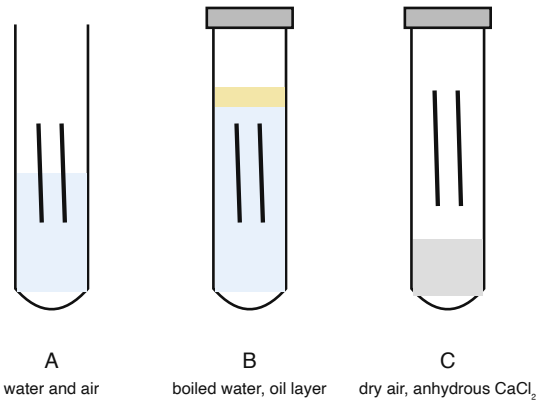
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16.	(a) Name the parts of the human female reproductive system where (i) fertilisation and (ii) implantation take place. (b) What is the placenta? State its function. (c) What happens to the egg and the uterine lining when the egg is not fertilised? (d) Name one method of contraception. **OR** (a) Write the overall equation of photosynthesis. (b) List the three events that take place during photosynthesis. (c) From where does a land plant get the raw materials for photosynthesis?	5

Section B — Chemistry

17.	When copper powder is heated in air, its surface becomes coated with a black substance. The black substance is: (A) copper sulphate (B) copper carbonate (C) copper chloride (D) copper(II) oxide	1
18.	Which of the following is a double displacement reaction? (A) $2H_2O \rightarrow 2H_2 + O_2$ (B) $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$ (C) $C + O_2 \rightarrow CO_2$ (D) $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$	1
19.	The pH of gastric juice in the human stomach is about: (A) 12 (B) 7 (C) 1 to 2 (D) 8 to 9	1
20.	The chemical formula of washing soda is: (A) NaOH (B) Na_2CO_3 (C) $NaHCO_3$ (D) $Na_2CO_3 \cdot 10H_2O$	1
21.	Which of these metals does not react with dilute hydrochloric acid? (A) copper (B) magnesium (C) iron (D) zinc	1
22.	Which of the following molecules contains a triple bond? (A) N_2 (B) CH_4 (C) O_2 (D) CO_2	1
23.	The next higher homologue of methanol, CH_3OH, is: (A) C_2H_6 (B) CH_3COOH (C) CH_3CHO (D) C_2H_5OH	1

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24.	**Assertion (A):** Aluminium is more reactive than iron, yet aluminium objects corrode much less. **Reason (R):** Aluminium is covered by a thin, tough layer of aluminium oxide that protects it. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. (B) Both A and R are true but R is not the correct explanation of A. (C) A is true but R is false. (D) A is false but R is true.	1
25.	In the electrolysis of water shown below, (i) name the gases collected at the cathode and at the anode, and (ii) explain why the volume of one gas is twice that of the other. 	2
26.	Give reasons: (i) HCl and HNO_3 show acidic character in water, but glucose and alcohol do not. (ii) Dry HCl gas does not change the colour of dry blue litmus paper. (iii) While diluting an acid, the acid is added to water and not water to the acid.	3
27.	The set-up below is used to study the conditions needed for rusting. (i) In which test tube do the nails rust? (ii) Why is boiled water used in tube B, and why is calcium chloride used in tube C? (iii) What does the activity show?  **OR** Give reasons: (i) gold and platinum are used for jewellery, (ii) sodium and potassium are stored under oil, (iii) aluminium is used for cooking vessels.	3

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28.	**Case study.** Soaps are sodium or potassium salts of long-chain carboxylic acids. A soap molecule has an ionic end that dissolves in water and a long carbon chain that dissolves in oil. In water, soap molecules form clusters called micelles. With hard water, soap forms an insoluble scum. (i) Why does soap not work well in hard water? *[1]* (ii) What is a micelle? *[1]* (iii) Explain how soap removes oily dirt from clothes. *[2]* **OR** (iii) Why are detergents better than soaps for washing in hard water? *[2]*	4
29.	(a) Why does carbon form compounds mainly by covalent bonding? (b) Explain catenation and tetravalency. (c) Draw the structures of the two isomers of butane, C_4H_{10}. **OR** (a) Identify the substance oxidised and the substance reduced: (i) $ZnO + C \rightarrow Zn + CO$; (ii) $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$. (b) What is rancidity? Give two ways to prevent it. (c) Why is respiration an exothermic reaction?	5

