Advice on answering clinical science viva questions

The clinical science viva

The format of the Final FRCA examination has remained materially unchanged since its inception in 1996, and the clinical science viva continues to test ‘the understanding of basic science to the practice of anaesthesia, intensive therapy and pain management’. The College has always included the proviso that ‘it is accepted that candidates will not have acquired a detailed knowledge of every topic during the period of recognised training’, but this has on occasion contrasted uneasily with the bitter perception of at least some candidates that they had been examined almost to destruction on scientific minutiae. This perception, against a background of muted unease about this section of the exam, has been acknowledged by the College, which has decided therefore to introduce greater clinical emphasis into the science oral. The change of emphasis is relatively subtle, because both the College and its examiners remain reluctant to dilute the rigour of what for most candidates will be the last examination in anaesthesia that they are likely to take. Nevertheless, the tenor of many of the questions has now altered so that the clinical applications of the underlying science have more prominence than hitherto. The questions continue to have two parts: the basic scientific principles and their clinical application, but many of the topics will now be introduced via a clinically orientated question that is intended to reassure you that the subject does have anaesthetic relevance. The viva, or ‘structured oral examination’, as the College prefers to call it, lasts 30 minutes, during which time you will be asked questions on four different and unrelated subjects. The time spent on each should be around 7–8 minutes.

The marking system

The marking system continues to evolve. In the past, a ‘close marking’ system has been used, which meant that instead of being given a numerical mark a candidate was awarded one of four grades, which ranged from ‘1’ to ‘2+’. A ‘1’ represented a poor fail
and ‘1’ a fail; a ‘2’ was a pass and a ‘2+’ was an outstanding pass. One of the justifications for the close marking system was that it did force examiners to make a definite choice between a pass and a fail, which a numerical marking system might otherwise allow them to avoid. A ‘1’ mark in any part of the exam meant that the candidate was judged either to be potentially dangerous or to be too ignorant of the fundamentals of anaesthetic practice to pass, even should their other marks include three ‘2+’s. A ‘2+’ represented an outstanding pass, indicative of a potential prize-winner. (The award of a prize may be considered if a candidate achieves a ‘2+’ in each of the four parts of the exam at their first attempt.) For most candidates, therefore, the ‘1’ and the ‘2+’ marks were largely theoretical: what was much more important for them was the distinction between a ‘1+’ and a ‘2’. What is now proposed is a system in which each of the four questions in the science oral will be marked independently by each examiner. Instead of receiving a single close mark, agreed by the two examiners after conferring, you will receive eight separate marks. Examiners have a choice of ‘0’ (poor fail), ‘1’ (fail) and ‘2’ (pass). This is intended to reduce bias and variability further. At the time of writing it is not exactly clear how these marks will be translated into a final grade; nor how this system will be adjusted to allow feedback to unsuccessful candidates; nor how it will identify the exceptional candidate.

You will be aware that the FRCA is a structured examination. The material on which candidates are to be tested is made available to the examiners only on each morning of the exam. The questions are changed after each session to avoid any possibility of later candidates obtaining unfair advantage. Each pair of examiners will decide between themselves which two of the four questions they are going to ask. This is broadly the extent of the choice that they are able to make because the scope of each question is limited both by the guidance answer and by the relatively short time available for each topic. The first examiner will spend 7 or 8 minutes on the first subject before changing to the second. At the first bell (after 15 minutes), the other examiner will repeat the process. The examiner who is not asking questions will usually be making detailed notes which inform the marking process. Previously, at the end of the viva, each examiner used to record an independent mark before conferring and agreeing a final mark. The system that is currently envisaged is one in which the examiners will independently assess performance in each one of the four questions. The two will no longer confer; with this practice will disappear any accusation that one examiner may exert undue pressure on the other during the marking process. Importantly, this system also means that you must not allow yourself to become demoralized should a question go particularly badly. You must leave it behind you, conscious that the four questions are unrelated and that your other answers may well redeem it. In that respect it is not unlike the short answer question paper, in which a good answer can outweigh a poor one.

**Appearance and affect**

You cannot fail the Final FRCA because of your appearance or because of poor taste in clothes, and most examiners will be able to recollect candidates whose personal presentation could at best be described as unconventional. It rarely matters. At worst, however, an unkempt or casual appearance may convey the subliminal impression that
you are unprofessional, and at the least it is likely to be a distraction. You should therefore wear something neutral and reasonably smart, which is comfortable and which you have worn before. The examination areas can be hot and there is no need to increase your stress levels further by forcing yourself into a three-piece suit or other outfit that sees the light of day only rarely.

