EXAMINERS' REPORTS

LEVEL 3 CERTIFICATE / DIPLOMA IN MEDICAL SCIENCE

SUMMER 2018

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MEDICAL SCIENCE

Level 3 Certificate/Diploma

Summer 2018

UNIT 1 – HUMAN HEALTH AND DISEASE

Most candidates attempted all questions and it was apparent that all candidates had sufficient time to complete the paper. A number of candidates failed to express themselves clearly and responses lacked the use of appropriate terminology or specificity, this was a problem in both Welsh and English medium scripts again this year.

The quality of written communication was again an issue for some candidates. They are reminded of the necessity for good English/ Welsh on the front of the examination paper. It was also clear that many candidates had difficulty with simple mathematical problems. It was refreshing to see that most candidates had appropriate equipment i.e. pencil and ruler for use with drawing the graph.

Section A

Pre-release Material

Facility factor (FF) 49.3, attempt rate 100%
Most centres had spent a considerable length of time preparing candidates for the pre-release section. These candidates scored high marks for Section A. There was a significant number of candidates, however, that had not thoroughly studied the pre-release and could not expand beyond the content of the article. The pre-release article was available for four weeks before the examination to allow preparation in advance. Questions were based both directly on the content of the article and wider knowledge taken from the specification.

Q.1 Candidates had no problem in stating three symptoms of vCJD which were listed comprehensively in the pre-release article. Where some candidates did not gain this mark was due to them not reading the headings in the table clearly and not listing vCJD specific symptoms.

Q.2 Here most candidates scored one mark for stating that there is a change in the stack of beta pleated sheets. Only a small minority stated that this had an effect on the secondary structure of the protein or that there were three alpha helixes in a normal prion compared to two in a diseased prion.

Q.3 **(a)** **(i)** The graph question was very straight forward this year and candidates who identified the correct data from the table scored well. The majority of candidates did score three marks here. Very few plotted incorrectly, and a small number clearly did not have a ruler with them in the examination to be able to connect the points with a suitable straight line so lost this mark.

(ii) Describing the trend on the graph proved no problem for most candidates with the majority scoring at least one mark for stating that CJD numbers were higher than vCJD numbers. However many did not get the second mark as their descriptions were not clear enough.

Q.3 **(b)** The calculation should have proved no problem to candidates as this was a very basic mathematical skill being tested. However many candidates did not achieve the two marks here as they were unable to find the correct figures from the pre-release material. There were a few candidates that did not round up correctly so lost one mark and a small number did not have calculators so could show their workings but struggled to note the correct answer on the line.

(c) Candidates struggled to answer this question with very few understanding that vCJD was not recognised pre-1995. Only a small number of candidates achieved any marks on this question.

Q.4 **(a)** Only a small number of candidates scored two marks here, where interviews were accepted for both qualitative and quantitative methods, the use of questionnaires alone was not awarded any credit as this was not specific enough for the mark. It is worth remembering that Unit 3 content will be tested in this unit and these two marks were clear examples of this.

(b) Again, here candidates failed to make the link with unit 2/3 and so only a very few managed to score two marks. Most were able to achieve one mark for stating that it was unethical to share information and also not being able to share information without consent was given as a correct answer by many.

Q.5 **(a)** The description of an EEG procedure was on the whole done well. This was directly linked to both the pre-release article and Unit 2 content. A small number of candidates mixed up an EEG with an ECG and gave excellent descriptions of the use of an ECG which obviously gave no marks. The majority of candidates correctly associated the EEG with brain activity and were able to describe the procedure for at least one additional mark.

(b) The majority of candidates were able to give the name of a condition that an EEG is used to detect, epilepsy being the example from the specification, but credit was awarded for other correct answers such brain tumours, stroke, brain cancers, Alzheimer's and stroke.

Q.6 **(a)** The majority of candidates were able to read the graph from the pre-release correctly and so were awarded the mark for this question. Where a candidate did not achieve the mark, they had not looked at the correct date range.

