

## Health and disease (risk factors, non-communicable diseases, cancer basics)

### Q1. (2018)

|      |                                                      |                                                                                                                                                              |   |                                             |
|------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------------------------------|
| 02.1 | is not caused by a pathogen / infective organism     | allow not caused by a microorganism / microbe<br>ignore not caused by infection<br><br>ignore named pathogen unless bacteria, virus and fungus all mentioned | 1 | AO1<br>4.2.2.4<br>4.2.2.5<br>4.3.1.1<br>4.3 |
|      | (so ) is not passed / spread (from person to person) | allow cannot be spread / caught<br>allow is not infectious / contagious                                                                                      | 1 | AO2<br>4.2.2.4<br>4.2.2.5<br>4.3.1.1<br>4.3 |

### Q2. (2018)

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                          |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------------------------------------------|
| 02.3 | <b>Level 3:</b> Relevant points (factors / effects) are identified, given in detail and logically linked to form a clear account.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5–6 | AO2                                      |
|      | <b>Level 2:</b> Relevant points (factors / effects) are identified and there are attempts at logical linking. The resulting account is not fully clear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3–4 | AO2<br>AO1                               |
|      | <b>Level 1:</b> Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1–2 | AO1                                      |
|      | <b>No relevant content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0   |                                          |
|      | <b>Indicative content</b><br><br><b>medical risk factors:</b> <ul style="list-style-type: none"> <li>high blood pressure</li> <li>high cholesterol</li> <li>diabetes</li> <li>genetic factors</li> <li>medications</li> </ul> <b>lifestyle risk factors:</b> <ul style="list-style-type: none"> <li>smoking</li> <li>obesity</li> <li>lack of exercise</li> <li>high fat / energy diet</li> <li>eating insufficient fruit / vegetables</li> <li>alcohol</li> <li>high salt intake</li> <li>exposure to air pollution</li> <li>certain drugs / correct named drug</li> </ul> <b>examples of links:</b> <ul style="list-style-type: none"> <li>smoking – high bp / cholesterol / fatty deposition</li> <li>obesity – lack of exercise / high bp / cholesterol / fatty deposition / diabetes</li> <li>exercise – obesity / bp / diabetes</li> <li>diet – obesity / cholesterol / diabetes</li> <li>alcohol – bp / cholesterol</li> <li>high salt intake – high blood pressure</li> <li>genetic factors – bp / cholesterol / diabetes / obesity</li> <li>medication – can affect blood / blood vessels / metabolism</li> </ul> <p>the main discriminator is the quality of linking<br/>both lifestyle and medical factors are required for <b>level 3</b></p> |     | 4.2.2.2<br>4.2.2.4<br>4.2.2.5<br>4.2.2.6 |

|      |                                                                                                                                                                                                                         |                                                                                                                                                               |   |                           |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------------|
| 03.1 | any <b>one</b> from: <ul style="list-style-type: none"> <li>• (Type 2) diabetes</li> <li>• (coronary / ischaemic) heart disease / CHD</li> <li>• high blood pressure</li> <li>• cancer</li> <li>• depression</li> </ul> | ignore obesity<br><br>do <b>not</b> accept Type 1 diabetes<br>allow cardiovascular disease<br>ignore heart attack / failure<br><br><br>allow (osteo)arthritis | 1 | AO1<br>4.2.2.5<br>4.2.2.6 |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------------|

A)

|             |                                                                                                                                                                          |                                                                                                                                                                                                                                              |                                                      |                                          |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------|
| <b>03.2</b> | $27 = \frac{68.1}{\text{height}^2}$ <p>height<sup>2</sup> = 68.1 ÷ 27</p> <p><b>or</b></p> <p>height<sup>2</sup> = 2.522(r) / 2.52 / 2.5</p><br><p>height = 1.59 (m)</p> | <p>allow height = <math>\sqrt{\frac{68.1}{27}}</math></p> <p><b>or</b></p> <p>allow height = <math>\sqrt{2.522(r)}</math></p><br><br><br><p>allow a correctly rounded value</p> <p>if 2.5 is given in step 2 allow an answer of 1.58 (m)</p> | <p>1</p><br><p>1</p><br><br><br><br><br><br><p>1</p> | <p>AO2</p> <p>4.2.2.5</p> <p>4.2.2.6</p> |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------|

B)

|      |            |                                                          |   |                           |
|------|------------|----------------------------------------------------------|---|---------------------------|
| 03.3 | overweight | answer must be consistent with height calculated in 03.2 | 1 | AO3<br>4.2.2.5<br>4.2.2.6 |
|------|------------|----------------------------------------------------------|---|---------------------------|

## Q5. (2020)

03.4

max **2** marks if refer to energy being made / used / produced / created  
allow reference to calories / joules for energy

AO2  
4.2.2.5  
4.2.2.6  
4.4.2.2  
4.4.2.3

any **three** from:

3

- increased energy intake if more food eaten

allow increased energy intake if more fat / carbohydrate eaten  
allow converse  
allow energy taken in when you eat

