November 2017 subject report

ITGS

Overall grade boundaries

Higher level

Grade:	1	2	3	4	5	6	7
Mark range:	0 – 11	12 – 23	24 – 37	38 – 48	49 – 58	59 – 69	70 - 100

Standard level

Grade:	1	2	3	4	5	6	7
Mark range:	0 – 10	11 – 22	23 – 33	34 – 45	46 – 57	48 – 69	70 - 100

Higher level internal assessment

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 – 4	5 – 8	9 – 11	12 – 15	16 – 18	19 – 22	23 - 30

The range and suitability of the work submitted

The findings from the November 2017 session for ITGS Internal Assessment - Higher and Standard Level are consistent with those in Internal Assessment - Higher and Standard Level in the ITGS May 2017 Subject Report. Therefore, the May 2017 Subject Report needs to be considered along with the observations highlighted in this report.

Most ITGS Projects were developed following the assessment criteria and submitted according to the submission requirements. The OCC ITGS discussion forum, has now been replaced by the My IB ITGS discussion forum. It has been used by ITGS teachers for advice regarding the ITGS Project. A current ITGS Project checklist has also been provided in the discussion forum.

Generally, the client, the problem addressed and the IT solutions were appropriate. In some instances, the product was poorly designed, too simplistic or contained too little content.

Candidates used Forms.zip to develop the contents for the ITGS Project folder. The templates and file and folder names may not be changed.

The Teacher Marks Justification Form included with each of the ITGS Projects zipped files in the sample included the marks awarded and the teacher's comment for each of the assessment criteria. ITGS teachers generally awarded marks higher than the moderated marks indicating a misinterpretation of the assessment criteria.

Candidate performance against each criterion

On all criteria, there is a lack of detail relating to the specific client, problem, product, process, design, tools, resources, and techniques. Many entries were generic throughout the documentation. The descriptions could refer to any product of the type being developed.

Criterion A:

The major weakness is both in the methods used to consult with the client and also in poorly constructed interview questions which provide little support for Criterion A.

Criterion B:

Varied between 1-3 marks out of 5 marks. Generally, there was a lack of detail in the Requirements Specification. Specific Performance Criteria (SPC) were especially weak and not

measurable. The SPC is important as a basis for testing in Criterion E and for evaluation in Criterion F. The justification for the chosen solution was, in most instances, adequate.

Criterion C:

Not all stages of development were included. Many project schedules contained generic entries which did not refer to the specific client, problem, solution being developed, techniques being used.

Criterion D:

The entries continue to be generic and simplistic. The overall structure and internal structure were not communicated well and lacked appropriate design and detail. This is particularly evident for both website and database products. Students need to research how to best present the overall structure and internal structure/design for the products being developed. In general, the description of techniques and resources were limited and testing was generic. The client's signature in most cases was provided.

Criterion E:

Some description of the techniques with screenshots was provided, but there were few instances where the reasons for the use of the techniques was explained.

Criterion F:

The feedback from the client was not always aligned with the product. Some client feedback did not include responses about to what extent the Specific Performance Criteria had been met. Recommendations were not always described well and, at times, were superficial and included features that should have been included in the Product.

Criterion G:

The marks awarded on Criterion G, which has 4 technical requirements were often inconsistently awarded. In a number of cases the teacher awarded a mark without any evidence, for example, no subfolders within the Product Folder. Screencasts must be provided to demonstrate that the product is fully functional, contains sufficient content and demonstrates the techniques highlighted in Criterion E. Silent screencasts are not helpful because they rely on the moderator trying to 'guess' what is being demonstrated.