(b) The majority of candidates gave a correct description of the trend for 1 mark, but only very few achieved any further marks by explaining where this trend could be happening.

(c) This suggest question resulted in many random answers by candidates. Many believed that the increase in cases of CJD in France was because they went on holiday to the UK. Suitably correct answers were credited here when seen.

Section B

Q.7 FF 38.9, attempt rate 99.7%

(a) **(i)** Candidates did not correctly connect that the infected pork was cooked incorrectly or eaten raw to achieve this mark. Simply stating 'from infected pork' was not sufficient for the mark here. Clarity in answers was seen to be a problem for many on these questions.

(ii) Most candidates had no problem in stating two symptoms of pork tape worm infection.

(b) Here, candidates needed to state the method for prevention and then explain how this method would reduce the risk of transmission/ infection by a pork tape worm. Many were able to give one suitable method but lacked detail in their explanation. Many stated 'using antibiotics to treat the pigs' which was obviously incorrect and showed that they thought the infection was caused by bacteria.

Q.8 FF 39.8, attempt rate 99.8%

(a) The table was designed to be accessible to all and the diagrams should have been recognised with ease if candidates had been exposed to these in class. Teachers are reminded to use the teacher guidance if in doubt of the level of scientific detail that is needed to be taught. Here they would have seen that only the correct biological names for these cells would be accepted. As such, when candidates used red blood cells, white blood cells and platelets as names for the cells they did not gain the mark. They should use erythrocytes, leucocytes and thrombocytes for these cells. The error was carried forward for these and candidates were able to gain the second mark for the function. Very few failed to score any marks in the table, however very few achieved full marks.

(b) 1 mark was awarded here for simply stating a correct natural barrier and then the second for describing it's use. Skin was a popular answer here but candidate's clarity in their response when describing often meant they did not gain the second mark. 'Hair' was used by a number of candidates but the lack in biological specificity meant no mark awarded.

(c) **(i) & (ii)** Named deficiency disorders directly from the specification include scurvy and rickets. It was clear that many candidates did not know what caused these deficiencies and what their symptoms are. Many confused both giving a lack of vitamin D for scurvy and C for rickets. Most were able to gain a mark for a correct symptom many of these marks could have been guessed by candidates. This question should have been straight forward and should have been an easy four marks if candidates had revised their work.

Q.9 FF 36.5, attempt rate 99.8%

(a) Calculations are challenging, and this proved potentially trickier due to the candidates having to note the answer in standard form. Besides the usual issues of candidates not having a calculator it was apparent that many struggled with standard form. Many candidates were able to achieve at least 1 mark for the correct calculation and many achieved two marks for the correct answer, but not the third as they were unable to convert this into standard form.

(b) Again, large numbers were used for this calculation and it proved problematic. In many cases candidates failed to achieve the mark for the answer as they did not convert correctly between pounds and pence. The majority did achieve one mark for the workings.

Q.10 FF 35.3, attempt rate 100%

(a) The enzyme table was completed to a very poor standard on the whole. Candidates that understood this work scored well but those that had not learnt the enzyme names, products and site of production scored very badly. Candidates failed to give both glucose and galactose as products of lactose digestion so failed to achieve a mark for this. Many could name sucrase and sucrose but the site of production of trypsinogen was not answered well at all. It was a lack of scientific detail that let the candidates down here.

(b) **(i)** Around half of the candidates correctly identified the mucosa in the question.

(ii) Lubrication was a popular answer to this question, even though it was incorrect and so did not gain any marks. Candidates failed to connect the mucus in the stomach acting as a barrier to protect the stomach lining from the acid. Many candidates that stated it was used in protection, followed this up with saying that it 'stopped the stomach digesting itself'- this was not credited.

(c) Most candidates could state that enzymes worked at a specific pH but then did not follow this up with a description of how this could cause the enzymes to become denatured when in different pH around the body. Many identified the stomach acidity as a means of killing bacteria which was also credited.

