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Your JEE Guide

CBSE Class X · Science (086)

Sample Question Paper 3 · 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 loss of water as vapour from the aerial parts of a plant is called: (A) absorption (B) respiration (C) transpiration (D) translocation	1
2.	In human cells, pyruvate is broken down into carbon dioxide and water, releasing a lot of energy, in the: (A) cytoplasm (B) chloroplast (C) nucleus (D) mitochondria	1
3.	The blood vessel that brings oxygenated blood from the lungs to the heart is the: (A) pulmonary artery (B) pulmonary vein (C) aorta (D) vena cava	1
4.	The junction between two neurons, across which an impulse passes, is called a: (A) synapse (B) cell body (C) axon (D) dendrite	1
5.	Iodised salt is advised to prevent: (A) goitre (B) dwarfism (C) anaemia (D) diabetes	1
6.	Which of the following plants has unisexual flowers? (A) rose (B) papaya (C) mustard (D) hibiscus	1
7.	If producers trap 10 000 J of solar energy, the energy available to the secondary consumers is about: (A) 1000 J (B) 10 J (C) 100 J (D) 10 000 J	1

8.	**Assertion (A):** Arteries have thick, elastic walls. **Reason (R):** Blood in the arteries flows under high pressure from the heart. (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):** The pancreas produces bile. **Reason (R):** Bile helps in the emulsification of fats. (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.	Why is the small intestine of a herbivore longer than that of a carnivore?	2
11.	Name (i) the hormone that prepares the body for an emergency, and (ii) the male sex hormone. Name the gland that secretes each. **OR** How do the leaves of the sensitive plant (touch-me-not) respond to touch? Is this a growth movement?	2
12.	What is an ecosystem? Name its two components with an example of each.	2
13.	State the role of (i) the diaphragm and ribs, (ii) the alveoli, (iii) haemoglobin in human respiration.	3
14.	Why is DNA copying an essential part of reproduction? How does it lead to variation? **OR** Name three methods of contraception and explain how any one of them works.	3
15.	**Case study.** Ozone (O_3) at the higher levels of the atmosphere shields the Earth from ultraviolet radiation. In the 1980s scientists found that the amount of ozone was falling sharply, and linked this to synthetic chemicals such as chlorofluorocarbons (CFCs), used as refrigerants and in fire extinguishers. (i) How is ozone formed in the upper atmosphere? *[1]* (ii) Which chemicals are mainly responsible for the depletion of the ozone layer? *[1]* (iii) State two harmful effects of UV radiation on human health. *[2]* **OR** (iii) What international step was taken to protect the ozone layer? *[2]*	4

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16.	(a) What is transpiration? Give two of its functions. (b) Explain how water moves from the roots to the leaves of a tall plant. (c) How is food transported in plants? **OR** State the function of each: (a) cerebrum, (b) cerebellum, (c) medulla, (d) spinal cord. (e) How is the brain protected?	5

Section B — Chemistry

17.	Which of the following is an exothermic process? (A) decomposition of calcium carbonate (B) photosynthesis (C) electrolysis of water (D) burning of natural gas	1
18.	When dilute hydrochloric acid is added to sodium carbonate, the gas evolved is: (A) CO_2 (B) Cl_2 (C) O_2 (D) H_2	1
19.	Which of the following is a strong base? (A) H_2CO_3 (B) CH_3COOH (C) NaOH (D) NH_4OH	1
20.	Which non-metal is a good conductor of electricity? (A) phosphorus (B) iodine (C) sulphur (D) graphite	1
21.	Which of these metals is found in the free state in nature? (A) sodium (B) gold (C) calcium (D) magnesium	1
22.	The general formula of alkynes is: (A) C_nH_{2n-2} (B) C_nH_{2n+2} (C) C_nH_{2n} (D) C_nH_n	1
23.	The IUPAC name of CH_3CHO is: (A) ethanoic acid (B) ethanal (C) methanal (D) ethanol	1
24.	**Assertion (A):** Pure ethanoic acid is called glacial acetic acid. **Reason (R):** Pure ethanoic acid has a melting point of 290 K and often freezes in cold climates. (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