Recommendations for the teaching of future candidates

For additional information regarding the ITGS project, please consult:

- ITGS Guide (pages 56-72)
- Teacher Support Material (Internal Assessment)
- Forms.zip templates
- *Guidance on the appropriateness of an Information Technology solution* for the project
- ITGS Subject Reports, especially the M17 subject report
- Project Checklist at https://docs.google.com/document/d/1z78MuvNcUR3tSIypG42-

PSIFHiOmzIwaQAS0qYTv8tI/edit

For additional professional development regarding the ITGS Project, please participate through:

- My IB ITGS discussion forum and My IB ITGS Project group
- ITGS online workshops (cat 1, cat 2) or ITGS face-to-face workshop (cat 1, cat 2, cat 3)

Standard level internal assessment

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 – 4	5 – 8	9 – 11	12 – 15	16 – 18	19 – 22	23 - 30

The range and suitability of the work submitted

Candidate performance against each criterion

Recommendations for the teaching of future candidates

Further comments

Higher level paper one

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 – 6	7 – 13	14 – 20	21 – 26	27 – 32	33 – 38	39 - 60

General comments

Higher level (HL) Paper 1 and Standard level (SL) Paper 1 are separate components. However, many of the comments that apply to one component apply to the other. Given the overlap between the HL and SL papers (three out of the four SL questions also appeared on the HL paper), **comments offered for SL Paper 1 should be read in conjunction with those for HL Paper 1.**

In this session the three questions common to both papers were as follows:

Q1 - Voice biometrics technology in banking

Q2 - Goal-line technology in soccer (football)

Q3 - Social media and political tension

The comments for these common questions are included within the HL Paper 1 comments on specific questions.

The areas of the programme and examination which appeared difficult for the candidates

Overall, candidates had difficulty conceptualizing the subject so there is a tendency for generic responses and an inability to use specific examples as well as subject specific vocabulary. The best many students could do was description while analysis showed up very rarely. Memorizing definitions and other information is not enough. What is needed is understanding and existing knowledge that a candidate can apply to new situations.

In part b when the command term is “analyze” few candidates went beyond description to engage in analysis supported by reasoning and detail. Candidates had somewhat less trouble with explanations. The command term asks students to explain **why** something occurs, **why** it is important to the point s/he is making, or **describe** the consequences of a policy/action/ uses of IT. Each of these requires specific support.

Part c of the questions posed the most significant problems. Some candidates are still writing lists, usually of advantages and disadvantages, sometimes with minimal description, and often in the form of bullet points. However, the command terms for question c should elicit developed arguments, not lists. To earn a 5 or above for these questions, candidates need to show evidence of critical thinking by providing arguments that are supported by reasoning, examples, and details.

Surprisingly, the part B questions provided the most difficulty specifically because candidates had not really conceptualized the content.

The areas of the programme and examination in which candidates appeared well prepared

Being able to answer three questions instead of four gave a number of candidates the opportunity to think carefully and develop their ideas more thoroughly. Candidates need to be taught how to take advantage of this opportunity.

Candidates were able to deal with question a most of the time and b quite often.

The strengths and weaknesses of the candidates in the treatment of individual questions

Question 1: Voice biometrics technology in banking

a i Nearly all candidates got this right.

a ii Most candidates earned at least 3 marks. The most common issue was failure to realize that the voice is stored in a database.

b Candidates who were secure in the definitions did very well. The most common errors were confusing privacy and security and not understanding anonymity at all.

c Many students did not realize that changing passwords is automated, and so they saw the elimination of passwords as a benefit for IT support. Quite a few realized that voice recognition is still vulnerable to attack and that some people might have physical conditions which would not allow them to use it. However, few students went beyond listing or briefly describing these issues.

Question 2: Goal-line technology in football (soccer)

a i Nearly all students know that resolution referred to the number of pixels in an image but few were able to go beyond that.

a ii Candidates generally were either able to do the calculation or not.

a iii Most candidates were able to provide one field and many were able to provide two.

b Candidates who dealt with the issue raised by the question i.e. the quantity of data did quite well and were able to distinguish between collection, storage, and sharing. Some students suggested a relational database because they reduce redundancy. However, the focus of the question was on a policy and on the amount of data stored rather than the way it was stored.

c Overall, candidates were able to identify pertinent issues as this is a very familiar topic for them. However, going beyond identification and some description to analysis proved difficult.