Q.11 FF 41.2, attempt rate 100%

This was the best answered question in Section B.

(a) Only a small number of candidates could name the model of the plasma membrane as fluid mosaic. Here many just wrote 'phospholipid bilayer' which was in part in the stem of the question.

(b) Candidates could state that the heads were hydrophilic and tails hydrophobic, but this did not gain a mark as they then failed to describe their position within the bilayer.

(c) The name and position of different proteins in the bilayer was done very poorly. Many candidates gained a mark for stating 'channel/ carrier/ intrinsic/ extrinsic' but were then unable to describe their position in the membrane so failed to gain more than two marks on this question. Many candidates did not attempt this part of the question so it has become a discriminator.

(d) **(i)** Candidates had no problem on the whole in stating the trend between temperature and rate of diffusion.

(ii) Here, candidates failed to mention either 'kinetic energy/energy' so could not access the first mark and then for the second they failed to mention that collisions with the plasma membrane would increase so diffusion would increase. Instead, many described enzyme collision theory instead of diffusion which was incorrect- here candidates failed to apply the knowledge they had learned about particle kinetics to a different situation.

(iii) Most candidates were able to score well in this question as the majority were able to state two other methods of transport into/ out of cells. A large number were also able to describe how these methods differed to simple diffusion. This question was generally answered well and showed that candidates clearly understood this area of the unit, of course, some of this work was done at GCSE level so would be familiar to the candidates.

Q.12 FF 32.5, attempt rate 100%

This was the least well answered question in Section B.

(a) **(i)** Only a very few candidates scored any marks on this question and it became a discriminating question on the paper. A lack of scientific detail and use of key terms resulted in candidates writing lots but not accessing any marks. Candidates failed to mention that blood flow to the heart **muscle** or oxygen to the heart **muscle** was restricted so could not access these marks. This is a standard requirement at GCSE so it was disappointing to see this lack of clarity in answers.

(ii) The majority of candidates had no problem in listing lifestyle choices that could reduce CHD but failed to access marks again due to lack of detail in the answers. Simply stating diet was not sufficient- they needed to state 'low fat diet, low sugar diet,' the diet needed to be qualified. Exercise was another answer that was widely used without qualification, 'exercise more/ increase intensity of exercise' these were answers that we were looking for, simply stating regular exercise was too vague and so a question that should have been an easy two marks turned out to be done very badly by a large number of candidates.

(b) **(i)** The majority of candidates scored very highly on this question with most being able to describe the procedure for measuring blood pressure. This was a link to Unit 2 and candidates clearly understood this area of the work.

(ii) Only a very small number of candidates could define the terms systolic and diastolic. This is directly from the specification and so was very disappointing to mark. This again was an unintended discriminator.

(iii) Candidates that understood the question scored well with coherent descriptions of the different blood pressure in the aorta, capillaries and veins. Capillaries are not explicitly described on the specification but due to many candidates describing these we deemed it credit worthy. There were up to 13 marking points available for this question and candidates only needed to mention 5 for full marks but awarding this was very rare as candidates described everything but the pressure changes in the blood. Clarity in responses let the candidates down once again and thoroughly learning the work was needed to achieve a good mark on this question.

(c) This again, should have been a straight forward lifestyle choices question but ended up being answered very badly by many candidates. The question wanted a lifestyle choice and its effect for 1 mark and candidates needed to describe three lifestyle choices. Many candidates simply wrote a list of lifestyle choices with no effect described - this gained no marks. Again stating 'diet' as a lifestyle choice was not enough for the mark, candidates needed to state 'high fat diet' for example and then a description of its effect for 1 mark. Again, a recurrent theme this year was the lack of clarity and depth in responses that have lost marks that were easily accessible for even some of the weakest candidates.

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UNIT 2 – PHYSIOLOGICAL MEASUREMENT TECHNIQUES

General Comments

Thirty-Eight centres submitted work for this unit in this series.