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25. What is a precipitate? Write a balanced equation, with state symbols, for a reaction in which a yellow precipitate forms. — 2

26. What happens when (i) iron nails are dipped in copper sulphate solution, (ii) sodium is put in water, (iii) aluminium oxide reacts with sodium hydroxide? Write balanced equations. — 3

27. Five solutions A to E have pH values 4, 1, 11, 7 and 9 respectively. Which solution is (i) neutral, (ii) strongly alkaline, (iii) strongly acidic, (iv) weakly acidic, (v) weakly alkaline? Arrange them in increasing order of hydrogen-ion concentration. — 3

OR

(i) Why does tooth decay start when the pH in the mouth falls below 5.5? How does toothpaste help? (ii) How does an antacid relieve indigestion?

28. **Case study.** A student put small pieces of four metals A, B, C and D into the solutions shown and recorded what happened. — 4

Metal	Iron(II) sulphate	Copper(II) sulphate	Zinc sulphate	Silver nitrate
A	No reaction	Displacement	–	–
B	Displacement	–	No reaction	–
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

(i) Which is the most reactive of the four metals? *[1]*
(ii) What would you see if B were added to copper(II) sulphate solution? *[1]*
(iii) Arrange A, B, C and D in decreasing order of reactivity. *[2]*

OR

(iii) Which of the four metals could be copper? Give a reason. *[2]*

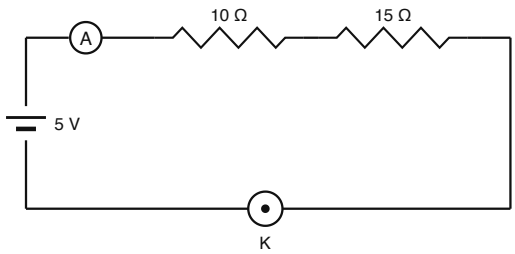
29. Write a chemical equation for each of the following and name the type of reaction: (a) ethanol is heated with alkaline potassium permanganate; (b) ethanol is heated with excess concentrated sulphuric acid at 443 K; (c) vegetable oil is treated with hydrogen in the presence of nickel; (d) methane reacts with chlorine in sunlight. (e) Why are animal fats considered less healthy than vegetable oils? — 5

OR

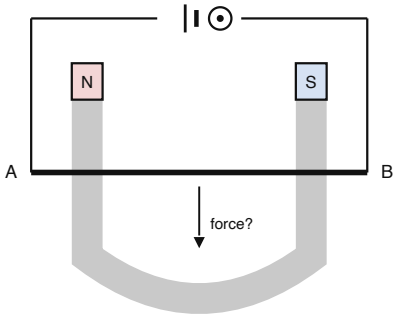
Identify the type of reaction, write the balanced equation, and state one observation for: (a) heating ferrous sulphate crystals; (b) exposing silver chloride to sunlight; (c) adding water to quicklime.

Section C — Physics

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30.	The mirror used as a rear-view mirror in vehicles is a: (A) concave mirror (B) combination of a concave and a plane mirror (C) plane mirror (D) convex mirror	1
31.	1 kWh is equal to: (A) 3.6×10^3 J (B) 3600 J (C) 3.6×10^6 J (D) 1000 J	1
32.	**Assertion (A):** Danger signal lights are red. **Reason (R):** Red light is scattered the least by fog and smoke, so it can be seen from a distance. (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.	Find the power of a concave lens of focal length 2 m. What is the focal length and nature of a lens of power +2.5 D? **OR** Why does a pencil partly immersed in water in a glass look bent at the surface of the water?	2
34.	In the circuit shown, find the current in the circuit and the potential difference across the 15 Ω resistor. 	2
35.	An object is placed 30 cm in front of a concave lens of focal length 15 cm. Find the position, nature and magnification of the image, and draw the ray diagram.	3
36.	What is hypermetropia? State two possible causes and show with diagrams how it is corrected.	3
37.	A metal wire 1 m long has a resistance of 26 Ω at 20 °C. If its diameter is 0.3 mm, find the resistivity of the metal. What would its resistance be if the diameter were doubled? **OR** Two identical resistors are first connected in series and then in parallel to the same battery. Find the ratio of the power used in the parallel arrangement to that in the series arrangement.	3