Question 3: Social media and political tension

a i Nearly all candidates were able to answer this question.

a ii Some candidates were able to provide two characteristics; many managed at least one.

a ii Many candidates were able to provide two characteristics; some managed at least one.

b This question was difficult to be specific about because it wasn't clear whether monitoring involved denial of access or some sort of disciplinary approach. Overall, answers were very vague with little analysis.

c Quite a few candidates distinguished between surveillance and censorship thus offering a more nuanced argument. The best were able to pursue ideas in depth and see implications.

Question 4: Expert systems in healthcare

a i A surprising number of candidates did not seem to understand interface. Those who did got at least one mark, often two.

a ii Answers here were rather vague indicating that many candidates really didn't understand the job of a systems analyst

a iii Candidates either understood this or they didn't. Many did.

b In many cases, this was handled quite well with not only general comments made but development of the ideas. Some candidates seemed to think that the information being collected was essentially a medical record for the individual patient rather than information that would help design the system. This lead them astray.

c Because few candidates did not really understand a medical expert system, they really struggled with this question. Many students assumed patients would be using the system, highly unlikely.

Question 5: Patrolling train stations with a Segway

a i Few problems here.

a ii Surprisingly, a number of candidates did not know what a prototype is, and quite a few did not apply their answer to the added features as stated in the question.

b Candidates who understood alpha and beta testing did very well, but a surprising number could not go beyond basic definitions.

c This was a difficult question as the focus was on machine learning which most candidates did not understand in a way that would enable them to answer the question.

Question 6: Student counseling

Not enough candidates answered this to say anything of substance. However, it could have been much easier for students to deal with than question 5 if they had studied expert systems and fuzzy logic at all. It would have been a better choice than question 4.

Question 7: Social robots

a i Nearly all candidates were able to answer this correctly.

a ii Candidates had great difficulty with this question because many seemed to think that the internet was somehow involved.

b This should have been quite straightforward and for some candidate it was. But many did not fully understand PDFs or the difference between hosting the documentation online and allowing users to download it.

c This question was quite difficult as the types of decisions Jibo might make was not specified. However, some candidates did produce some good ideas.

Recommendations and guidance for the teaching of future candidates

- Read the Subject Report. Please! Additionally, the May 2017 Subject Report provides valuable help in preparing students to answer exam questions.
- Next November there will be three questions which could deal with robots/AI/3:11 in an integrated manner. These topics need to be studied.
- Concepts should be taught in specific contexts so candidates can see how the concepts relate to real world conditions. Then, candidates should be presented with a new scenario (context) and asked to apply what they have learned to that new situation. This can be done by using current news articles from reliable sources and creating activities that require candidates to provide supported arguments and to evaluate the impacts of information technology on specific stakeholders.
- Candidates should keep a record of what is learned in class including copies/links to news articles discussed, notes on concepts which have been taught, copies of formative assessments and so. The format does not matter as long as the candidates have an organized body of material to review before the exam.
- Sample exams with comments will be provided in the Teacher Support Material. Teachers should check My IB regularly to see when they will be available. In addition, a different set of examples will be provided for use in workshops.
- Teach candidates how to read questions carefully so that they do not miss key elements or misinterpret the question entirely.