- if exercise more, more energy is transferred / released

allow if exercise more, respiration / metabolism increases **or** is faster  
allow converse  
allow energy is transferred during exercise  
do **not** accept energy is burnt during exercise

- if more energy is taken in than is transferred body mass increases  
**or**  
if less energy is taken in than is transferred body mass decreases

allow if less energy is transferred than is taken in body mass increases  
**or**  
if more energy is transferred than is taken in body mass decreases

- if energy intake = energy transferred body mass stays the same

if no marks are awarded allow **1** mark for food eaten can increase body mass **and** exercise can decrease body mass  
**or**  
allow **1** mark for if a lot of food is eaten **and** little exercise is done body mass increases  
allow converse

## Q6. (2022)

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                             |   |                |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----------------|
| 05.1 | <p>any <b>four</b> from:</p> <p><b>Similarities:</b></p> <ul style="list-style-type: none"> <li>• result from changes in the cell / DNA / genes</li> <li>• uncontrolled cell growth / division</li> <li>• can form a lump of cells</li> <li>• made up of abnormal cells</li> </ul> <p><b>Differences:</b></p> <p>Malignant tumours:</p> <ul style="list-style-type: none"> <li>• are made of cancer cells, benign tumours are not</li> <li><b>or</b></li> <li>benign tumours are made up of cells that are more similar to normal cells</li> <li>• (usually) grow faster than benign tumours</li> <li>• invade neighbouring tissues, but benign tumours do not</li> <li>• can spread (to other parts of the body) but benign tumours stay in one place</li> <li><b>or</b></li> <li>cells can travel in the blood, but benign tumours do not</li> <li>• can form secondary tumours, benign tumours do not</li> </ul> | <p>max <b>three</b> marks if only similarities or differences given</p> <p>allow result from mutations</p> <p>allow benign tumours (often) have a layer of covering cells, malignant tumours (usually) do not</p> <p>ignore references to level of harm</p> | 4 | AO1<br>4.2.2.7 |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----------------|

## Q7. (2022)

A)

|      |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |                           |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------------|
| 05.2 | <p>little exposure to ionising radiation</p> <p><b>or</b></p> <p>little exposure to carcinogens</p> <p>(so) less cell / DNA / gene damage</p> | <p>allow little exposure to UV (light)</p> <p>allow little exposure to sunlight</p> <p>ignore little exposure Sun unqualified</p> <p>allow use sunscreen</p> <p>allow do not use sunbeds</p> <p>allow named carcinogen e.g. smoking</p> <p>allow (so) fewer mutations</p> <p>allow older people's (skin) cells are more susceptible to DNA damage</p> <p>if no other marks awarded allow <b>1</b> mark for skin cancer takes a long time to develop</p> | 1 | AO3                       |
|      |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1 | AO2<br>4.2.2.6<br>4.2.2.7 |

B)

|      |                                                                                                                |                                                              |   |                |
|------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---|----------------|
| 05.3 | any <b>two</b> from:                                                                                           | ignore the number of cases of skin cancer increases with age | 2 | AO3<br>4.2.2.7 |
|      | • more females than males diagnosed each year up to age 59 (years)                                             |                                                              |   |                |
|      | • more new cases in males than in females from 60 (years)                                                      |                                                              |   |                |
|      | • greatest number of people / males / females diagnosed in age group 65-69 (years)                             |                                                              |   |                |
|      | • number of new cases increases in <b>males</b> up to age group 65-69 (years) after which they decrease / fall |                                                              |   |                |

C)

|      |                                          |                                                                                 |   |                |
|------|------------------------------------------|---------------------------------------------------------------------------------|---|----------------|
| 05.4 | to account for the different group sizes | allow there are different numbers of people / males / females of different ages | 1 | AO3<br>4.2.2.7 |
|      |                                          | allow so the different group sizes can be compared                              |   |                |
|      |                                          | allow so it can be compared to populations in other countries                   |   |                |
|      |                                          | ignore to compare unqualified                                                   |   |                |
|      |                                          |                                                                                 |   |                |

D)

|      |                                                                                                                                 |                                                                                               |   |                |
|------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---|----------------|
| 05.5 | any <b>two</b> from:                                                                                                            | do <b>not</b> accept if referring to number of new cases                                      |   | AO2<br>4.2.2.7 |
|      | • number (of males / female per 100 000 population) increases with age                                                          |                                                                                               | 2 |                |
|      | • in females the number (per 100 000 population) increases at a steady rate                                                     |                                                                                               |   |                |
|      | • number (per 100 000 population) in males increases at a similar <b>or</b> at a slightly lower rate as in females up to age 55 | allow number (per 100 000 population) in males increases at a steady rate up to 55-59 (years) |   |                |
|      | • number (per 100 000 population) increases at a much higher rate in males than females above age 59                            | allow number (per 100 000 population) in males increases more rapidly above age 59            |   |                |

