

Drugs

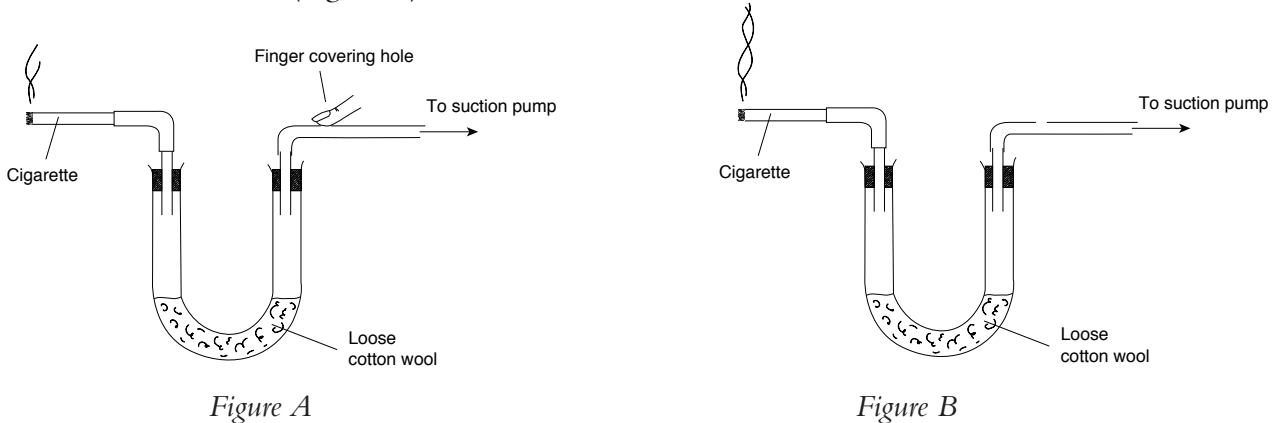
A drug is a chemical which, when taken, alters the functioning of the human body or changes the progress of a disease. Much media attention is focussed on the misuse of illegal drugs such as ecstasy, crack (cocaine) and heroin, but legal drug use is common in our society. Coffee, tea and cola drinks contain the drug caffeine; tobacco contains nicotine; alcohol is a drug; and medical preparations, both prescribed and over-the-counter, are drugs.

The effects of some drugs are shown here. Some major drugs such as cannabis, cocaine, heroin (an opiate drug), solvents (in certain glues and other products), tobacco and medically prescribed drugs are not shown.

Type of drug	Examples	Medical use	Possible effects
Analgesic (pain killers)	Aspirin	Eases pain, reduces fever and inflammation	May cause irritation of the stomach lining
	Paracetamol	A commonly used pain-killer	Overdose causes liver damage that can be fatal
Antibiotic	Penicillin	To treat infections caused by bacteria	Some people are allergic to penicillin. Incorrect use may encourage the development of penicillin-resistant strains of the bacterium
Depressant	Alcohol	Not generally used	Short-term: Slows reactions; reduces social inhibitions; may cause loss of self-control Long-term: May cause brain and liver damage, increases likelihood of circulatory disease
Hallucinogen	LSD	Not used	May cause pleasurable 'trips' or 'bad trips'. LSD may trigger mental illnesses such as a clinical depression
Stimulant	Amphetamines (eg 'speed')	No longer used	Both taken illegally to stay awake and alert, and to give an artificial 'high'. User may develop paranoia and start to hallucinate. MDMA may cause dehydration and over-heating leading to coma and occasionally even death. Impurities can be lethal
	MDMA (‘ecstasy’)	Not used medically	

Questions

1 The figures below show the apparatus used for collecting some of the substances in cigarette smoke. At intervals, the experimenter's finger is placed over the hole in the glass tubing (Figure A) and is then removed (Figure B).



a Which figure, A or B, shows the situation for a smoker inhaling cigarette smoke? _____
 Give a reason for your answer

b As the experiment progresses, the cotton wool turns yellow and then brown. Name the substance that causes the cotton wool to change colour.

c What structures in the lungs does the cotton wool represent?

d One chemical in cigarette smoke directly affects the blood's ability to carry oxygen.

i What is the name of this chemical? _____

ii How is this chemical able to affect the blood's oxygen-carrying capacity? _____

e Smoking during pregnancy can have a harmful effect on the development of the unborn child (foetus). Give one way in which smoking can be harmful to the foetus.