- Candidates need to be thoroughly familiar with the markbands and the command terms. This can be done by using them for formative assessments, having candidates use them to evaluate their own work and/or the work of other candidates, and applying them to samples such as those available on My IB.
- Often textbooks, news articles, and websites do not provide clear substantive explanations of topics related to artificial intelligence and robotics. For teachers, the best sources for understanding the basic concepts are often, take a deep breath, books. MIT and Oxford Press each have a series of books that are very short (100-200 pages), low cost, basic introductions to a number of technological topics. Occasionally they can become a bit obtuse but overall, they offer clear systematic explanations that are hard to extract from websites and article and develop concepts beyond the kind of comprehensive texts sometimes used in ITGS classes. They can be a good resource for teachers.
- An effective approach to teaching students how to develop an idea is to provide them with a sample answer to question c (or a similar writing prompt), project that on a screen so the entire group can see it, and then as a group revise the text so that it reaches a proficient level (detailed knowledge, ITGS terms, well supported and balanced analysis). Follow up activities could include having pairs of students do the same process, exchange their work with another pair of students so that each pair marks the other pair's work. Then can then discuss the result or present it to the entire group. These kinds of activities can begin with simple paragraphs that develop one idea and progress to more complex arguments. Writing exercises should be incorporated throughout the entire course.

Standard level paper one

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 – 4	5 – 8	9 – 13	14 – 17	18 – 22	23 – 26	27 - 40

General comments

Higher level (HL) Paper 1 and Standard level (SL) Paper 1 are separate components. However, many of the comments that apply to one component apply to the other. Given the overlap between the HL and SL papers (three out of the four SL questions also appeared on the HL paper), **comments offered for SL Paper 1 should be read in conjunction with those for HL Paper 1.**

The areas of the programme and examination which appeared difficult for the candidates

The comments made in the HL section of this report also apply here and should be read in conjunction with these additional notes.

It is worth reinforcing the comments in the HL section about candidates' understanding of the command terms. These are vital as they delineate the expected scope and depth of responses. Some candidates appear to have been taught that responses for part a questions using *identify* can always be reduced to one word, which is not necessarily the case. Although there is no expectation for candidates to write full paragraphs, there are some occasions where at least a phrase or sentence is needed in order to identify adequately the term or concept specified by the question.

Although candidates are getting better at setting their responses in the overall context of the scenario for part b and part c responses (see comments in the following section), many candidates are still essentially writing generic responses and then simply labelling them with words and names from the scenario. An undeveloped, list-like response with some scenario-specific words tacked-on is still an undeveloped, list-like response.

As the HL comments suggest, candidates need to try to conceptualise the scenario and explore how their knowledge of ITGS concepts and terminology from the three strands might apply to that specific set of circumstances and impact the specific stakeholder(s) mentioned in the question. This will often require a degree of speculation, particularly when scenarios are outside the direct experience of the candidate. What markers are looking for are detailed, balanced, plausible responses, *explored* through reasoned arguments, supported by appropriate examples, leading to balanced and substantiated conclusions that *answer the question* asked.

The areas of the programme and examination in which candidates appeared well prepared

The comments made in the HL section of this report also apply here and should be read in conjunction with these additional notes.

Although a significant number of candidates are still giving generic responses, especially to part b and part c questions, the message from past subject reports about setting responses in the context of the scenario detailed in the stem* does seem to be having a positive impact on many candidates' responses.

*the introductory paragraph(s) that set the context and scenario for the overall question and any additional information provided before each question part.

The strengths and weaknesses of the candidates in the treatment of individual questions

In this session there were three questions that were common to both papers. They were as follows:

Q1 -Voice biometrics technology in banking

Q2 - Goal-line technology in soccer (football)

Q3 - Social media and political tension

The comments for these common questions are included within Section A of the HL Paper 1 comments on individual questions.

Question 4: Sports watches used in physical education (PE) lessons

a i Most candidates answered this question correctly. The term "vital signs" is interpreted fairly broadly by the markscheme as ITGS candidates are not expected to know the strict medical definition.

a ii Many candidates answered this question correctly and most understood the relationship between Bytes and bits. Where marks were lost this was mainly due to calculation errors.

b i Most candidates could identify a use of the monitoring device by students although a significant number did not adequately explain why this use consituted an advantage.

bii Many candidates answered this question well. However, a significant number suggested a further advantage for *students*, at best with the very generalised addition that as the teacher was legally responsible for the welfare of the student, this was, de-facto, also an advantage for the teacher.