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38.	**Case study.** An electric fuse is a safety device in a household circuit. It is a piece of wire that melts when the current through it becomes more than its rating, breaking the circuit. Fuses commonly used at home are rated 1 A, 2 A, 3 A, 5 A and 10 A. (i) On which effect of electric current does a fuse work? *[1]* (ii) What property should the material of a fuse wire have? *[1]* (iii) An electric iron uses 1 kW at 220 V. Find the current it draws and choose a suitable fuse for it. *[2]* **OR** (iii) Why is a fuse connected in series with the appliance, on the live wire? *[2]*	4
39.	(a) Draw ray diagrams to show the image formed by a convex lens when the object is placed (i) at $2F_1$, (ii) between F_1 and the optical centre O. State the nature of the image in each case. (b) An object 4 cm tall is placed 15 cm from a convex lens of focal length 10 cm. Find the position and size of the image. **OR** An aluminium rod AB is hung between the poles of a horseshoe magnet and connected to a cell through a key, as shown. (a) What happens to the rod when the key is closed? (b) What happens if the direction of the current is reversed? (c) State the rule that gives the direction of the force. (d) What happens to the displacement of the rod if the current is increased? 	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)** transpiration. *Working:* Water evaporates mainly through the stomata of leaves.

2. **(D)** mitochondria. *Working:* Aerobic breakdown of pyruvate takes place in the mitochondria.

3. **(B)** pulmonary vein. *Working:* The pulmonary veins carry oxygenated blood to the left atrium.

4. **(A)** synapse. *Working:* At the synapse, chemicals carry the signal to the next neuron.

5. **(A)** goitre. *Working:* Iodine is needed by the thyroid gland to make thyroxine; its deficiency causes goitre.

6. **(B)** papaya. *Working:* Papaya flowers have either stamens or a pistil, not both.

7. **(C)** 100 J. *Working:* About 10% passes at each step: 10 000 → 1000 (primary) → 100 J (secondary).

8. **(A)** Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. *Working:* The thick elastic walls withstand the high pressure, so R explains A.

9. **(D)** A is false but R is true. *Working:* A is false: bile is made in the liver (and stored in the gall bladder). R is true.

10. Herbivores eat grass, which contains cellulose that takes a long time to digest (1). A longer small intestine gives more time and surface for its digestion, whereas meat is easier to digest (1).

11. (i) Adrenaline (½), adrenal gland (½). (ii) Testosterone (½), testes (½).

OR The leaves fold up and droop when touched; the plant cells change shape by changing the amount of water in them (1). It is not a growth movement, since it happens immediately and involves no growth (1).

12. All the living organisms in an area together with the non-living factors around them, interacting with each other (1). Biotic components such as plants and animals; abiotic components such as temperature, water and soil (½ + ½).

13. (i) When we breathe in, the ribs are lifted and the diaphragm flattens, enlarging the chest cavity so that air is sucked into the lungs (1). (ii) The alveoli give a very large surface, with a rich blood supply, for exchanging oxygen and carbon dioxide (1). (iii) Haemoglobin in red blood cells has a high affinity for oxygen and carries it from the lungs to the tissues (1).

14. DNA carries the information needed to make the proteins that build the body; each new cell needs a copy of it (1). DNA copying produces two copies, so each new cell receives the full set of instructions (1). Copying is never absolutely accurate, so small changes arise; these are the source of variation (1).

OR Mechanical barriers such as condoms; oral pills; intra-uterine devices such as the copper-T (or surgical methods) (1½). For example, a condom stops sperm from reaching the egg, preventing fertilisation; it also protects against some sexually transmitted infections (1½).