Nor can you fail the FRCA because of inappropriate behaviour alone. Examiners are well aware of the stress that candidates are enduring, and most will make every attempt to put you at your ease. They are also likely to assume that aggressive or facile responses are a manifestation of stress and will make allowances accordingly. I have been answered with hostility: ‘For God’s sake don’t ask me that – I’ve never even thought about it’, and with fatuity: ‘I’ll probably know the answer when you tell it me.’ I have also been subject to what might be described as the Bertie Wooster approach: the candidate didn’t quite call me Jeeves but did say that ‘it blocks the 1,2 hydroxy-whatsit, oh I don’t know, you give the stuff and the atom bings off.’ I have been patronized: ‘Forgive me, but what I think that you are trying to ask is’, and have even had to resist the obvious retort to the candidate who asked: ‘Can I interest you in the concept of context-sensitive half-time?’ None of it much matters. Yet examiners can be indulgent only up to a point, and the overall impression that you are creating will not be reassuring. If an inappropriate manner is also accompanied by a weak performance then you will stand little chance of being given the benefit of the doubt. Take issue with examiners, by all means: it is stimulating for both sides to develop a considered discussion of a topic, but avoid getting into an argument because the rules of this particular enterprise are not written in your favour.

Oral questions

On average you will have about 7 minutes on the topic. Should a question have somewhat limited scope, or if your knowledge is thin, you may spend a bit less time on it, but consistency demands that the examiners divide the time more or less equally. As explained above, these vivas are structured and the examiners have no choice of question. Although it would be logical, given the avowed purpose of the clinical science oral, to subdivide the questions into anaesthesia, intensive therapy and pain management, in practice they do not fit readily into these categories. In the past, the four questions could be somewhat random: it is now usual to have one question which relates to applied anatomy, one to physiology, one to pharmacology and one to physics, clinical measurement, equipment and statistics. This classification is not absolute (topics such as jaundice or latex allergy do not fit strictly into any one of these groups), but it does indicate the broad division of the available questions. The structured nature of the exam minimizes the likelihood of an examiner being able to question you in excessive depth on a subject which happens to be an area of special interest or expertise. It also increases the likelihood of an examiner having to ask questions about a subject in which they do not even have a current generalist interest. The sub-specialty interests of examiners change as retiring examiners are replaced but, at any one time, only about 15–20% will have an interest in intensive care medicine, in paediatric anaesthesia or in neuroanaesthesia, while a much smaller number will work in chronic pain management. Thus a paediatric cardiac anaesthetist
may have to ask about adult ophthalmic applied anatomy, a neuroanaesthetist about neonatal fluid requirements, or an obstetric anaesthetist about intensive therapy ventilatory strategies. These examiners will not necessarily be ignorant on these topics, but it is certainly possible that your own clinical experience will be more recent and well informed than theirs. This should give you confidence, and you should not let the stress of the exam situation override it. Many candidates, for example, will have performed percutaneous tracheostomies in intensive care. However, unless your examiner is an intensivist, it is possible (if not probable) that he or she has performed not even one, and so your own clinical experience in this area is already much wider than his or hers. Draw confidence from this, and do not be intimidated. The examiner guidance may even be dated and say, for instance, that the approach should be through the first and second tracheal rings, whereas your own experience may reflect the increasing tendency to site the tracheostomy lower, between the second and third. So, if you do get the sense that the examiner is unhappy with your answer mainly because it does not accord with what is written on the sheet, then have the confidence to explain the current thinking. Do not be argumentative, but simply offer your considered reasoning of the issue. This is likely to increase your own credibility while perhaps denting that of the examiner. So, if you have recently seen an innovative technique used in the operating theatre, in the chronic pain clinic or in intensive care, do not be hesitant about citing it during the discussion.