Section C — Physics

30.	The focal length of a plane mirror is: (A) 25 cm (B) infinite (C) zero (D) 1 m	1
31.	A wire has resistance R. Another wire of the same material and thickness but twice as long has resistance: (A) R (B) R/2 (C) 2R (D) 4R	1
32.	**Assertion (A):** Stars twinkle when seen from the Earth. **Reason (R):** Starlight is refracted by layers of the atmosphere whose refractive index keeps changing. (A) Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. (B) Both A and R are true but R is not the correct explanation of A. (C) A is true but R is false. (D) A is false but R is true.	1
33.	Draw a labelled diagram to show the refraction of a ray of light through a triangular glass prism. Mark the angle of deviation. **OR** What is dispersion of white light? Why does a prism split white light into colours?	2
34.	Find the heat produced when a current of 2 A flows through a 50 Ω resistor for 1 minute.	2

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35.	What is myopia? Give two possible causes, and show with diagrams how it is corrected.	3
36.	An object 5 cm high is placed 20 cm in front of a concave mirror of focal length 15 cm. Find the position, nature and size of the image.	3
37.	You are given three resistors of 2 Ω, 3 Ω and 6 Ω. (i) What are the largest and the smallest resistances you can obtain using all three? (ii) How would you connect them to get 4 Ω? **OR** A 100 W and a 60 W lamp, both rated at 220 V, are connected in parallel to a 220 V supply. Find the current through each lamp, the total current, and the resistance of the 100 W lamp.	3
38.	**Case study.** The refractive index of a medium tells us how much light slows down in it. The refractive index of glass is 1.5 and that of water is 1.33. The speed of light in air is 3×10^8 m/s. (i) Find the speed of light in glass. *[1]* (ii) Which is optically denser, water or glass? *[1]* (iii) A ray enters a rectangular glass slab obliquely from air and comes out on the other side. Describe the path of the emergent ray. *[2]* **OR** (iii) Find the refractive index of glass with respect to water. *[2]*	4
39.	(a) State Joule's law of heating. (b) Why are the coils of electric toasters made of an alloy and not a pure metal? (c) An electric heater draws 4 A from a 220 V supply. Find its power and the energy it uses in 2 hours. (d) Why is tungsten used for bulb filaments? **OR** (a) Draw the field lines around a bar magnet. (b) Why do two field lines never cross? (c) Where is the field strongest, and how does the diagram show it? (d) What is the direction of the field lines inside the magnet?	5

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Answers and Marking Scheme

Marks for each step are shown in brackets. Any correct alternative method gets full credit.

Section A — Biology

1. **(C)** nostrils → pharynx → larynx → trachea → bronchi → alveoli. *Working:* Air passes through the nasal passage, pharynx, larynx and trachea, then the bronchi and bronchioles, and finally the alveoli.

2. **(A)** saprotrophic nutrition. *Working:* Fungi such as bread mould secrete enzymes on the food and absorb the products.

3. **(D)** insulin. *Working:* Insulin from the pancreas lowers the blood sugar level.

4. **(B)** forebrain. *Working:* The forebrain (cerebrum) is the main thinking part.

5. **(A)** regeneration. *Working:* Specialised cells in each piece multiply and develop into a complete organism.

6. **(B)** ovary. *Working:* The ovule becomes the seed and the ovary becomes the fruit.

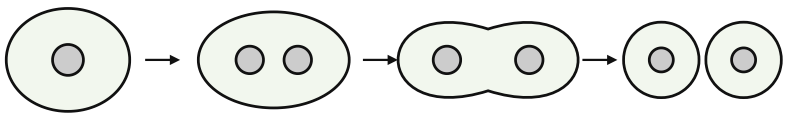
7. **(C)** plastic bag. *Working:* Plastics are not broken down by decomposers.

8. **(A)** Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. *Working:* By absorbing UV radiation, ozone shields living organisms from it.