Generally, the quality of work submitted by centres was of a good standard and the majority of the assessment decisions made by centres were accurate and agreed with the moderator's decisions.

There were instances where centres had over graded for some assessment criteria, often awarding higher band marks where the candidate's work was at best middle band.

For the majority of centres the administrative work was correctly submitted, with authentication sheets signed by the candidates. The majority of centres had correctly completed the mark record sheet, some centres had included detailed annotation on candidate's work which was very helpful to the moderation team.

Task 1

Evidence required: candidates need to produce pre-test information for three different tests; one of these tests must be an ECG.

A.C 1.1 needs to be demonstrated in each piece of pre-test information, as each piece is marked out of a maximum of 6 marks for this A.C (18 marks in total for this A.C). It is important that for A.C 1.1 candidates do not just describe the procedures for carrying out the physiological test but explain the **principles of how the test works.** So for example with peak flow test, candidates could explain about this test measuring airflow through the bronchi and thus the degree of obstruction and/or narrowing, with blood pressure candidates need to explain how the cuff inflates to cut off blood flow, then slowly releases, so that the sensor can accurately record when pressure returns. Explanations for blood pressure should include reference to systolic and diastolic measurements, what these are in relation to the cardiac cycle in order for candidates to be awarded top band marks.

Many candidates seemed confused about the principles of peak flow measurement.

Task 2

For this task candidates need to produce a plan (A.C 3.1). This plan should be detailed and cover things such as: identification of information to be collected, procedures that will be used, equipment needed, and the location and timing of the test; how/when patients will be informed of when they need to attend, what they should do/not do before the test; any other individuals that need to be contacted - e.g. technician, facilities etc.
Although the observation record can also support the achievement and assessment of this A.C, it is important that candidates do produce a written plan themselves.

Candidates need to perform a minimum of two tests on at least two patients. The two tests should test two different physiological systems, for example blood pressure test: cardiovascular system, peak flow: respiratory system. Tests such as BMI do not test a specific system and are not listed in the content for this unit (A.C 3.2). Pulse Oximetry and Blood Pressure are a permitted combination of tests.

If the test is Blood Pressure measurement; the expected clinical requirement is for this to be repeated three times. The taking of three readings, provides opportunities for data processing (A.C4.1), through the calculation of a mean. Three readings also provide data for students to then discuss repeatability and outlining results in their evaluations.

Task 3 and 4

These two tasks are linked, but it is important to ensure that candidates do cover all the required A.Cs. This includes describing possible limitations of the tests they have performed (A.C 1.3). These limitations should not be specifically about the individuals tested, but about the actual test/method of testing/equipment etc. If only one Blood Pressure measurement is taken, using this as a limitation is not good practice, as indicated above three readings are the expected for this measurement test.

Candidates should process data from the physiological measurement tests they performed and from the data with which they are provided (ECG trace). With the ECG trace candidates should label the components of the ECG (P, QRS and T) and undertake relevant analysis. They should also comment on the "repeatability of the two traces provided.

For A.C 4.2 Candidates need to provide conclusions which are detailed and are clearly linked to the evidence, this includes comparisons to expected norms and patient history. Candidates need to link their findings to expected physiology and possible pathology. Statements such as "individual is healthy" are not linked to evidence or suitable at this level as detailed explanations.

For A.C 4.4 it is important that candidates use scientific and technical language appropriately and consistently in the report for the head of department (e.g. hypertension rather than high blood pressure).

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UNIT 3 – MEDICAL SCIENCE RESEARCH METHODS

General comments

Thirty-nine centres submitted work for this unit in this series.

The quality of the work submitted was generally good and assessments by the centres were in the main accurate and in agreement with the moderators. It was pleasing to note that many centres had paid heed to the feedback given last year.

Administrative work was generally correct, with authentication sheets signed by candidates. It would be helpful if there was more annotation on the candidates' work, in the appropriate place, to indicate why certain bands and marks were awarded for the individual assessment criteria.