The other consequence of the format of the structured oral is that it may lack fluency. It is partly a reflection of examining technique. Some examiners simply introduce the question before initiating a discussion, with only occasional reference to their paperwork. This is usually because they are familiar with the material and can allow the viva to run a more spontaneous course because they have confidence enough in their own ability to assess the answers. An examiner who is less comfortable with the topic and who is less certain of the criteria against which the answers are to be judged is likely to spend much more time referring to the answer sheet. Alternatively, of course, they might just be particularly pedantic in their interpretation of how a structured viva should be conducted. You may get a clue as to which of these you are facing by the way that they introduce the topic. The one type of examiner will try to put you more at ease by phrasing the question in a way which emphasizes the clinical context. Other examiners may simply look down at the sheet and intone ‘What is an inotrope?’ This second examiner is likely to want facts, and ideally the facts that are listed on the answer paper. He or she clearly has not realized that you are not telepathic. If, however, you have some confidence both in your knowledge and in your clinical experience, you may be able to get him or her on the defensive. Remember that such an examiner may never have initiated the use of dopexamine or enoximone, and if you sense a slight uncertainty which confirms that suspicion, then expound as freely as they will let you. Remember also that this may be the limit of the manipulation that you are able to employ, unless you can muster the bravado of the candidate who, when his examiner tried to interrupt his fluent and detailed answer, paused briefly to announce ‘No, thank you, but I wish to finish.’ The examiner, by his own confession somewhat intimidated by the intellectual onslaught, allowed the candidate to continue to the bell. That candidate passed; however, this is not a strategy for the faint-hearted.
What you may be able to do, however, is to refine your viva technique to improve the overall impression that you create. Take, for example, two imaginary candidates who have been asked about the Poiseuille–Hagen equation. The examiner initiates the questioning: ‘Does this have any clinical relevance?’ Candidate: ‘Yes’. Examiner: ‘Can you give me some examples?’ Candidate: ‘It affects fluid flow through tubes.’ Examiner: ‘In what way?’ Candidate: ‘If you increase the driving pressure, then you increase the flow’ . . . and so it goes on, with more abbreviated answers prompted by the examiner from a candidate who gives no real sense of mastery of the subject. Could it be done better? The examiner asks the same question: ‘Does this have any clinical relevance?’ Candidate: ‘The equation strictly applies only to Newtonian or ideal fluids, but in practice it still has cardiorespiratory implications. The relationship means that gas or liquid flow though a tube is inversely proportional to the length and viscosity of the fluid, and is directly proportional to the pressure gradient down the tube and, crucially, to the fourth power of its diameter.’ This candidate, in contrast, requires no prompting, but demonstrates instead an orderly and logical approach that conveys the impression of obvious understanding of the topic.

Only the occasional candidate achieves the fluency of the second example, whereas rather more candidates behave like the first and require a little help. Yet if you do have some knowledge of the subject asked, you can train yourself, with practice, to deliver the information both with more facility and more enthusiasm. This applies particularly to the clinical areas of the viva in which you can make your experience count.

You do not need to worry about trying to pace the viva. It is the responsibility of the examiners to ensure that the requisite points are covered, and the guided answer sheets from which they are working contain more information than all but the most exceptional candidate will cover in the time. The clinical science questions continue broadly to have two parts, the basic science and its clinical application. However, this is still none the less a science oral and, despite the aspiration to increase the clinical relevance, the reality remains that in many of the questions it is the basic science that will be seen as the more important. Take for example the humidification of inspired gases. The clinical benefits of humidification are obvious: inhaled dry gases inspissate secretions, affect ciliary function and may cause impaired gas exchange due to atelectasis. However, these benefits can be summarized in a sentence; a sentence moreover that does not contain concepts that are especially complex. In contrast, the physical principles of latent heat of vaporization and saturated vapour pressure (which may be introduced by the subject of humidification) are topics which may warrant more detailed discussion. Equally, the anatomy of the nerves supplying the lower abdominal wall will take much longer to discuss than the description of a field block.

The viva on each subject lasts less than 8 minutes. The examiner will take up at least 20% of this time in framing the questions. That leaves you, therefore, with only about 5 or 6 minutes during which you have to talk. Were you to read out steadily, fluently and without hesitation one of the average length answers in this book, it would probably take you twice that long. There are few candidates, moreover, who can answer viva questions as rapidly as they can read. You should find this reassuring, because it means that you cannot be expected to convey more than a proportion of the information that appears in each of the specimen questions.
Why do they have to ask these kinds of question?