9. **(C)** A is true but R is false. *Working:* A is true: variations can help some individuals survive changed conditions. R is false: variations in body cells or acquired during life (such as a trained muscle) are not inherited.

10. (i) Saliva moistens food and contains salivary amylase, which breaks starch into sugar (1). (ii) HCl makes the medium in the stomach acidic so that pepsin can act, and it kills germs in the food (1).

11. The nucleus of the parent cell divides into two, and then the cytoplasm divides, giving two daughter cells (1). Diagrams (1):

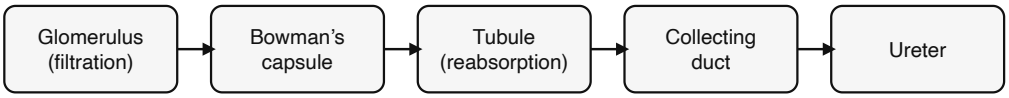


OR Producing new plants from vegetative parts such as roots, stems or leaves (1). Advantages: plants that do not produce viable seeds can be grown; the new plants bear flowers and fruits earlier and are genetically like the parent (½ + ½).

12. Energy captured by producers passes to herbivores and then to carnivores; it does not return to the producers (1). At every level much of it is lost as heat and cannot be used again, so it flows in one direction only (1).

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13. Filtration: in the glomerulus, blood is filtered under pressure and the filtrate collects in Bowman's capsule (1). Selective reabsorption: as the filtrate passes along the tubule, useful substances such as glucose, amino acids, salts and much of the water are taken back into the blood (1). What remains is urine, which passes into the collecting duct and then to the ureter (1).



14. The growth movement of a plant part in response to light (1). When light falls on one side, auxin made at the shoot tip moves to the shaded side (1). Auxin makes the cells there grow longer, so the shaded side grows more and the shoot bends towards the light (1).

OR Nervous: messages are electrical impulses along nerves; hormonal: chemical messages carried in the blood (1). Nervous responses are fast and short-lived; hormonal responses are slower but last longer (1). Nervous messages reach only cells connected by nerves; hormones reach all cells, but act only on target cells (1).

15. (i) Round and yellow.
(ii) RrYy.
(iii) Round yellow : round green : wrinkled yellow : wrinkled green = 9 : 3 : 3 : 1. **OR** Seed shape and seed colour are inherited independently, so new combinations of traits appear.

16. (a) (i) Oviduct (fallopian tube) (½); (ii) wall of the uterus (½). (b) A disc-shaped tissue embedded in the uterine wall, connected to the embryo (1); it supplies the embryo with glucose and oxygen from the mother's blood and removes its wastes (1). (c) The egg lives about a day; the thickened lining is not needed and breaks down, coming out as blood and mucus (menstruation) (1). (d) Any one: condom, oral pills, copper-T (1).

OR (a) $6CO_2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$, in the presence of sunlight and chlorophyll (1). (b) Absorption of light energy by chlorophyll; conversion of light energy to chemical energy and splitting of water into hydrogen and oxygen; reduction of carbon dioxide to carbohydrates (1 + 1). (c) CO_2 from the air through stomata (1); water and minerals from the soil through the roots (1).

Section B — Chemistry

17. **(D)** copper(II) oxide. *Working:* $2Cu + O_2 \rightarrow 2CuO$.

18. **(B)** $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$. *Working:* Ions are exchanged between the two reactants, and $BaSO_4$ precipitates.

19. **(C)** 1 to 2. *Working:* The stomach contains hydrochloric acid, so the juice is strongly acidic.

20. **(D)** $Na_2CO_3 \cdot 10H_2O$. *Working:* Washing soda is sodium carbonate decahydrate.

21. **(A)** copper. *Working:* Copper is below hydrogen in the activity series.

22. **(A)** N_2. *Working:* The two nitrogen atoms share three pairs of electrons.

23. **(D)** C_2H_5OH. *Working:* Successive members differ by a $–CH_2–$ unit and keep the same functional group.

24. **(A)** Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. *Working:* The oxide layer stops further reaction, which explains why reactive aluminium resists

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corrosion.