If centres are changing the task for the model assignment it is highly recommended that they contact WJEC to ensure that candidates can generate the evidence required to meet the assessment criteria.

When making a photocopy of the candidate's presentation, please ensure that any spreadsheets, tables and graphs are large enough to be clearly readable. This is especially important when statistical calculations are embedded into the spreadsheet.

If candidates start to plan their work with clear and measurable independent and dependent variables it sets the tone for the rest of the investigation; making planning the questionnaire, gathering and evaluating data and making conclusions more accessible.

Task 1: Planning to carry out the investigation

AC1.1: To achieve band 3 candidates are required to give clear descriptions of the variables along with how they will be measured or, for the extraneous variables, how they may be controlled or their effect minimised. To quote 'attitudes' as the dependent variable is too vague.

AC1.2: Whilst it is essential to quote the hypothesis for the investigation the marks are awarded for its justification. Candidates should consider why they have chosen to investigate this hypothesis and why the information produced might be valuable. Better candidates might refer to a research paper or newspaper article. There is no requirement to produce pages of secondary data.

AC1.3 & AC1.4: These were generally well answered by most candidates. There was some confusion between qualitative and quantitative data. The better responses referred to how the data might be analysed, for example, by giving examples of questions which will generate data for graph drawing or may be used for a named statistical test.

Task 2: Collecting information

AC2.1: To award band 3 the plan needs to be detailed for it to be followed by a third party. For example, it is insufficient to say that the questionnaire will be handed out. How will it be handed out? A few candidates lost all the available marks here for not including a plan.

AC2.2: For many candidates this was an exercise in collecting as much data as possible about smoking and the questionnaires contained far too many irrelevant questions. Consequently, far too much data was generated which did not link to the hypothesis making analysis difficult. It also resulted in investigations which were far too lengthy.

AC2.3: The use of spreadsheets for the raw data was an issue here with some candidates producing multiple pages of numbers and words, often in a miniscule font size, which had little resemblance to the questions asked. Candidates should be encouraged to collate their raw data and present it in suitably labelled tables. This will also contribute towards AC5.1.

Task 3: Analyse the data

This is the task the candidates struggle with the most.

Throughout this task there should be evidence that the candidates understand and apply the terms used in data analysis. If a statistical test is used then terms such as degree of freedom, probability, critical value, parametric should be used and explained in the correct context.

Candidates should explain why they have chosen a statistical test using terms such as nominal, categoric or ordinal to describe their data. Other terms might include correlation, statistical difference, trend and normal distribution. If necessary, the null hypothesis should be stated before carrying out the test. Note that the null hypothesis should contain the phrase 'there is no significant difference between …'

A well set out and analysed statistical test will meet many of the assessment criteria including AC3.1, AC4,2 and AC4.1 and 4.2.

A list of terminology and mathematical notation can be found in the Guidance for Teaching booklet.

AC4.1: A statistical test, such as Chi Square or Mann Whitney should be carried out correctly to achieve band 3. The Chi square test was used inappropriately by many candidates. Standard deviation can only be used to analyse data which shows a normal distribution. AC4.4. It is acceptable to analyse the data by using an excel spread sheet, but if candidates show the stages of the calculation of the statistical test it will help them to access marks for both.

AC4.2: The best answers here will be where the conclusions are clearly and logically linked to the evidence and to the null hypothesis. Candidates who do not carry out a statistical test can still make detailed and appropriate conclusions.

AC4.3: Requires candidates to evaluate their data and/or their procedures. Reference could be made here to the number of people in the sample, bias, reliability of the data collected along with any possible improvements.

AC4.4: Few candidates achieved above band 1 for this criterion. A mark for using significant figures correctly can only be awarded where there is clear evidence of a calculation having been carried out.

Task 5: Prepare a presentation

AC5.1 requires candidates to present their data visually and suitable for an audience of scientists and non-scientists. Any scientific terminology needs to be explained (link to AC 3.1). All tables and graphs need to be correctly set out. Tables need to have clear column headings (link to AC 2.3 and 4.4) and graphs need to be fully labelled.

