

Question 14 (Answer: **D**)

- Fibrinogen is converted to fibrin, not the other way round – statement 1 is reversed.
- Phagocytes engulf pathogens; it is *lymphocytes* that make antibodies – statement 2 is wrong.
- The genuine barriers are the skin, mucus, hairs in the nose and clotting at a wound.

Question 16 (Answer: **A**)

- Each pathogen carries its own specific antigens – statement 2.
- Lymphocytes make antibodies with a complementary shape to those antigens – statement 1.
- A vaccine contains the antigen in a harmless form, so it triggers the same response – statement 3.

Question 15 (Answer: **D**)

- Cholera bacteria act on the lining of the small intestine.
- They release a toxin that makes those cells secrete chloride ions.
- Water then follows by osmosis, causing severe watery diarrhoea.

Question 22 (Answer: **B**)

- Resistance spreads because using an antibiotic kills the sensitive bacteria and spares the resistant ones.
- So using antibiotics less often, and only when they are really needed, slows that selection.
- Completing every prescribed course also matters, so no partly-resistant survivors are left behind.

Question 17 (Answer: **A**)

- Active immunity means the person's own lymphocytes make the antibodies.
- Producing antibodies after an infection is exactly that.
- Antibodies received in milk or across the placenta were made by the mother, so that is *passive*.

Question 16 (Answer: **D**)

- Active immunity means the person's *own* lymphocytes respond.
- The pathogens' antigens are detected, and lymphocytes are activated.
- They then make antibodies that mark the pathogens for destruction, plus memory cells for the future.

Question 17 (Answer: **C**)

- The cholera toxin acts on the cells lining the small intestine.
- It makes them secrete chloride ions, so water follows out of the blood by osmosis.
- The result is severe watery diarrhoea and dehydration.

Question 19 (Answer: **C**)

- Antibodies passed in breast milk were made by the mother, so the baby's immunity is *passive* – statement 1 is right.
- Passive immunity is short-lived, because no memory cells are made, so statement 2 is wrong.
- Only active immunity, from infection or vaccination, gives long-term protection.

5(a)(i)	bacteria / prokaryote(s) ;
5(a)(ii)	<i>any two from:</i> only use for bacterial infections / when essential / when necessary ; use appropriate antibiotic ; AVP ;
5(b)(i)	genus ;
5(b)(ii)	fungus / fungi ;
5(c)(i)	insulin / mycoprotein / ethanol / (named) alcohol / carbon dioxide / amino acids / hormones / proteins / factor VIII / AVP ;
5(c)(ii)	oxygen ;
5(c)(iii)	<i>any five from:</i> 1 monitoring ; 2 temperature ; 3 water jacket / described / water bath ; 4 pH ; 5 carbon dioxide might reduce pH ; 6 buffer / described ; 7 keep, pH / temperature, at suitable value for enzyme activity ; 8 (named) nutrient supply ; 9 carbon dioxide / waste products, removal ; 10 stirrer to equally (distributed), temperature / pH / nutrient concentration / oxygen concentration / microorganisms ; 11 idea of regulating (gas) pressure ; 12 vent or exhaust ; 13 sealed to prevent contamination / AW ;
5(d)	yeast ;

Question 17 (Answer: D)

- Vaccination introduces a harmless form of the antigen, which triggers the immune response.
- Active lymphocytes make antibodies and memory cells.
- Antibodies given to someone else would provide *passive* immunity, since that person made none of their own.