b iii Many candidates could identify a potential source of unreliability of the sports watches, although at times this was expressed in very generic and vague terms. Far fewer were able to

explain why this would be a concern for the teacher. There was a significant minority of responses that made no mention of the teacher at all.

c One striking thing about some of the responses to this question was the variety of assertions made about the nature of *Fitness World*. The question itself only identifies *Fitness World* as a 'third party'. Candidates' responses did require a degree of speculation about the characteristics of this third party and some plausible suggestions could be made based on the name. However some responses included lengthy passages asserting *Fitness World*'s 'global reputation', business structure, level of employee competence etc. as unarguable statements of fact. Even when these imagined details did not negatively impact the quality of the responses, they fequently represented a use of time during the examination that was unnecessary and in many cases added little to the arguments presented.

That aside, most candidates did manage to explore some valid implications of data sharing for stakeholders. In many cases, valid points were raised for the student and *Fitness World* but candidates did not develop their responses to relate them effectively specified focus of the question, whether the Principal at Collège Earlet should agree to share data.

Recommendations and guidance for the teaching of future candidates

With the exception of the explicit reference to robotics and AI, all recommendations and guidance in the HL section of this report apply to SL candidates.

Paper two

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 – 2	3 – 5	6 – 8	9 – 11	12 – 15	16 – 18	19 - 26

General comments

This paper uses the same questions and assessment criteria but a different article for each session. The IT system in this article, a university MOOC, was a complex IT system, and there was evidence that some students were not familiar with how a MOOC worked. However, the article contained a significant amount of material that candidates could use and relate back to other virtual learning environments that they had used in their own school or online studies, e.g. tutorial sites, or studied. This paper requires the use of transferable skills.

In this session, there was a significant increase in the number of candidates who used extra script pages to write responses, especially for Question 2a and Question 3. This may have reflected the complex IT system and the number of issues raised in the Article for the various stakeholders. The overall impact was an increase of candidates in the mid-range grades of 4, 5 and 6 compared to previous sessions. At the top end, there was less analysis and evaluation which resulted in fewer 7s, but conversely at the lower end there was enough material in the Article for candidates to use if they wanted to which resulted in fewer low grades.

This comment applies to every session. The questions lend themselves to a structured (rather than templated) approach and teachers seem to be emphasizing this to their students. However, teachers must be careful not to impose a restrictive template that stifles creativity and higher order thinking. It is clear that teachers are preparing their candidates using this approach when responding to Question 3 (Criterion C) and Question 4 (Criterion D). Even though it was evident that the candidates could easily access a range of ITGS issues and IT topics in the Article, the depth of analysis and evaluation which was needed for access to the higher markbands in Question 3 and Question 4 was lacking in the same way as in previous sessions. Teachers need to emphasize that it is not enough to only identify and describe issues and problems, but there also needs to be an analysis and evaluation the overall impact of the IT system.

Interlinked ICT systems, such as MOOCs, are becoming more prevalent and candidates are encouraged to study a variety of them if possible. This paper is likely to evolve as the IT systems that existed in 2010 (when the course was first taught) are likely to have become obsolete. This evolution of IT systems can be a problem for candidates and teachers as these larger and more complex IT systems are often outside the direct experience of both, and examples may be difficult to access. Therefore, in order to be well prepared for this paper and the other ITGS Papers, teachers and candidates need to keep up with developments in IT.

The areas of the programme and examination which appeared difficult for the candidates

As usual the higher mark bands for Question 3 and Question 4 were rarely accessed as there were very few substantiated conclusions. Many of the conclusions that were provided were often no more than a summary of the analysis. Additionally, a significant number of candidates did not provide enough balanced analyses to enable a meaningful conclusion to be drawn.

A second area of weakness was that too often candidates will identify a concern or impact and not provide details. A technique to solve the problem is for teachers to direct the candidates to explain why there is a problem, or why there are positive or negative impacts. In the process of explaining why, candidates usually provide the relevant details.