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UNIT 4 – MEDICINES AND TREATMENT OF DISEASE

General Comments

Twenty-two centres submitted work for this unit in this series. This is the first time that any work has been submitted for this unit, so although centres have previously submitted other units, this was the first submission they had made for this unit.

Generally, the quality of work submitted by the centres was of a good standard and the majority of the assessment decisions made by centres were accurate and agreed with the moderator's decisions.

There were instances where centres had over graded for some assessment criteria, often awarding higher band marks where the candidate's work was at best middle band.

For the majority of centres the administrative work was correctly submitted, with authentication sheets signed by the candidates. The majority of centres had correctly completed the mark record sheet; some centres had included detailed annotation on candidate's work which was very helpful to the moderation team.

Task one

In completing their presentations, candidates are specifically asked to provide a reflective account of their contribution to team work (A.C 4.3). Whilst the assessor can also comment on this in the observation record, the reflection is a specified piece of evidence (see assignment brief). On this occasion assessors marks as indicated on the observation record have been taken as correct. In future submissions candidates must provide this required piece of evidence.

Whilst the assessor observation record does validate the marks awarded for this aspect of the assessment, it is good practice for candidates to include their actual group presentation (just one copy per group is sufficient), as well as any presentation notes.

Tasks 2 and 3

A.C 2.1: There was often a lack of detail in the explanations provided regarding the molecular basis of the action of a medicine.

A.C 2.2: Candidates should directly reference the body systems that the medication effects, and not just discuss an individual organ affected by the medicine.

A.C 2.4: Often candidates did not provide a suitable or detailed enough explanation of why medicines can lose their effectiveness across all the medicines discussed. Candidates do need to provide this explanation across all medicines discussed in order to be awarded the top band marks (this clearly specifies medicines and examples).

A.C 2.7: Candidates often failed to explain clearly how adverse reactions to medicines occur; instead they only provided a list of possible adverse reactions which is not the requirement of this assessment criterion.

A.C 3.4: Candidates are expected to discuss in detail the impact of new therapies and not just describe the techniques.

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UNIT 5 – CLINICAL LABORATORY TECHNIQUES

General Comments

Twenty-two centres submitted work for this unit in this series. The quality of work submitted was generally good, although some centres had not completed all the tasks. Most centres correctly submitted the required administrative work and authentication sheets signed by the candidates, however folders and polypockets are unnecessary, simply using a treasury tag to ensure all candidate's work is together would be sufficient. The mark scheme for this unit can be found in the specification and it may be worth sharing this with students before they begin the assignment, as some had not included all the required information.

Activity 1 - Use of Clinical Laboratory Techniques

The tasks are linked with the candidates being expected to plan and carry out the investigation, collecting results which they then summarised in a separate report. Most candidates were able to gain marks in all assessment criteria. A.C 2.1 required candidates to plan three tests, it was expected that for the highest marks they would:

- say what each test was for
- write a brief, but accurate method which would work (e.g. not streak testing, as colony numbers had to be calculated)
- state the expected results.

The observation record, provided for the assessor to complete, must include the mark for the tests. This was not completed by all centres, meaning marks could not be awarded as there was no evidence to show some aspects of A.C 2.2. When recording the data for A.C 2.3 marks were lost due to a poor use of precision and units. Those who had been given proformas did not always provide the required information, at this level, candidates should be able to present their own findings. A.C 3.4 was assessed here. The task required a brief summary and no diagnosis. Not complying with these instructions lost some candidates marks and the quantity of work produced must have made it very difficult to complete within the time constraints.

Activity 2 - Clinical testing

The tasks here were more discrete. The first task often lost candidates marks, with the second being done well by the majority.