When your examiner looks up with an air of benign amusement from the question paper and invites you to discuss ‘cytochrome P450’ or ‘chirality’, your initial instinct may be to leap across the table to transfix them with your free Royal College examinations pencil. Some examiners, at least, will ask these questions with at least a hint of apology, which may raise your spirits marginally as you sense that these individuals might be on your side. Other examiners alas will be completely bereft of irony.

The difference between them should be obvious, but it might be of interest, if little consolation, were you to be aware of some of the reasons why such questions can arise.

A brief history of anaesthesia’s inferiority complex

Anaesthesia had its humble origins in mid nineteenth century dentistry, and although hospital-based anaesthesia did become more sophisticated, in the early twentieth century simple general anaesthesia in the UK was still being delivered by individuals who were not only without medical qualifications but in many instances were without even a rudimentary education. In contrast, however, physicians and surgeons of that era had high social and intellectual standing that had been established for centuries. As the specialty evolved over succeeding decades it continued to enjoy only very modest status. There were, however, some politically astute individuals who recognized the potential perils of anaesthetic humility and who thought it unwise to succumb to anaesthesia’s inferiority complex. In particular they recognized the truth that anaesthetists could achieve equality of status with surgeons only if they had a qualification that was equivalent to the Fellowship of the Royal College of Surgeons, the FRCS. It was this realization which explained the early two-part exams, first the Diploma of Anaesthesia, and then the FFARCS which was the immediate forerunner of the FRCA. These examinations were modelled on the FRCS, had a low pass mark in the region of 25–30% and, by including in the syllabus detailed anatomy and pathology, established the precedent for rigour in the basic sciences.

The establishment of a difficult anaesthetic exam with a low pass rate actually played a crucial role in the development of the specialty. When you are tempted, therefore, to curse the College for erecting the hurdles of the Primary and Final FRCA, you could at least reflect that the difficulty of these examinations may in some oblique way ensure that you get paid the same as your colleagues in surgery and medicine. Anaesthesia has a reputation for having amongst the most difficult postgraduate exams and, superficial though this may sound, it does remain one of the ways in which the specialty safeguards its standing.

Did this attempt to mirror the FRCS take the process too far? At times it can certainly seem so, and you may have to console yourself with the familiar, yet no less true, observation that ‘Examinations are formidable even to the best prepared . . . for the greatest fool may ask more than the wisest man can answer.’ (Rev. Charles Colton 1780–1832). A more recent perspective was provided by a distinguished professor of
medicine and scientist from Oxford. During his valedictory speech to the faculty of medicine he commented that in 30 years of clinical medicine his intimate knowledge of the Krebs cycle had influenced his management ‘of not one single patient’. Medicine is as often pragmatic and empirical as it is intellectual. Some, but not all, examiners agree with that view, and do not accept that a detailed knowledge of scientific minutiae is necessary for the safe and effective practice of clinical anaesthesia. It may be obvious at your viva into which category the examiner falls.

**Strategies for answering clinical science questions**

**Anatomy**

Some candidates demonstrate a very detailed knowledge of areas of human anatomy, which allows them to embark on a thorough description of all the relevant structures and their immediate relations. Others have a more modest working knowledge and there is a final group which includes candidates who are able to demonstrate that they have only a very vague idea of where these structures lie. You will know as soon as the question is asked of you which of these types you most closely match. One obvious strategy for passing questions on applied anatomy is just to learn it, or at least develop enough confidence to be able to launch into a rapid account of the area in question. The speed of delivery is of some importance. Not every examiner will be able to recall the precise anatomical details that are found in the questions in this book. This means that they will probably have to make repeated reference to their answer sheet to check that what you are saying is true. Yet if they were to ask you to clarify more than one or two of your descriptions then too much of the time in the viva would be lost. There is a tendency, therefore, for the examiner to listen to what you are saying, rather than making frequent interruptions. At the end of your account he or she may simply judge their overall impression of its accuracy. Confident presentation may, in this instance, allow you to mask some gaps in your knowledge.

What if you are the candidate whose recollection of an area is vague? Your chances of success in the question will depend on whether it is what could be termed ‘theoretical anatomy’ or ‘practical anatomy’. The coronary arterial and venous circulation is an example of theoretical anatomy. Certainly it is important, and of course it is true that anaesthesia may influence it, but it remains a visual construct which is neither seen nor felt. One tactic, which may salvage something from this part of the viva, is to move swiftly to the functional anatomy of the circulation. ‘The main importance for anaesthetists of the right and left coronary circulations’, you could state airily, ‘lies in the way that we can influence oxygen supply and demand.’ The examiner will take you back to check that you are indeed ignorant of the anatomy, but you will at least have initiated the physiological discussion which is the clinical part of the question and which, in any case, is generally of greater interest to both candidates and examiners alike. Other examples of theoretical anatomy are the cerebral circulation and the blood supply to the spinal cord.