Candidates seemed less well prepared for responding to Question 1 and Question 2 than in previous sessions. Perhaps this was due to the complexity of the topic in the Article.

The areas of the programme and examination in which candidates appeared well prepared

Again, it was pleasing to see structured responses in Question 3 and Question 4. However, the use of an overly templated structure can inhibit the use of higher order thinking skills needed to access the higher markbands.

The strengths and weaknesses of the candidates in the treatment of individual questions

Question 1 (Criterion A)

This question is meant to be an opportunity for the candidates to become engaged with the details of the article and the major themes of the articles. The material required in the responses usually comes directly from the Article and candidates who did not use the Article well inevitably lost easy marks.

Part A

Generally, this question was done well, often with responses focusing on the digital divide (for individuals and/or small universities), and a range of other issues from the Article. A problem in this session was the uncertainty of naming concerns which could have various contexts, specifically reliability, authenticity, integrity. However, if the concern was described well the marks were awarded. There were still some concerns about privacy and hacking, even though both were not entirely appropriate for this article considering the type of ICT system and the range of other issues in the article.

Part B

This question is about the use of the ICT by the stakeholders. Some candidates did not include the details in the ICT system but provided general descriptions, or became side-tracked

discussing impacts on various stakeholders. However, most candidates answered this question well. The emphasis in this question is on what the stakeholders are doing with the ICT system, which is a distinct contrast to Part A.

Question 2 (Criterion B)

Part A

Considering the limited space in the answer booklet, and the complexity of the IT system, it was not uncommon for candidates to use pages from an extra answer booklet, which is very useful for demonstrating their technical knowledge. The purpose of the question is to provide an opportunity for the candidates to demonstrate their technical knowledge of the IT system and an understanding of how it is used in a specified context. The markscheme is looking for the difference between the IT that is included in the Article, and the IT that could be used to demonstrate their knowledge that goes beyond the Article.

The candidates were required to provide the steps for using the IT system: A Virtual learning environment (VLE) for learners to participate in online courses. The key word here is 'participate' and candidates were expected to include connectivity steps, and the steps for using the VLE, especially the input, output, and the processes when interacting with the online course, with reference to storage. Too many candidates focused on the connectivity part which has been a significant part of previous articles. Other candidates provided a list of features of the VLE rather than how to use them. Others missed out many of the details, especially the interaction steps.

Part B

The connection between the IT system and the concern needs to be explained. Often candidates provided more information about the concern but did not explain the connection to the IT system. It is recommended that candidates attempt this question immediately after Question 1a, and then return to Question 1b and Question 2a. The response needs to focus on the deficiencies of the polices, hardware, software, processes, etc. associated with the use of system, to analyse WHY these deficiencies enable the negative impact/effects to happen. Many candidates only explained how the negatives could happen. The markscheme clearly shows the difference between the HOW and the WHY.

Question 3 (Criterion C)

The more successful responses were structured on the various stakeholders as specified by the question, rather than an issue based structure, such as privacy and digital divide. This often-enabled candidates to provide a balanced set of impacts for each of two main stakeholders. A conclusion about the overall impact (positive or negative) cannot be argued unless there is a balanced comparison of impacts that can be used to justify the conclusion. The main word here is 'argue' not 'state' the conclusion, and the details would need to justify the conclusion. Too many candidates mistook a summary for an argument. Marks are awarded for a structural analysis even if other analytical links and evaluation comments are missing.

In the body of the response, candidates are expected to show evidence of consistent critical thinking by making analytical connections between impacts to show how they are related to each other; and making evaluative comments about the impacts in terms of size, the future, links to other effects, impacts on other stakeholder, duration, extent, etc. For example, a candidate could make an **explicit analytical** link between the benefits for the learner from obtaining a qualification from a MOOC, and **at the same time, explain the link** to the negative that the qualification may not be recognised by employers. An **evaluative comment** would be that this could be a reason why the completion rate is low. Often these two impacts were placed near each other but the link between them was not included explicitly.