E)

|      |                                        |                                                                                            |   |                |
|------|----------------------------------------|--------------------------------------------------------------------------------------------|---|----------------|
| 05.6 | $\frac{116 \times 694\,000}{100\,000}$ | allow values in the range 114 to 118                                                       | 1 | AO2<br>4.2.2.7 |
|      | = 805.04                               |                                                                                            | 1 |                |
|      | = 805                                  | allow an incorrectly calculated number of males correctly rounded to 3 significant figures | 1 |                |
|      |                                        | if no other marks awarded allow <b>1</b> mark only for an answer of 5270                   |   |                |

## Q8. (2023)

|      |        |  |   |                           |
|------|--------|--|---|---------------------------|
| 01.1 | cancer |  | 1 | AO1<br>4.2.2.7<br>4.2.2.6 |
|------|--------|--|---|---------------------------|

## Q9. (2023)

|      |                                                                                                 |                                                                                                                                                                                                |   |                                      |
|------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------------|
| 01.2 | any <b>one</b> from:<br>• (coronary) heart disease / CHD / cardiovascular disease<br>• diabetes | ignore cancer<br><br>allow atherosclerosis<br>ignore heart attack<br><br>allow high blood pressure<br>allow stroke / asthma / depression / gallstones / (osteo)arthritis<br>allow sleep apnoea | 1 | AO1<br>4.2.2.4<br>4.2.2.5<br>4.2.2.6 |
|------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------------|

## Q10. (2023)

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             |   |                           |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---|---------------------------|
| 01.3 | any <b>one</b> from:<br>• taxes on high energy / fat / sugar foods<br>• education (about diet and health)<br>• (government) advertising<br>• restrict media advertising of high energy / fat / sugar foods<br>• information on food labels<br>• help / advice / groups for obese people via the NHS<br>• calorie information on restaurant / takeaway menus<br>• regulation of supermarket offers on high sugar / fat / energy foods<br>• regulation of type of foods for sale near checkouts<br>• exercise campaigns | allow increase the price on high energy / fat / sugar foods | 1 | AO3<br>4.2.2.5<br>4.2.2.6 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---|---------------------------|

## Q11. (2023)

|      |                                            |                                                                                  |   |                           |
|------|--------------------------------------------|----------------------------------------------------------------------------------|---|---------------------------|
| 01.4 | $BMI = \frac{69}{1.64^2}$                  | allow $BMI = \frac{69}{1.64 \times 1.64}$<br><br>allow $BMI = \frac{69}{2.6896}$ | 1 | AO2                       |
|      | BMI = 25.6(5437....)                       | allow 26 or 25.7                                                                 | 1 | AO2                       |
|      | (the person's BMI category is:) overweight | must be consistent with their calculated BMI value                               | 1 | AO3<br>4.2.2.5<br>4.2.2.6 |

## Q12. (2023)

A)

|      |                                                                                                                                        |                                                       |   |                           |
|------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|---|---------------------------|
| 01.5 | any <b>one</b> from:<br>• women will gain mass / weight (during pregnancy)<br>• (developing) baby will increase mass / weight of woman | allow BMI (of woman) will increase (during pregnancy) | 1 | AO3<br>4.2.2.5<br>4.2.2.6 |
|------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|---|---------------------------|

B)

|      |                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                      |   |                           |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------------|
| 01.6 | any <b>two</b> from:<br>• smokers had babies with lower birth mass<br><br>• women / smokers / non-smokers with higher BMI had heavier babies<br><br>• smoking had the greatest effect on birth mass in underweight women<br><br>• smoking had the least effect on birth mass in overweight women<br><br>• smoking had less effect on birth mass in overweight and obese women (than in underweight and healthy weight women) | statements must be comparative<br>allow converse statements<br>allow weight for mass<br><br>allow obese women have the heaviest / heavier babies<br>allow underweight women have the lightest / lighter babies<br><br>allow there is only a 365 g difference between the smallest and largest babies | 2 | AO3<br>4.2.2.5<br>4.2.2.6 |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------------|

## Q13. (2024)

|      |                                                                                     |                           |   |                |
|------|-------------------------------------------------------------------------------------|---------------------------|---|----------------|
| 06.2 | uncontrolled cell division / growth                                                 |                           | 1 | AO1<br>4.2.2.7 |
|      | invade neighbouring tissues                                                         |                           | 1 |                |
|      | (tumour) cells spread to different parts of the body / tissues in the blood / lymph | allow tumour metastasises | 1 |                |

## Q14. (2024)

|      |                                                      |                                                                                                                                                                                   |   |                                                 |
|------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------|
| 06.3 |                                                      | allow the converse if clearly stated                                                                                                                                              |   | AO2<br>4.2.2.6<br>4.2.2.2<br>4.4.2.1<br>4.4.2.2 |
|      | (need to breathe faster / deeper) to get more oxygen |                                                                                                                                                                                   | 1 |                                                 |
|      | (because) smaller surface area                       |                                                                                                                                                                                   | 1 |                                                 |
|      | (so) less oxygen in the blood                        | allow (so) less oxygenation of haemoglobin                                                                                                                                        | 1 |                                                 |
|      | (so) less (oxygen for) respiration                   | allow (so) anaerobic respiration increases<br>allow (so) lactic acid is produced<br>allow (so) an oxygen debt is created<br>do <b>not</b> accept energy produced / made / created | 1 |                                                 |