**1.** AIDS (acquired immune deficiency syndrome) has resulted in millions of deaths worldwide since it was first recorded in 1981. The control and treatment of HIV is made worse by the high price of anti-retroviral agents and sociocultural issues. Discuss **one** sociocultural difficulty facing society today associated with solving this global problem.

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(Total 3 marks)

**2.** Drugs can be prescribed for treating various diseases and assisting in healing the human body, however, any drug presents potential risks. The properties of three drugs are summarized below.

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| --- | --- | --- | --- |
| **Drug** | **Physiological effect** | **Side-effects** | **Therapeutic window** |
| **A** | high | severe | medium |
| **B** | moderate | moderate | narrow |
| **C** | low | minimal | wide |

Suggest which drug (**A**, **B** or **C**) could be

(a) considered safe enough to be taken by patients without supervision.

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(1)

(b) administered **only** by qualified staff.

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(1)

(c) used **only** in a medical emergency.

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(1)

(Total 3 marks)

**3.** Bacterial and viral infections require different types of medication.

(a) Outline **two** differences between bacteria and viruses.

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(2)

(b) Antiviral drugs are used for the treatment of HIV and other viral infections. Describe **two** ways in which antiviral drugs work.

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(2)

(c) Discuss why viral infections are generally harder to treat than bacterial infections.

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(3)

(Total 7 marks)

**4.** Caffeine and nicotine are two common stimulants.

(a) Describe **two** effects of large amounts of caffeine on the human body.

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(2)

(b) (i) State the name of the functional group circled on the structure of caffeine.



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(1)

(ii) Deduce which functional group is common to both nicotine and caffeine.

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(1)

(iii) Identify **one** short-term effect of nicotine consumption.

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(1)

(Total 5 marks)

**5.** The first penicillin to be used was benzylpenicillin (Penicillin G), its structure is shown below.



(a) Explain how penicillins are able to act as antibacterials.

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(2)

(b) Modern penicillins have a similar structure to Penicillin G but a different side-chain.  
State **two** advantages of modifying the side-chain.

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(2)

(c) Discuss the reason why a “cocktail” of different antibacterials may be needed to treat tuberculosis (TB).

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(1)

(Total 5 marks)

**6.** Two substances commonly used in antacid tablets are magnesium hydroxide and aluminium hydroxide.

(a) State an equation to represent a neutralization reaction with one of the above antacids.

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(1)

(b) State and explain whether 0.1 mol of magnesium hydroxide is more effective or less effective than 0.1 mol of aluminium hydroxide.

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(1)

(c) Suggest why compounds such as sodium hydroxide or potassium hydroxide cannot be used as an antacid.

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(1)

(d) Explain why alginates and dimethicone are often included in antacid tablets.

Alginates:

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Dimethicone:

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(2)

(Total 5 marks)