As was mentioned above a concern was the number of candidates who identified impacts but did not provide details describing the impact. Also, lists of impacts were common ranging from identifications of issues and concerns to detailed descriptions. But these alone limited the marks to the lower end of the mark range as an analysis and evaluation of the impacts is required for entry to the higher mark bands.

Question 4 (Criterion D)

Candidates need to describe a solution to one of the problems found in Question 3 but far too often candidates did not provide a detailed description of the solution, especially technical details (who, where, when, what, how) or details of policies, laws or procedures that needed to be implemented. Textbook type solutions receive low marks if not connected to the article, e.g. a description of encryption or security measure such as passwords and biometrics.

Sometimes the problem was generic and lacked details connected to the Article which made the candidates task of explaining how the solution solved the problem difficult.

Candidates were asked to identify the problem before providing a solution. All candidates filled in this section which provided a focus for the response. As usual a number of candidates included more than one solution and effectively self-penalized. Only the first solution will be marked. Fortunately, very few candidates provided a problem that was not mentioned in Question 3.

In the second half of the response the candidates need to provide a balanced set of further positive and negative evaluations of the effectiveness beyond the direct solving of the problem. These could include consequential impacts of the solution on other problems, stakeholders, long and short-term benefits, costs, etc. These need to be used in the conclusion that argues that the solution overall was effective or limited in solving the problem considering the negative impacts, or vice versa. Also, in the conclusion candidates can provide future developments that could improve the solution based on the negative evaluations provided.

Recommendations and guidance for the teaching of future candidates

The previous subject reports contained detailed suggestions for Question 3 and Question 4 which teachers and students are heeding, and candidates are becoming proficient in providing better responses for these questions. However, this Article highlighted the need to revisit the

approach teachers are taking with Question 1 and Question 2. Suggestions about how to approach these questions are contained above.

The previous markschemes contain large amounts of material that can be used to practice Question 1 and Question 2. Also, this material could be used as a revision of the IT terminology that should be included in responses. In particular, Question 2a needs practice, even to the stage of numbering the steps and sub-dividing the steps. Also, the candidates could practice dividing up the IT system into the steps provided by the Article and the developments BEYOND the article.

Also, considering the inconsistencies of many of the responses for Question 1 and Question 2 candidates need to return to them towards the end of the examination and remedy any potential issues. There was very little evidence of this happening.

Higher level paper three

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 – 4	5 – 8	9 – 14	15 – 17	18 – 19	20 – 22	23 - 30

General comments

The topic of the case study was clearly accessible to many of the candidates who had engaged with smart watches, either through class demonstrations, visiting guest speakers discussing how they are being used and through news articles discussing some of the issues. Candidates where possible tried to demonstrate this knowledge, but were not always prepared for or able to apply their research to the questions given. The approach to each question was generally good, however, it did appear that some candidates ran out of time in Question 4.

The areas of the programme and examination which appeared difficult for the candidates

Knowing the exact definitions and differences of copyright and patent was poorly addressed by candidates, with them either confusing the two terms or not really having a clear understanding of either of them.

Knowledge and understanding of wifi technologies. When comparing wifi with the other two methods of data transfer, this was the technology that candidates had the weakest understanding of. Many candidates did not consider this as a method of data transfer on a local area network. Candidates needed a better understanding of network technologies in relation to the context of the case study.

Candidates found it difficult to evaluate the introduction of services and how this might impact KHT and their customers, often meaning that responses were unbalanced.

The areas of the programme and examination in which candidates appeared well prepared

Candidates had clearly experienced fitness watches and were therefore readily able to identify the sorts of data that it could collect after a run.

It was also clear that candidates had studied ANT + technology and could therefore describe adequate features as part of the comparison.