Task 1 required candidates to produce a leaflet. Marks were lost from A.C 3.4 when this instruction was not followed. The leaflet needed to relate to the principals of the three tests. Many candidates wrote about what the patient would be required to do rather than how the test actually works, which is what is described on the mark scheme for A.C 1.1. Very few candidates had included information for A.C 1.2 on the factors which would affect each of the three tests and this was a place where many candidates lost marks, with only one or two giving an accurate, detailed and coherent explanation, showing detailed reasoning of the factors that affect each of these clinical tests.

Task 2 was an analysis of results the candidates had been given using the values supplied. The graph required for A.C 3.1 needed to have suitable scales and be accurately drawn and labelled; hand drawn graphs tended to achieve the highest marks. It needed to be constructed using the means calculated for A.C 3.2. Most candidates did manage these calculations. However, the mark scheme requires calculations to be clearly and logically presented using consistent, accurate significant figures, many candidates losing marks for these aspects. The marks for A.C 3.3 tended to be good with most candidates able to analyse the marks for all information provided. Again, there needs to be no diagnosis and the information should be brief.

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UNIT 6 – MEDICAL CASE STUDY

This was the first time that this unit has been examined and it was pleasing to see that most of the candidates attempted all of the questions. The questions in this paper are based on a pre-release which is made available four weeks before the examination.

The pre-release / resource folder contains information about three medical conditions. In this examination the medical conditions were COPD, Athlete's foot and Anaemia. Candidates are expected to study and research the information presented in the resource folder.

A case study and additional materials about each medical condition were also included in the examination.

Questions 1-5 – Case Study 1 - COPD

Facility factor (FF): 50.7, attempt rate 100%

Q.1 This question uses information from the resource folder focusing on tests used in the diagnosis of COPD. Information about the tests are expanded upon in the case study and additional material is given in the examination.

(a) Most of the candidates were able to describe how the peak expiratory flow meter measures the flow of air forcibly expelled through the airways and how the equipment is used by the patient. Many candidates omitted the important first step of inhaling (to total lung capacity) before being able to breathe out and so they only gained 2 marks here.

(b) Only a few candidates understood the difference between a COPD patient and an asthma patient on the PEF test. Asthma patients would see an improvement in the PEF results with bronchodilators or the PEF would get worse with a suitable trigger.

(c) In (i) most candidates were able to read the FEV_1 and FVC from the graph and use the equation given to calculate the FEV_1% and so gained 3 marks.

In (ii) most candidates were able to use their answer to part (i) and the additional information given (the GOLD system) to determine the severity of COPD. If the candidate had incorrectly calculated the FEV_1% in part (i) an error carried forward (ecf) was awarded as long as the candidate used their answer to part (i) and correctly determined and described the severity based on their answer.

Q.2 The candidates were expected to comment on two differences between a normal and COPD patient. The graph showed differences in volume and air flow. Most candidates were able to describe these differences and give simple but suitable explanations. Many candidates' descriptions were rather vague but they were able to gain credit by giving simple but suitable explanations.

Q3 This question focusses on the drugs mentioned in the pre-release and how they work.

(a) Most candidates understood the fact that bronchodilators dilate the airway and so increase air flow. However very few candidates recognised that the bronchodilators relax the muscles to allow the airway to dilate. Many only gained 2 marks here.

(b) Most candidates understood the role of corticosteroids as anti-inflammatory drugs, but many did not explain how this would be used in a COPD patient.

Q.4 Figures 2 and 3 were needed to answer this question.

(a) Many candidates managed to correctly calculate the saving. It was evident that a number of candidates incorrectly calculated the saving by over complicating the calculation with transfer errors when converting billions to millions instead of using the difference in percentage use.

(b) Most candidates were able to identify at least one trend – the prevalence of COPD increases with smoking. Less identified that it increases with age.

(c) Most candidates suggested at least one suitable reason for increased funding, usually increasing population or cost of medication increasing.

Q.5 Nearly all candidates were able to describe the type of medication used to give up smoking – some use of nicotine replacement therapy.

Questions 6 -11 – Case Study 2 – Athlete's foot

Facility factor (FF): 46.5, attempt rate 100%

Q.6 Nearly all the candidates could state at least one environmental condition that increases the risk of athletes foot.