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15. (i) UV radiation splits O_2 into free oxygen atoms; each atom combines with an O_2 molecule: $O + O_2 \rightarrow O_3$.
(ii) Chlorofluorocarbons (CFCs).
(iii) Any two: skin cancer; cataract and other eye damage; weakening of the immune system. **OR** In 1987 the United Nations Environment Programme (UNEP) reached an agreement to freeze CFC production at 1986 levels.

16. (a) Loss of water as vapour from the aerial parts of a plant (1). It creates a suction that pulls water up, and helps in the upward movement of minerals; it also cools the plant (1). (b) Root cells take in ions, creating a difference in concentration so that water enters the xylem from the soil (root pressure) (½). Evaporation from the leaves creates a suction (transpiration pull) that pulls water up through the continuous column of xylem; this is the main force in tall plants (1½). (c) Food is translocated through phloem, upwards and downwards; sucrose is moved into phloem using energy from ATP, raising the osmotic pressure so water enters and pushes the food to where it is needed (1).

OR (a) Cerebrum: thinking, memory, voluntary actions, and interpreting information from the sense organs (1). (b) Cerebellum: posture, balance and precision of voluntary movements (1). (c) Medulla: involuntary actions such as blood pressure, salivation and vomiting (1). (d) Spinal cord: carries messages between the brain and the body and controls reflex actions (1). (e) The brain sits in a bony box, the cranium, and is cushioned by a fluid-filled balloon that absorbs shocks (1).

Section B — Chemistry

17. **(D)** burning of natural gas. *Working:* Burning releases heat; the other three need energy.

18. **(A)** CO_2. *Working:* $Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$.

19. **(C)** NaOH. *Working:* NaOH ionises completely in water; NH_4OH is a weak base and the other two are acids.

20. **(D)** graphite. *Working:* Graphite, a form of carbon, conducts electricity.

21. **(B)** gold. *Working:* Gold is very unreactive.

22. **(A)** C_nH_{2n-2}. *Working:* For example, ethyne C_2H_2.

23. **(B)** ethanal. *Working:* Two carbon atoms with an aldehyde group: ethanal.

24. **(A)** Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. *Working:* Its freezing in cold weather is the reason for the name "glacial".

25. An insoluble solid formed in a solution during a reaction (1). $Pb(NO_3)_2(aq) + 2KI(aq) \rightarrow PbI_2(s) + 2KNO_3(aq)$; lead iodide is the yellow precipitate (1).

26. (i) The blue solution turns pale green and a reddish-brown coat of copper forms on the nails: $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$ (1). (ii) Sodium reacts violently, giving hydrogen and much heat: $2Na + 2H_2O \rightarrow 2NaOH + H_2$ (1). (iii) Sodium aluminate and water form: $Al_2O_3 + 2NaOH \rightarrow 2NaAlO_2 + H_2O$ (1).

27. (i) D, (ii) C, (iii) B, (iv) A, (v) E (½ each = 2½). Increasing H^+ concentration: C (11) < E (9) < D (7) < A (4) < B (1) (½).

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OR (i) Below pH 5.5 the acid produced by bacteria from sugar corrodes tooth enamel (calcium hydroxyapatite) (1). Toothpastes are basic and neutralise the excess acid (1). (ii) Indigestion is caused by too much acid in the stomach; a mild base such as magnesium hydroxide (milk of magnesia) neutralises it (1).

28. (i) B (it displaces iron from iron(II) sulphate).
(ii) B is more reactive than iron, which is more reactive than copper, so B would displace copper: a reddish-brown deposit forms and the blue colour fades.
(iii) B > A > C > D. B displaces iron; A displaces copper but not iron; C displaces only silver; D displaces nothing. **OR** C. It displaces silver from silver nitrate but does not react with copper(II), iron(II) or zinc sulphate, which matches the position of copper in the reactivity series.