Questions on ‘practical anatomy’ should be rather easier to handle because they relate to areas such as the internal jugular vein and the brachial plexus, detailed knowledge of which is of direct and self-evident importance. You can also reinforce this...
knowledge by disciplining yourself to visualize the relevant structures each time that you perform or observe a procedure relating to such an area. If you rehearse in your mind the nerves that are being blocked for an awake carotid endarterectomy as you see it being done, or describe the anatomy of the sacrum to a less experienced colleague to whom you are teaching a caudal block, it will not be long before the details are secure in your mind without recourse to yet more evening study. In other words, you can revise for the Final FRCA during the course of your daily work. This does not of course apply only to anatomy, but is true of other areas of the examination as well.

The examiner may ask you if you have performed a particular procedure, or may even give you a question that allows you to discuss, for example, an upper or lower limb block of your choosing. In respect of practical procedures that you claim to have undertaken, you should be aware that the threshold for a pass shifts sharply upwards. If you say that you regularly perform caudal blocks in children or interscalene blocks in adults, but then go on to reveal that your knowledge either of the anatomy or of the appropriate drug doses is at best hazy, then you will fail the viva badly. In examination anaesthesia, as in real life anaesthesia, whenever you are in any doubt you should choose the safest option. Better in both situations to admit that you have done very few caudal or interscalene blocks and that you would seek experienced help.

Finally, anatomy questions do lend themselves readily to diagrammatic answers. Many candidates seem to benefit from being allowed to describe the anatomy while they draw; producing the diagram acts as a stimulus to recollection. It is worth practising this technique because the number of anatomy topics is relatively small and it is almost certain that one of them will appear as a question.

Physiology

Anatomy, pharmacology and physics are all large scientific disciplines, yet in the context of the Final FRCA their scope is restricted, and the areas of specific relevance to anaesthetic practice are finite. Physiology, in contrast, is very wide-ranging, and questions appear which are related to all the systems, including renal, gastrointestinal and endocrine.

When the oral was marked as a whole entity it was almost inevitable that examiners would give more weight to core topics related to respiratory and cardiac physiology. The change in the marking system is probably intended to mean that this is no longer the case, with topics such as ‘plasma proteins’ and ‘thyroid hormones’ ranked equally with ‘oxygen delivery’ and ‘pulmonary oedema’. However, it is likely that examiners will mark less stringently those subjects which they do not regard as central. You may need to do less, in other words, to pass a question on gut hormones than on assessment of cardiac function. So, as before, what this means in practice is that your grasp of core areas needs to be more secure than your knowledge of more peripheral aspects of physiology. It is not that you will not get asked a question on the latter, but that you will disadvantage yourself much more by ignorance of the former.

Pharmacology

The number of core anaesthetic drugs is limited. The sum of the regularly used induction agents, neuromuscular blockers, volatiles, analgesic drugs and local anaesthetics exceeds barely 20. The pharmacology of these substances is almost by
definition applied science, and so you will find examiners much less forgiving of deficiencies in anaesthetic pharmacological knowledge than they would be of ignorance of lasers or medical statistics. You may feel somewhat aggrieved if the viva concentrates on GABA and NMDA receptor theory, but you should recognize that there is only so far that such a topic can be pursued, and you should be able to acknowledge finally that questioning about the scientific foundation of your everyday anaesthetic practice is a legitimate area of enquiry. Given the restricted numbers of drugs, however, it should not be an insuperable task to acquire the necessary amount of information. Some of the questions can be straightforward and lend themselves readily to a structured answer that you can adapt across the range of anaesthetic drugs. One such question, for instance, may ask you to enumerate the properties of an ideal volatile agent, and to compare desflurane and sevoflurane against that ideal. You will see that this same question could be asked of local anaesthetics, neuromuscular blockers, inotropes, anti-emetics and any number of classes of agents. You will also need to have some understanding of subjects such as pharmacokinetics and receptor theory. Other areas of relevance to anaesthetists are the non-anaesthetic drugs that patients may commonly take. The potential list is quite long and includes anti-hypertensive agents, drugs to treat asthma, drugs to treat diabetes and drugs which affect mood. Much of the knowledge that you may have acquired in working for the Primary FRCA will stand you in good stead for the Final. One final piece of advice: if you are asked the dose of a drug and you are unsure, then do not guess. Both in anaesthetic exams and in anaesthetic practice it is safer by far to admit that you would look it up.