Q.7 Figure 4 was used to answer this question.

(a) **(i)** Candidates will have learned about the null hypothesis from unit 3. Most candidates were able to correctly state this hypothesis.

(ii) Many candidates could state one advantage of the chosen test – random sampling – usually answers related to a non-biased sample or sample that would be large. However less candidates could state a suitable disadvantage.

(b) Nearly all candidates could identify one trend and compare the prevalence of athlete's foot in males and females.

Q.8 This question links to the resource folder - symptoms.

(a) Many candidates repeated the stem of the question in their answer and were awarded no marks as it lacked any explanation.

(b) Many candidates gave an incorrect disease, diabetes, as their example of an immune-suppressed condition. Type 1 diabetes is an autoimmune disease and leukocyte levels are in fact elevated in diabetes. Answers relating to transplants or chemotherapy patients were the usual correct answers.

(c) Candidates usually scored one mark here, usually for realising diabetics are more likely to have amputations but with little reasoning why. Those who scored two marks often referred to the lack of blood flow in the foot so secondary infection rates would be higher.

Q.9 This question links to the resource folder - treatment.

(a) **(i)** Most candidates were able to give two advantages of the use of topical treatment.

(ii) Many candidates gave one disadvantage – usually relating to side effects e.g. irritation or similar.

(iii) In this part most candidates gave one alternative – usually by oral or tablet form. However many gave the term injection, which was not awarded a mark.

(b) Most of the candidates could recognise that ergosterol was a steroid. However fewer candidates could suggest how the absence of ergosterol in the cell membrane would cause the death of the cells. Many candidates referred to the cell wall and the death of the cell wall.

Q.10 This question refers to the resource folder – prevention.
The candidates were expected to understand what was meant by 'good foot hygiene'.

Many of the candidates understood that reducing moisture levels in the shoes or socks promotes good hygiene and reducing the spread of the fungi in towels would decrease incidence of the disease.

Q.11 Figures 5 and 6 were used to answer this question.
It was pleasing to see that nearly all of the candidates were able to calculate the cost of the patient's treatment correctly.

Questions 12 -14 – Case Study 3 – Iron deficiency anaemia

Facility factor (FF): 39.8, attempt rate 100%.

Q.12 **(a)** Most candidates were awarded one mark in this part - usually for recognising that haemoglobin was made up of four polypeptides. Many did not refer to the haem group or any named bond in the protein.

(b) **(i)** Many candidates gave vague advantages or described the use of the test rather than state the advantages so gained no marks.

(ii) A number of candidates gave a very brief overview of the use of the test and gained no marks. Many candidates confused their method with an ELISA test, some credit was awarded for any relevant point. However, many candidates made a reasonable attempt at describing the RIA. One mark was awarded for the sequence of the description given.

(c) Figure 9 was used to answer this question.

(i) The standard definition of standard deviation was given by many of the candidates.

(ii) Many candidates were awarded 2 marks for the plot of the standard curve with a tolerance of +/- less than one small square. However very few candidates gained the mark for drawing the curve. Very few were drawn with a ruler.

(iii) Many of the candidates were able to determine the correct concentration of the ferritin by using their graph.

Q.13 Figure 7 was used to answer this question.
Most candidates gained only one mark here. Usually the candidates were able to recognise that an unbalanced diet affected the prevalence of anaemia in developing countries. Very few candidates related the prevalence to poor health care or higher pregnancy rates.

Q.14 Figure 8 was used to answer this question.

(a) Only a few candidates were able to use the graph to describe how the cardiac output was affected by anaemia and gain the 2 marks available. Many of candidates' descriptions were poor and often just stated that the 'cardiac output increased'.

(b) Most candidates explained that there would be less oxygen available because of the lack of haemoglobin or the presence of anaemia which was good. However many failed to link this fact to the effect on the cardiac output. These candidates were awarded one mark.

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