2 Here are some notes taken from an interview with John, a heroin user:

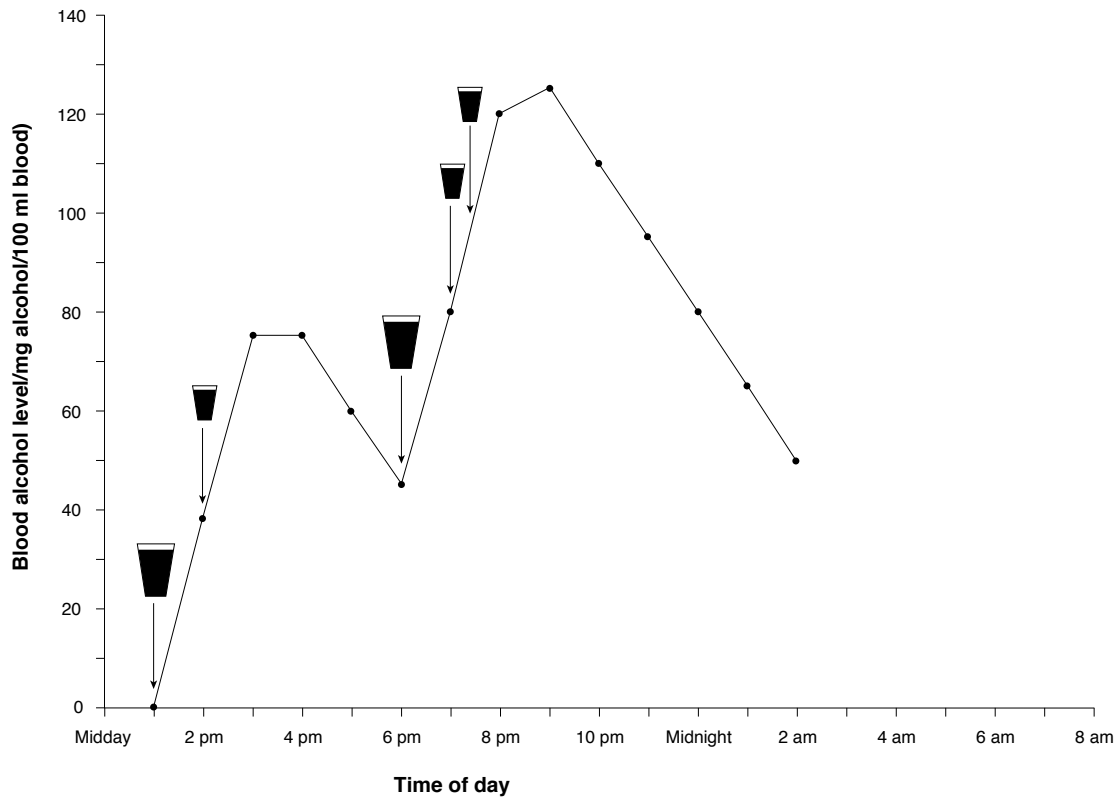
“I've been taking smack (heroin) for about four or five years now. I can't imagine life without it. Yeah, it costs me a small fortune and I'm always getting into trouble trying to raise the cash. I need to take a lot more now to get any effect at all. I tried stopping once, but I soon started to feel really ill.”

a Which statement in the above paragraph indicates that John shows *tolerance* to heroin?

b Which statement suggests that John is *physically dependent* on the drug heroin?

c Which statement suggests that John is *psychologically dependent* on the drug heroin?

3 This graph shows the alcohol level in an adult man's blood at various times after drinking an alcoholic beverage.



a The legal limit for driving a car is 80 mg alcohol/100 ml blood. During which times of the day was the man's blood alcohol level over the legal limit for driving?

b Which organ in the body breaks down alcohol and so gradually lowers the blood alcohol concentration?

c Using the information provided in the graph, at what time is this organ likely to remove the last traces of alcohol from the blood?

d Give two ways in which drinking even moderate amounts of alcohol can be dangerous when driving?

e Give two effects on the body of drinking large amounts of alcohol on a regular basis?

Answers

- 1 a Figure A. Covering the hole causes air to be drawn through the cigarette and into the U-tube (2)
- b Tar (1)
- c Alveoli (air sacs) (1)
- d i Carbon monoxide (1)
- ii Carbon monoxide ‘competes’ with oxygen to combine with haemoglobin, the oxygen-carrying chemical in blood. Carbon monoxide lowers the blood’s oxygen-carrying capacity. (2)
- e Toxic substances from cigarette smoke circulate in the mother’s blood, and can cross the placenta to enter the blood circulation of the foetus. (1) *or* Nicotine narrows blood vessels/Carbon monoxide displaces oxygen from haemoglobin. (1) *or* The foetus is deprived of sufficient oxygen, possibly resulting in retarded growth. (1) [Note only one correct answer required. Hence one mark for part e.]

Total 8 marks

- 2 a I need to take a lot more now to get any effect at all. (1)
- b I tried stopping once, but I soon started to feel really ill. (1)
- c I can’t imagine life without it. (1)

Total 3 marks

- 3 a Between 7 pm and midnight. (1)
- b Liver (1)
- c About 5.30 am (but accept 30 minutes either way). Note: The time is found by extrapolating the plotted line of the graph until it crosses the horizontal axis. (1)
- d Any two of the following: Slows reactions/Judgement is impaired/Over-confidence/Unpredictable behaviour (2)
- e Any two of the following: Brain damage/Liver damage (cirrhosis)/Greater likelihood of circulatory disease, eg strokes, high blood pressure, coronary heart disease, heart failure/Kidney damage (2)

Total 7 marks