Clinical measurement and equipment

You might have hoped to have left much of the physics and clinical measurement behind, but as also applies to pharmacology questions, much of the knowledge that you may have acquired in working for the Primary FRCA will be helpful for the Final. Some Final examiners are mesmerized by the physics involved in some of the questions that appear: others are less beguiled. If you are examined by one of the former group then expect to be asked to define, for example, the SI units that are appropriate to the particular question, and try not to worry if you get so immersed in the science that you only touch briefly on its clinical application. This is less likely than once it was now that there is an explicit emphasis on the clinical applications. At the other extreme lies the examiner who takes the view that complex anaesthetic devices are essentially black boxes whose inner workings can safely be left a mystery. In this case the viva will follow a rather different course, and it is probable that the emphasis will be more on clinical uses and on sources of error in interpretation of the information that is delivered. You will still need, therefore, to be prepared for both. Yet even those examiners who have considerable enthusiasm for this subject will recognize that there is a limit to how far it can reasonably be taken. The detailed physics underlying magnetic resonance imaging, for example, is too formidable to be covered in an oral such as this. If you can articulate the basic principles of the topic, whether it be magnetic resonance scanning or lasers, and if you can demonstrate that you are aware of its clinical and safety implications, then in most cases that should be enough to ensure you a pass.
Statistics
There are doctors who have an intuitive gift for statistics, which is a subject that they find very straightforward. Included amongst such doctors are some examiners and some candidates, and they do not therefore understand the collective groan that goes up when the prospect emerges either of having to ask or to answer a question on medical statistics. The fact remains, however, that the topic is unpopular with the majority of anaesthetists. Yet paradoxically this may be of some benefit to those who are uncomfortable with the concepts. Most examiners are conditioned by their own experience of asking about statistics to expect less than brilliant answers. What this means in practice is twofold. First, that the questions are not especially demanding and, second, that as long as you are able to enunciate some basic principles and definitions then you are more likely to get a bare pass than you would were you to offer the same level of information about, say, the anatomy of the epidural space. So as a minimum make sure, for example, that you know the difference between parametric and non-parametric data and tests, between paired and unpaired $t$-tests, about degrees of freedom and about the null hypothesis. Be prepared to discuss briefly the principles which underlie meta-analysis and be familiar with the results of at least one meta-analysis which is of clinical importance. Questions on statistics are unlikely now to stand alone but may be linked to subjects such as the design of clinical trials.

And finally: information, understanding and ‘buzz words’

It is only a few years since one particularly ferocious examiner, having encountered some hapless candidate or other, argued that no one should be allowed to pass the FRCA if they did not know the structure of ether. Although she said ‘structure’ it is likely that she really meant ‘formula’ (which as it happens is CH$_3$–CH$_2$–O–CH$_2$–CH$_3$). Either way the proposition is absurd. Yet it does raise interesting issues in relation to postgraduate examinations. What is their primary purpose? What are they actually for?

Some have argued that, in addition to providing a test of knowledge and a core syllabus, examinations also act as an incentive to learn, and perhaps less urgently, as an incentive to teach. They are used as a hurdle to promotion, and success indicates to colleagues that a standard of training has been achieved. This may also offer a measure of reassurance to an increasingly suspicious public, particularly if the examination is perceived as conferring a title of distinction.

Only two of these functions are of immediate relevance to you. The first is the suggestion that the possession of the diploma of FRCA is a title of distinction. That may sound somewhat grandiose, but in fact it is in everyone’s interest that it should be such. The diploma should not be easily won: it should feel like an exam that is difficult to pass yet one that is worth passing. Were it not so, then examiners and candidates alike would rapidly become demotivated and the standing of the specialty would slide. This thought may offer some solace as you lose many months of your life to the book work that is necessary. The second relevant factor is the exam’s function as a test of knowledge. It is relatively simple to test for information, harder to assess understanding, and more difficult still to provide an objective test of judgement. So as a particular exam evolves,