25. (i) Hydrogen at the cathode, oxygen at the anode (1). (ii) $2H_2O \rightarrow 2H_2 + O_2$: two molecules of hydrogen are produced for every molecule of oxygen, so its volume is double (1).

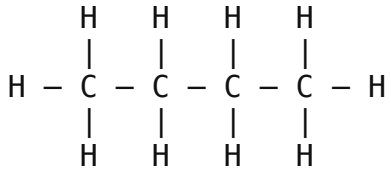
26. (i) The acids give H^+ ions in water; glucose and alcohol contain hydrogen but do not release H^+ ions (1). (ii) H^+ ions form only in the presence of water, so dry HCl shows no acidic behaviour (1). (iii) The process is highly exothermic; adding water to acid can make the mixture splash out and cause burns (1).

27. (i) Only in tube A (1). (ii) Boiling removes dissolved air, and the oil layer stops air dissolving again; anhydrous calcium chloride absorbs moisture, keeping the air in C dry (1). (iii) Both air (oxygen) and water are needed for rusting (1).

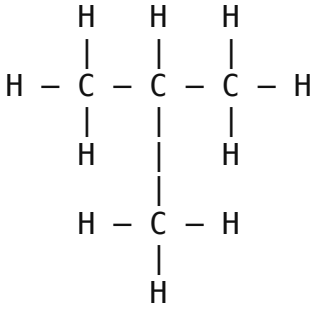
OR (i) They are very unreactive, so they do not tarnish, and they are lustrous and malleable (1). (ii) They react vigorously with oxygen and moisture in air and may catch fire (1). (iii) It is light, conducts heat well and resists corrosion (1).

28. (i) Calcium and magnesium salts in hard water react with soap to form an insoluble scum, so much soap is wasted.
(ii) A cluster of soap molecules with the carbon chains pointing inwards and the ionic ends outwards, facing the water.
(iii) The hydrocarbon tails dissolve in the oil while the ionic ends stay in water, so the oily dirt is trapped at the centre of micelles. The micelles stay suspended in water and are rinsed away. **OR** The calcium and magnesium compounds of detergents are soluble, so they do not form scum and keep cleaning in hard water.

29. (a) Carbon has four valence electrons; gaining or losing four electrons needs too much energy, so it shares electrons (1). (b) Catenation: carbon atoms link with one another to form long chains, branched chains and rings (1). Tetravalency: a valency of four lets carbon bond with four other atoms (1). (c) Structures (1 + 1):



n-butane



isobutane (2-methylpropane): $CH_3–CH(CH_3)–CH_3$

OR (a) (i) C is oxidised, ZnO is reduced (1). (ii) HCl is oxidised, MnO_2 is reduced (1). (b) Oxidation of fats and oils in food, which changes their smell and taste (1); prevented by adding antioxidants

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or packing in nitrogen, or keeping food in airtight containers (1). (c) Glucose combines with oxygen in cells and energy is released (1).

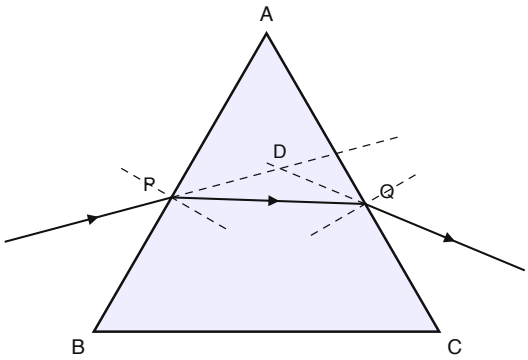
Section C — Physics

30. **(B)** infinite. *Working:* A plane mirror can be treated as a spherical mirror of infinite radius.

31. **(C)** 2R. *Working:* $R \propto l$ for the same material and cross-section.

32. **(A)** Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. *Working:* The changing atmospheric refraction makes the apparent position and brightness of a star flicker.