The approach to Question 3 was much better than Question 4, with the more able candidates being able to make the link between the partnership with the insurance company and how this may benefit KHT as well as their customers.

Candidates were more able in evaluating the decision to improve the reliability and functions of the KHT watches.

Candidates wrote well about social issues such as anonymity and confidentiality.

The strengths and weaknesses of the candidates in the treatment of individual questions

Question 1

1a. Most candidates were able to identify two items of data. There was a wide range to choose from in the article as well as from their research, and so candidates were able to score well in this question. However, data that was not specific to being collected after a jog was not accepted.

1b. On the whole this question was poorly done. Many candidates struggled to appreciate the difference between a patent and copyright, often mixing them up.

Question 2

Most candidates were able to identify some key features to compare, whether it be speed of transfer, level of security or proximity of transfer, and structure their answers by type of connection. Many candidates considered wifi as a connection to the Internet, instead of a wireless protocol that could allow a local area network in the home or gym to connect the watch and the laptop. Many candidates were not able to compare the key features between the three methods with sufficient detail with some advantages or disadvantages being no more than generic statements. Wifi was the weakest method discussed with many candidates incorrectly discussing the Internet without an appreciation for available security methods.

Some candidates described the transmission methods instead of comparing them, although descriptions were correct, they frequently did not address the characteristics that enabled a comparison of the technologies.

Question 3

Most candidates were able to take the information from the article to form the basis of their response. With more able students developing responses. Some candidates developed arguments about the benefits to the insurance company without relating this back to KHT and the customers. Many candidates referred to privacy and anonymity, with a range of quality of response on how it was developed, and the impact this may have on both the customer and KHT. Many candidates were able to respond on how KHT would benefit from increased reputation and sales, but only few could develop responses beyond the ‘fairer insurance policies’ for the customers.

Due to the line reference in this question referring to sharing data with medical professionals and insurance companies, some candidates did write about the impact with sharing with doctors, even though the question was focusing on insurance companies.

Question 4

This question was aiming at differentiating the difference between developing the functionality and reliability of the watch vs developing customization and services. However, the reference to line numbers was confusing with many students focusing on developing the watch to be more customized and not addressing the development of services.

Some candidates gave detailed descriptions of how the options could be developed without evaluating (considering the benefits and limitations of this option). Some candidates referred to the development of the products to appeal to a range of countries, but the line numbers 100-101 were not included in this question. Candidates were able to discuss the benefits of improving reliability and functionality for the customers and the impact this would have on KHT, but gave more unbalanced responses for services. This may have been due to time constraints, being the last question on the paper. Some candidates wrote about customization of devices under services when discussing developing watches for different sports, instead of it being part of the discussion under increased functionality.

The use of independent research was often limited to giving examples of a brand of watch and their features or position in the market of fitness watches, or a visitor to school demonstrating additional features of the watch. Very few candidates gave concise reference to news articles. Candidates need to be clear on how to make an explicit reference.

Recommendations and guidance for the teaching of future candidates

Teachers and students should take further notice of the additional terminology listed at the end of the Case Study and make sure that these terms are fully understood in the time allotted for research into the scenario.

Students should revise key technical terms and ensure that they have adequate understanding about their use.

Identify stakeholders: Provide further guidance for students to identify the key stakeholder being impacted by the discussion whether it be positive or negative, with developed responses on the consequences and supporting examples.

Balance of arguments: Students should ensure that there is an adequate balance of arguments and that both positive and negative impacts are being described for more than one primary stakeholder.

More explicit Independent Research (IR): More thorough research for the case study, so that each aspect of the case study has specific examples from independent research that can be explicitly linked from a reliable source and used to support explanations. Some students have completed some IR but do not know how to deploy this in their answer to Question 4.

Relate impacts on all stakeholders back to the primary stakeholder of the question: When evaluating the proposals in Question 4, the positive impacts for customers, need to be linked to KHT, as ultimately, they are making the decision that is best for them.