29. (a) $CH_3CH_2OH \rightarrow CH_3COOH$ (with alkaline $KMnO_4$ + heat): oxidation (1). (b) $CH_3CH_2OH \rightarrow CH_2{=}CH_2 + H_2O$: dehydration (1). (c) Unsaturated oil + $H_2 \rightarrow$ saturated fat (Ni catalyst): addition (hydrogenation) (1). (d) $CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$: substitution (1). (e) Animal fats are mostly saturated, and saturated fats are linked to health problems; vegetable oils contain healthier unsaturated fatty acids (1).

OR (a) Thermal decomposition: $2FeSO_4 \rightarrow Fe_2O_3 + SO_2 + SO_3$; the green crystals turn reddish-brown and a smell of burning sulphur is noticed (2). (b) Photolytic decomposition: $2AgCl \rightarrow 2Ag + Cl_2$; the white solid turns grey (used in black and white photography) (2). (c) Combination (exothermic): $CaO + H_2O \rightarrow Ca(OH)_2$ + heat; a hissing sound and a lot of heat (1).

Section C — Physics

30. **(D)** convex mirror. *Working:* A convex mirror gives an erect, diminished image and a wide field of view.

31. **(C)** 3.6×10^6 J. *Working:* 1000 W × 3600 s = 3.6×10^6 J.

32. **(A)** Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. *Working:* Because red light is scattered least, it travels farthest through fog: R explains A.

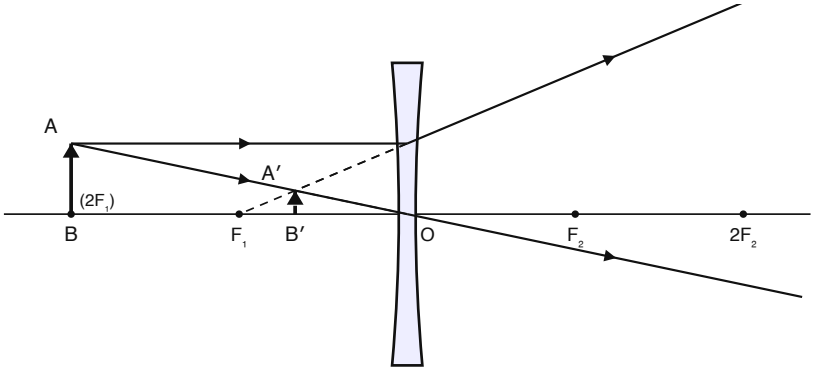
33. P = 1/f = 1/(–2) = –0.5 D (1). f = 1/2.5 = 0.4 m = 40 cm; the positive sign shows a convex (converging) lens (1).

OR Light from the part under water bends away from the normal as it passes from water into air (1). So that part appears raised, and the pencil looks bent at the surface (1).

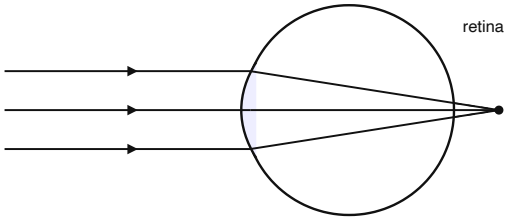
34. R = 10 + 15 = 25 Ω, so I = 5/25 = 0.2 A (1). V = IR = 0.2 × 15 = 3 V (1).

35. $\frac{1}{v} = \frac{1}{f} + \frac{1}{u} = -\frac{1}{15} - \frac{1}{30} = -\frac{1}{10}$, so v = –10 cm, on the same side as the object (1). $m = \frac{v}{u} = \frac{-10}{-30} = \frac{1}{3}$: virtual, erect and one-third the size (1). Ray diagram (1):

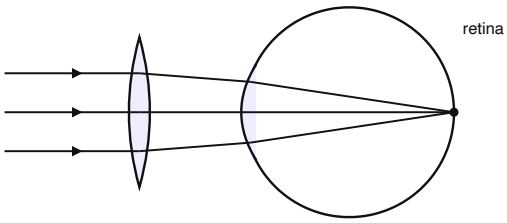
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36. Far-sightedness: a person sees distant objects clearly but not nearby ones, because the image of a near object forms behind the retina (1). Causes: the focal length of the eye lens is too long, or the eyeball has become too small (1). It is corrected with a convex lens of suitable power (1):