33. Ray bends towards the normal on entering and away from it on leaving, so it bends towards the base (1). Diagram with angle of deviation marked (1):

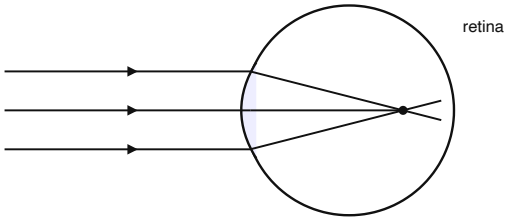


D: angle of deviation

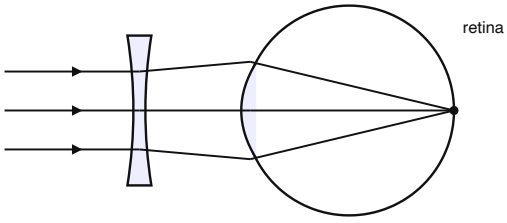
OR The splitting of white light into its component colours (1). Different colours have different speeds in glass, so they bend through different angles: red the least and violet the most (1).

34. $H = I^2Rt$ (1) $= 4 \times 50 \times 60 = 12\,000$ J (1).

35. Myopia (near-sightedness): distant objects look blurred because the image forms in front of the retina (1). Causes: too much curvature of the eye lens, or elongation of the eyeball (1). It is corrected with a concave lens of suitable power (1):



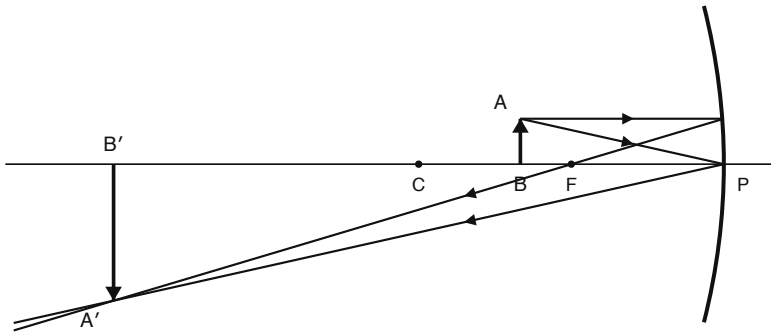
(a) Myopic eye: image in front of the retina



(b) Corrected with a concave lens

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36. $\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = -\frac{1}{15} + \frac{1}{20} = -\frac{1}{60}$, so v = –60 cm, in front of the mirror (1). $m = -\frac{v}{u} = -3$ (1). Image height = –15 cm: real, inverted and three times larger (1).



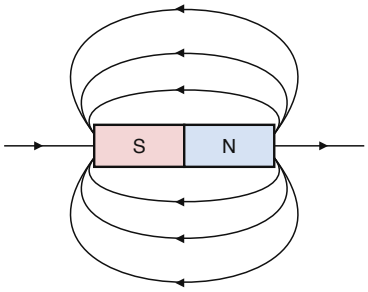
37. (i) All in series: 11 Ω (1). All in parallel: $\frac{1}{2} + \frac{1}{3} + \frac{1}{6} = 1$, so 1 Ω (1). (ii) 3 Ω and 6 Ω in parallel give 2 Ω; this in series with 2 Ω gives 4 Ω (1).

OR I_1 = 100/220 ≈ 0.45 A and I_2 = 60/220 ≈ 0.27 A (1). Total ≈ 0.73 A (1). $R = \frac{V^2}{P} = \frac{220^2}{100} = 484$ Ω (1).

38. (i) $v = \frac{3\times10^8}{1.5} = 2 \times 10^8$ m/s.
(ii) Glass, because its refractive index is higher.
(iii) It bends towards the normal on entering and away from it on leaving. The emergent ray is parallel to the incident ray but shifted sideways (lateral displacement). **OR** $\frac{1.5}{1.33} \approx 1.13$.

39. (a) The heat produced in a resistor is proportional to the square of the current, the resistance and the time: $H = I^2Rt$ (1). (b) Alloys have higher resistivity and do not oxidise (burn) readily at high temperatures (1). (c) P = VI = 220 × 4 = 880 W (1); energy = 0.88 kW × 2 h = 1.76 kWh (1). (d) Tungsten has a very high melting point (about 3380 °C) and glows without melting (1).

OR (a) Diagram (2):



(b) At a crossing point the compass needle would point in two directions at once, which is impossible (1). (c) Near the poles, where the lines are closest together (1). (d) From the south pole to the north pole (1).

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