(a) Hypermetropic eye: image behind the retina



(b) Corrected with a convex lens

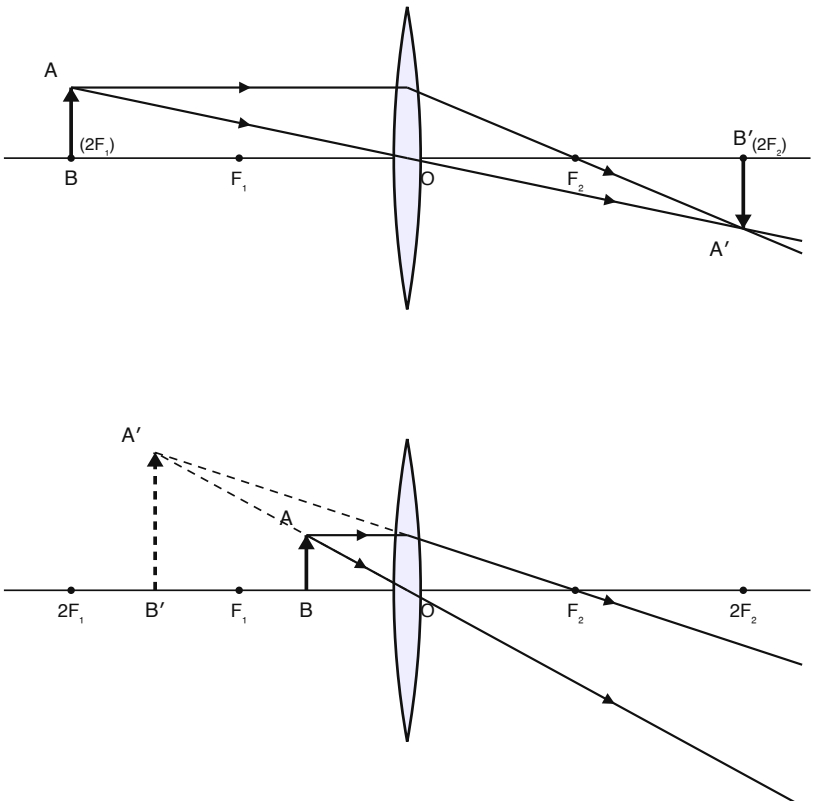
37. $A = \pi r^2 = 3.14 \times (0.15 \times 10^{-3})^2 \approx 7.07 \times 10^{-8}$ m² (1). $\rho = \frac{RA}{l} \approx 26 \times 7.07 \times 10^{-8} \approx 1.84 \times 10^{-6}$ Ω m (1). Doubling the diameter makes the area four times as large, so R = 26/4 = 6.5 Ω (1).

OR Series: 2R, so $P_1 = \frac{V^2}{2R}$ (1). Parallel: R/2, so $P_2 = \frac{2V^2}{R}$ (1). $P_2 : P_1 = 4 : 1$ (1).

38. (i) The heating effect of current.
(ii) A low melting point (and suitable resistance).
(iii) I = 1000/220 ≈ 4.5 A; a 5 A fuse is suitable. **OR** So that all the current to the appliance passes through it; when it melts, the appliance is cut off from the live supply.

39. (a) (i) Image at $2F_2$: real, inverted, same size (1½). (ii) Image on the same side as the object: virtual, erect, enlarged (1½). (b) $\frac{1}{v} = \frac{1}{10} - \frac{1}{15} = \frac{1}{30}$, v = +30 cm (1). $m = \frac{30}{-15} = -2$, so the image is 8 cm tall, real and inverted (1).

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OR (a) The rod is displaced: a force acts on it because it carries current in a magnetic field (1). (b) It is displaced in the opposite direction (1). (c) Fleming's left-hand rule: with the forefinger along the field, the middle finger along the current and the thumb perpendicular to both, the thumb shows the direction of the force (2). (d) The displacement increases (1).

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